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UNITED NATIONS

**Report of the Commission of Enquiry
on the Coca Leaf**

May 1950

ECONOMIC AND SOCIAL COUNCIL

OFFICIAL RECORDS

FIFTH YEAR: TWELFTH SESSION

SPECIAL SUPPLEMENT No. 1

LAKE SUCCESS, NEW YORK

July 1950

HW
JC 10/8/96
#2156

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Bolivia
Coca
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History

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LETTER OF TRANSMITTAL

11 September 1950

Sir,

With reference to my letter of 17 January 1950 addressed to the President of the Economic and Social Council (document 7/1612), I have the honour to transmit to you, for submission to the Commission on Narcotic Drugs, the attached report of the Commission of Enquiry on the Coca Leaf, prepared in accordance with the Commission's terms of reference as laid down by the Council (resolutions 159 (VII) IV, 202 (VIII) and 246 H (IX)).

I take this opportunity to express the gratitude of the Commission of Enquiry on the Coca Leaf to the Governments of Peru and Bolivia for the co-operation and hospitality received from them at all times in the discharge of its mission. Thanks are also due to the Secretary-General of the United Nations for the assistance rendered by the members of the Secretariat who accompanied the Commission of Enquiry.

Please accept, Sir, the assurances of my high consideration.

(Signed) H. B. FONDA
*Chairman of the Commission
of Enquiry*

Mr. Stane KRASOVEC
*Chairman of the Commission
on Narcotic Drugs*

Part One

GENERAL AND GEOGRAPHICAL CONSIDERATIONS

Chapter I

HISTORY OF THE COMMISSION

On 22 April 1947, the permanent representative of Peru to the United Nations transmitted to the Secretary-General the following communication:

"I have the honour to enclose herewith a recommendation which my Government wishes to be included in the agenda of the forthcoming session of the Narcotics Commission of the Economic and Social Council.

(Signed) "Carlos HOLGUÍN DE LAVALLE
Permanent Representative of Peru
to the United Nations

"Draft recommendation presented to the Commission on Narcotic Drugs by the representative of Peru to the Economic and Social Council

"The Economic and Social Council,

"Considering

"(1) That the alkaloid known as cocaine is obtained from the coca which is widely grown in the valleys of South America,

"(2) That since time immemorial the indigenous population of this part of the American Continent, especially along the Andean region of its West Coast, has indulged in the habit of chewing coca leaves, and

"(3) That there is a large and highly controversial dispute as to the harmful or harmless effects of this habit upon the biological, social and economic activities of this very vital segment of the South American population,

"Recommends

"(1) To organize a committee or study group of experts in order to carry a field survey, in co-operation with the World Health Organization, thus to determine:

"(a) The harmful or harmless effects of the coca-leaf chewing habit upon the human body in general or upon some specific organ in particular;

"(b) The factors or motives (i.e., climate, high altitude, diet, organic reserves, heredity, tradition, etc.) which prompt this chewing habit; and

"(c) The social and economic implications of this aforesaid habit; and

"(d) The measures to be taken, should this habit prove to be harmful, in order to eradicate it from the population concerned.

"7 March 1947"

At its second session (24 July to 8 August 1947) the Commission on Narcotic Drugs considered with care the request by the Government of Peru and recommended to the Economic and Social Council that a

commission of inquiry be sent to Peru and such others of the countries concerned as might give their approval. At the same time, the Commission was of the opinion that it would be advisable to make, in addition, an inquiry on the spot into the possibilities of limiting the production and regulating the distribution of coca leaves. It was recommended that the membership of the commission should include two medical men and two administrative experts (E/575 and addenda 1 and 2, pages 16-19).

At its second session the General Assembly, taking note of the resolution of the Commission on Narcotic Drugs, expressed its interest in this important subject. It invited the Economic and Social Council, without prejudgement, to consider the matter with all the urgency which it deserved (resolution 134 (II) of 17 November 1947).

During its sixth session the Economic and Social Council, having taken note of the above resolution, approved in principle the dispatch of the Commission of Enquiry to Peru. It further requested the Secretary-General to submit to the Council at its next session a detailed plan for such a Commission, taking into account any request which might be received from other countries concerned (resolution 123 C (VI) of 2 March 1948).

In pursuance of resolution 123 C (VI), the Secretary-General submitted to the Economic and Social Council at its seventh session a detailed plan concerning:

(1) The terms of reference of the Commission of Enquiry;

(2) Its membership and appointment of members;

(3) Its itinerary; and

(4) Financial estimates of expenditure to be incurred.

In accordance with the proposal made by the Commission on Narcotic Drugs, the two medical members would be chosen by the Economic and Social Council from names submitted by the World Health Organization at the request of the Secretary-General. It was also suggested that names of three experts in international administration might be submitted by the Bureau of the Commission on Narcotic Drugs. The Council could then make the final appointments at its eighth session. On the basis of a two months' mission to Peru, the costs were estimated at \$35,000, a figure which would have to be revised if any further request were received from the Government of another country concerned (E/860). On 10 August 1948, the Economic and Social Council adopted resolution 159 (VII) IV, which reads as follows:

"The Economic and Social Council,

"Having taken note of the resolution adopted by the General Assembly on 17 November 1947 concerning the problem of the coca leaf, and of the "Detailed Plan" submitted by the Secretary-General,

"Approves the despatch of a commission of enquiry to Peru at the earliest possible date to investigate the effects of chewing the coca leaf and the possibilities of limiting its production and controlling its distribution; and

"Recommends that the General Assembly appropriate the necessary funds for the Commission of Enquiry."

The General Assembly at its third session made an appropriation of \$17,000 for the Commission.

During its eighth session (7 February to 18 March 1949) the Economic and Social Council referred to its Social Committee the question of the "appointment of members of the Commission of Enquiry into the effects of chewing the coca leaf". The Social Committee had before it the "Detailed Plan" (E/860) and also a note by the Secretary-General communicating the names of candidates proposed by the World Health Organization on 19 January 1949. As regards the experts on international administration, it was stated that the Bureau of the Commission on Narcotic Drugs, having examined the situation, agreed that it would be preferable for the Commission on Narcotic Drugs itself to draw up a list of candidates from names to be suggested by its members. Accordingly, the Secretary-General asked the members of the Commission on Narcotic Drugs to communicate to him the names of suitable candidates before 20 April 1949, so that the Commission would be able to select the non-medical members during its fourth session in May. In these circumstances the Secretary-General proposed in document E/1124 that the Council should defer further consideration of this matter until its ninth session.

At its meeting on 2 March 1949 the Economic and Social Council examined the report of the Social Committee. The Peruvian representative stressed the international character of the problem under discussion and pointed out that a time limit of one month for the Commission of Enquiry to make its investigation on the spot was insufficient. The Economic and Social Council thereupon approved a resolution (202 (VIII)) requesting the Commission on Narcotic Drugs to select during its fourth session, for membership of the Commission of Enquiry into the Effects of Chewing the Coca Leaf, a team of two experts in the international administration and control of narcotic drugs, and a team of two medical experts to be chosen after consultation with the World Health Organization from the list of candidates already proposed by that organization.

On 20 April 1949 the Secretary-General received the following request from the Government of Bolivia:

"SC-41/49

"19 April 1949

"The Permanent Representative of Bolivia to the United Nations presents his compliments to the Secretary-General of the United Nations and kindly requests, in behalf of his Government, that the Commission created to study the matter of chewing the coca leaf, which is leaving for Peru during next June, would extend its investigations in the Bolivian country."

On 5 May 1949, the Secretary-General informed the permanent representative that his request would be transmitted to the Commission on Narcotic Drugs during its fourth session and to the Economic and Social Council during its ninth session and drew his attention to the fact that it was not foreseen that the Commission of Enquiry would leave for Peru before September 1949.

This request was duly considered by the Commission on Narcotic Drugs in June 1949, when the Commission decided that it would be desirable for the Commission of Enquiry to visit Bolivia as well as Peru, and made a strong recommendation to the Economic and Social Council that it should be given the financial means to enable it to spend enough time in each country to make a thorough study of the problems confronting it.

In accordance with resolution 202 (VIII) of the Economic and Social Council of 2 March 1949, the Commission on Narcotic Drugs designated the following as members of the Commission of Enquiry on the Coca Leaf:

As the team of two experts in administrative questions and international control of narcotics:

Mr. Howard B. FONDA (United States of America). Senior vice-president and director of Burroughs Wellcome and Co., Incorporated; vice-president and director of the American Pharmaceutical Manufacturers Association; director of the Wellcome Foundation, Incorporated; director of the National Vitamin Foundation, Incorporated; director of the First National Bank and Trust Company of Tuckahoe, New York; director of the Yonkers Chamber of Commerce, New York; treasurer of the Industrial Association of the Nation.

Mr. Jean-Philippe RAZET (France). Chief Inspector of the Ministry of Agriculture of France; director of the Narcotics Bureau of France for the last twenty years; author of the regulations governing the application in France of the five narcotics conventions; technical adviser in all the sessions of the Opium Commission and in three Opium Conferences of the League of Nations.

As the team of two experts on medical questions:

Professor Frederic VERZAR (Hungarian nationality). Doctor of Medicine; former Privat-Dozent at Budapest University; Professor of Physiology, former Rector and Dean of the Medical Faculty of Debreczen University (Hungary); at present: Professor of Physiology and Director of the Physiological Institute, University of Basle (Switzerland); former Dean of the Medical Faculty, Basle; President of the Swiss Physiological Society; member of the Académie and foreign member of various scientific societies, etc.; member of SAC of Nutrition of the Food and Agriculture Organization; acting director of the Nutrition Division, FAO, 1948; author of numerous scientific publications.

Dr. Marcel Alfred GRANIER-DOYEUX (Venezuela). Professor of Pharmacology at the Central University of Venezuela; permanent member and rapporteur of the Board for the Revision of Pharmaceutical Specialties, Ministry of Health and Social Assistance; member of the Society of Natural Sciences of Venezuela and of the Medical College of Venezuela, Caracas Station; member of the National Academy of Medicine; member of the Academy of Physical, Mathematical and

Natural Sciences; delegate of Venezuela to the XIIth Pan-American Health Conference; research fellow, Department of Pharmacology and Toxicology, Yale University, United States of America, 1941-1943.

On 12 July 1949, the Social Committee of the Economic and Social Council considered the question of the duration and the expenses occasioned by the task of the Commission of Enquiry in the light of the financial estimate prepared by the Secretary-General (E/1361/Add.1, section 1), which showed that the total cost involved would be \$44,000. After making slight changes in the drafting of the resolution proposed by the Commission on Narcotic Drugs, the Committee decided to recommend its adoption by the Council. However, the Secretary-General had doubts as to his power to appropriate the additional \$27,000 which such action would render necessary, and on 23 July 1949 informed the Council (E/1442) that the Advisory Committee on Administrative and Budgetary Questions had agreed with him that neither it nor the Secretary-General had the power to increase a specific appropriation which the General Assembly had reduced. The Council, therefore, adopted an amended form of the resolution recommended by its Social Committee (resolution 246 H (IX)) which reads as follows:

"The Economic and Social Council,

"Having noted that the Commission on Narcotic Drugs elected, during its fourth session, in implementation of resolution 202 (VIII), the following experts to membership of the Commission of Enquiry on the Coca Leaf:

*"Professor D. Granier-Doyeux Mr. H. B. Fonda
"Professor F. Verzar Mr. Razet*

"Having been advised by the Commission on Narcotic Drugs that the Commission of Enquiry should be given adequate time to perform its tasks satisfactorily, and that the funds so far appropriated by the General Assembly for the investigation in Peru were insufficient to allow a thorough enquiry to be conducted in that country,

"Having noted also that the request of the Government of Bolivia for the Commission of Enquiry to extend its investigations to that country was transmitted to the Secretary-General after the General Assembly had made the aforementioned budgetary appropriations,

"Having been informed that the Secretary-General and the Advisory Committee on Administrative and Budgetary Questions of the General Assembly are of the opinion that only the General Assembly is competent to appropriate the additional funds necessary to enable the Commission of Enquiry to remain longer in Peru and to extend its investigations to Bolivia also,

"Decides:

"1. To record its satisfaction at the declarations made to the Commission on Narcotic Drugs by the representatives of Bolivia and Peru of the willingness of the Governments of these two States to grant to the Commission of Enquiry all assistance and facilities for the successful performance of its mission;

"2. To request the members of the Commission of Enquiry to start work in Peru not later than during the second week of September 1949;

"3. To endorse the opinion of the Commission on Narcotic Drugs that the means should be given to the Commission of Enquiry to extend its investigations to Bolivia and to carry out its tasks satisfactorily; and accordingly

"4. To request the General Assembly to appropriate before 30 September 1949 the additional funds necessary to enable the Commission of Enquiry, with the terms of reference given in resolution 159 (VII) IV, to spend at least three months in Bolivia and Peru and to prepare a report on its work after the conclusion of its investigations in the field."

At its 185th meeting, held on 23 September 1949, the Fifth Committee of the General Assembly decided to approve the Secretary-General's recommendation to authorize the use of surpluses from appropriations made under the 1949 budget to increase the sum appropriated for the Commission of Enquiry by \$27,000 and thereby enable the Commission to extend its investigations to Bolivia and to carry out its tasks in accordance with the terms of resolution 246 H (IX) of the Economic and Social Council, and recommended that the General Assembly approve these supplementary credits.

On 20 October 1949 the General Assembly gave its approval to these proposals of the Fifth Committee.

On 8 September 1949 the Commission held its first meeting at Lake Success and elected Mr. Howard B. Fonda as its Chairman. Mr. Jean-Philippe Razet was later elected the Commission's Vice-Chairman.

The Secretary-General of the United Nations appointed the following persons to serve as the Commission's secretariat:

Mr. Vladimir Pastuhov, Chief of Section, Narcotics Division: Principal Secretary;

Mr. Manuel López-Rey, Chief of Section, Narcotics Division: Assistant Principal Secretary;

Miss Grace Bocquet: responsible for administrative and financial questions;

Mme Lucie Rodríguez Orgaz: secretary and interpreter;

Mr. Jacques Bordaz: secretary.

The Commission left New York with its secretariat on 10 September and arrived at Lima on 11 September. It devoted the period from 12 to 20 September 1949 to establishing liaison with the Peruvian authorities, making connexions with the persons and organizations in Lima interested in the question of the coca leaf, and assembling the information and documents available in the country's administrative centre. The Commission then proceeded to the interior of the country, following a programme prepared in consultation with the Peruvian authorities, in order to visit centres of coca-leaf production and consumption. For this purpose the Commission used rail or air routes, as convenient, in order to gather promptly the fullest possible impression of the situation. From 22 September to 16 October the Commission visited the area of Arequipa, Puno, Cuzco and the Quillabamba valley in southern Peru. It then returned to Lima to resume its contacts there and left again on 20 October to visit the producing and consuming areas of Tingo María, Huánuco, Cerro de Pasco and Oroya in eastern Peru. It returned to Lima

on 26 October and on 1 November left by air for La Paz. In this city, the seat of the Government of Bolivia, the Commission made contacts similar to those established in the capital of Peru, and, as previously, proceeded to the interior of Bolivia, following an itinerary drawn up in agreement with the Bolivian authorities. On 8 November the Commission visited the Indian communities of the Altiplano. From 9 to 12 November it visited the producing areas of Coroico, Coripata and Chulumani. After spending 13 and 14 November at La Paz, a section of the Commission left for the Cochabamba area and another visited the mining district of

Catavi in the Department of Oruro. On 19 November the Commission returned to La Paz, then left for Lima on 22 November and concluded its programme of visits to the interior of Peru by travelling to the Trujillo and Cajamarca areas in the north.

On 4 December the Commission returned to New York and began the drafting of its report which was completed in May 1950.

A detailed itinerary of the Commission's movements is given in annex III.

Chapter II

METHODS OF WORK

Mindful of the instructions of the Economic and Social Council, and with a view to concluding its local inquiries as efficiently and speedily as possible, the Commission adopted the methods of work described below, both in Peru and in Bolivia.

CONTACTS WITH CENTRAL AUTHORITIES IN PERU AND BOLIVIA

Immediately on its arrival at Lima the Commission entered into official contact through the Ministry of Foreign Affairs with the central Peruvian authorities. After visiting the Minister of Foreign Affairs, the Minister of Public Health, the Minister of Justice and the Minister of the Interior, the Commission and its secretariat consulted on particular points of interest for its inquiries with the higher officials of the above-mentioned Ministries and of the Ministry of Finance and Agriculture. In addition to these consultations, the Commission applied to the competent authorities for statistical and other data more readily obtainable in the country's administrative centre.

In Bolivia the Commission, after establishing official contacts through the Ministry of Foreign Affairs with the Bolivian authorities, held consultations with the Minister of Foreign Affairs, the Under-Secretary of State for Foreign Affairs, the Minister of Finance, the Minister of Economic Affairs, the Minister of Public Education, the Minister of Agriculture and the Minister of Public Health. As in Peru, these consultations were followed by conferences with the higher officials of the above-mentioned Ministries, who were asked to furnish information material similar to that requested of the Peruvian authorities at Lima.

APPOINTMENT OF OFFICIALS RESPONSIBLE FOR LIAISON BETWEEN THE GOVERNMENTS CONCERNED AND THE COMMISSION

In order to facilitate its negotiations with both the central and the local authorities, the Commission requested the Governments of Peru and Bolivia each to appoint a government official as liaison officer for that purpose. The Government of Peru appointed Dr. Carlos Avalos, Chief of the Narcotics Department of the Ministry of Public Health and Social Welfare, representative of Peru to the United Nations Commission on Narcotic Drugs, member of the National Executive Council against Illicit Traffic in Narcotic Drugs and representative of the Ministry of Public Health on the State Coca Monopoly. The Government of Bolivia appointed Dr. Alfredo Quiroga, Director of the Nutrition Department of the Ministry of Public Health.

The appointment of liaison officers proved to be highly useful, and the Commission cannot too greatly emphasize how efficiently these officers cooperated with it.

CONTACTS WITH LOCAL CIVIL AUTHORITIES

The Commission had requested the central authorities of Peru and Bolivia to take the necessary steps so that it might enter into relations with the authorities of the areas to be visited.

These measures having accordingly been taken, the Commission was able in the course of its movements to obtain the full co-operation of the prefects, deputy prefects, mayors, and municipal and police authorities. Similar facilities were extended to enable the Commission to approach the local authorities representing the Ministries chiefly concerned; in Peru, these included the representatives of the Ministry of Public Health and Social Welfare, the Ministry of Finance (and more particularly this Ministry's Deposit and Trust Fund), the Ministry of Agriculture and the Ministry of Education; and, in Bolivia, officials of the Ministry of Public Health, the Ministry of Labour and Social Welfare, the Ministry of Agriculture, the Ministry of Finance and the Coca Excises, and the Ministry of Economic Affairs. In addition, the Commission made contact whenever necessary with officials not included in the above categories.

CONTACTS WITH THE MILITARY AUTHORITIES

Both in Peru and in Bolivia the military authorities lent their assistance to the Commission in its inquiries. The regional commandants and their staffs placed themselves at the Commission's disposal for any information required; the military medical officers in both countries deserve special mention.

CONTACTS WITH THE MEDICAL PROFESSION, PHARMACISTS AND ACADEMIC CIRCLES

In all the localities visited by the Commission the members of its medical section, sometimes joined by one or two members of its economic and social section, held conversations with local medical practitioners. In university towns the Commission did not fail to use the good offices of faculty members. The talks with representatives of local pharmacists were frequently found useful.

CONTACTS WITH EMPLOYERS AND WORKERS

Whenever possible the Commission endeavoured to make contact with existing agricultural, industrial and other employers' or workers' organizations. Particular reference should be made to the contacts established with coca-leaf producers and, in Bolivia, the Society of Landowners of the Yungas area, and with representatives of the mining companies and of workers' trade unions both in Peru and Bolivia.

CONTACTS WITH RELIGIOUS AUTHORITIES AND MISSIONARIES

In a number of localities the Commission interviewed representatives of the religious authorities and members of Catholic and Protestant missions.

CONTACTS WITH REPRESENTATIVES OF PUBLIC OPINION INTERESTED IN THE COCA-LEAF PROBLEM

Anxious to obtain as comprehensive a picture as possible of the currents of public opinion on the coca-leaf problem, the Commission was eager to establish contact not only with the medical and scientific circles mentioned above, but also with the Press and all organizations or persons interested in this problem. A number of Press releases on the Commission's work were issued. Interviews were given to journalists. Conferences were held with engineers, agronomists, jurists, politicians and other persons interested in the problem.

NATIONAL COMMISSIONS

The Governments of Peru and of Bolivia have each set up a National Coca Leaf Commission. It was part of the duty of these Commissions, which are responsible for studying the coca-leaf problem on a national scale, to co-operate with the United Nations Commission of Enquiry.

Both in Peru and Bolivia the United Nations Commission held a number of joint meetings with these National Commissions, which are composed of prominent persons, and furnished information highly valuable for the Commission's work. The membership of the two National Commissions is shown in annex IV to the present report.

CONFERENCES

In each of the principal localities visited in the interior of Peru and of Bolivia the Commission, in order to obtain most promptly the greatest possible variety of views on the coca-leaf problem, held conferences at

which the local prefect, deputy prefect or mayor usually presided. These conferences were usually attended by the members of the Commission and its secretariat, the principal civil and military officials, representatives of the medical profession, of the civil, military and police authorities, the Civil Guard, producers, merchant manufacturers, engineers, agronomists, journalists, workers and others. Conferences of this kind were held in Peru at Arequipa, Puno, three at Cuzco Quillabamba, Tingo María, Huánuco, Cerro de Pasco, Trujillo and Cajamarca; and in Bolivia, Acha-Cachi, Huazata Coroico, Chulumani Cochabamba and Catavi.

At Huánuco, for example, the meeting was convened by the local prefect and mayor, who published a notice in the local *Official Gazette* inviting all persons interested in the problem to attend the conference. The conferences, the Commission believes, did a great deal to provide valuable information and enable the Commission to hear expressions of public opinion on the coca-leaf problem.

DOCUMENTATION

The Commission endeavoured to assemble as much written information as possible on the coca-leaf problem, both by applying to central or local authorities, mentioned above, for statistics and documents, and by asking the National Commissions, or organizations or private persons, to submit written reports on the question.

In addition to these written data, the Commission also made observations on the spot. It visited laboratories, hospitals, schools, missions, prisons, agricultural stations and farms, factories, mines, mining camps and co-operatives. In the course of its travels the Commission was able to observe living and housing conditions in widely separated regions. The Commission ascribes great importance to this part of its work, since it was able in this way to compare its field observations with the written data and the literature on the coca leaf.

INTERNATIONAL SYMPOSIUM ON ALTITUDE BIOLOGY

This congress was held under the auspices of the United Nations Educational, Scientific and Cultural Organization at Lima from 23 to 30 November 1946 and was attended by representatives of a number of countries who are specialists in the study of the biological problems connected with altitude. The experts of the Commission's medical section were invited to attend the meetings, and were thus enabled to obtain information connected with its own terms of reference.

Chapter III

ENVIRONMENT

No study can be made of the sections of the population in Peru and Bolivia which chew the coca leaf without specific reference to the various groups constituting the population of those countries. These groups are ordinarily designated "white", *mestizo*, and "Indian". This terminology was officially adopted for the preparation of the National Census of Peru in 1940¹ and is frequently used in various publications and official documents issued in Bolivia. Each of these terms refers to a social group, the outlines and boundaries of which are in process of constant modification and transformation by social, economic and cultural forces.

As the Commission of Enquiry on the Coca Leaf observed, almost all coca-leaf chewers are "Indians", though this does not mean that all Indians are coca-leaf chewers. Moreover, the term "Indian" is not a sharply defined one. The distinction between "Indian" and *mestizo* is normally based on cultural, social, economic and linguistic considerations. Frequently a more habitual or skilful use of Spanish in daily life has been considered an important criterion. This must be treated with some reserve, since in some cases Indians are completely bilingual, and speak both Spanish and one of the two native tongues (Aymara or Quichua) without thereby ceasing to be Indians. In other cases a person considered as a *mestizo* speaks one of the native tongues well and Spanish badly.

The second Inter-American Indigenist Congress (Cuzco, Peru, June-July 1949) defined the Indians as the descendants of the pre-Colombian peoples having a common social consciousness, based on their work, their language and their traditions, though all of these may have undergone modifications.² It will be seen that this definition also, while it includes anthropological elements, is based on social, economic and linguistic considerations.

Nor can coca-leaf chewing be considered as a characteristic differentiating these various groups, since, as has already been observed, not all Indians are coca-leaf chewers, though the great majority are. Moreover, chewing is practised among the *mestizos*, although to a much smaller extent. The very few whites who chew a coca leaf must be regarded as isolated cases, and not as a social problem.

To sum up, the words "Indian", *mestizos* and "white" in this document should be considered as relative terms, and when used in connexion with statistical data. And for more than four centuries of miscegenation in Peru and Bolivia, any purely biological definition of these groups could be accepted only in certain cases.

Since almost all coca-leaf chewers are members of the Indian population of Peru and Bolivia, which constitutes a large part of the population of these countries, it would appear desirable to devote some attention, however brief, to the social and economic conditions of this population.

The indigenous population of both countries consists essentially of two ethnic groups, the Quichuas and the Aymaras, which, while they have certain differences, also exhibit a number of common characteristics due to their similar historical background. Together these two groups made up the vanished empire of the Incas; they lived through the colonial epoch, and at present constitute an essential element in the economic and social life of both countries.

Both in Peru and in Bolivia the Aymaras and Quichuas live in somewhat ill-defined regions incapable of precise demarcation. However, Indians, both Aymara and Quichua, also live in the great urban, manufacturing and mining centres of Peru and Bolivia, and in the coastal zone of Peru. Such residence is often merely transitory, constituting an internal migration repeated every year to a greater or lesser extent. Generally speaking, natives migrate during the months following the cultivation of the soil. After a period varying from two to four or five months the Aymaras and Quichuas, being essentially agricultural peoples, return to their communities or homes to do the farm work. When this and other work has been completed, the migratory movement toward the coast, the mines, or the urban, industrial or agricultural centres is resumed.

THE QUICHUAS

The Quichuas are an essentially agricultural people, and their entire culture and economic and social life revolves around the land and its produce. All other cultural concepts are subordinate to that denoted by the term *Pacha mama* (Mother Earth). Agricultural labour is based on an elaborate system of ritual, in which the coca leaf plays an important part. This attitude of reverence towards the earth and its products to some extent explains the veneration with which the coca plant has been regarded from earliest times. The sacredness of the coca plant appears not to originate in the fact that it was used in the Empire of the Incas as a privilege, or only on special occasions, but in the fact that even before these customs and usages the coca plant was considered as the plant or tree *par excellence*. The subsequent veneration of the coca as a "sacred plant" derives from this concept.

¹ See *National Population and Employment Census for 1940*, General Statistical Department, 1944-1949; 9 vols.

² See *Final Minutes of the Second Inter-American Indigenist Congress*, Mexico, Inter-American Indigenist Institute, 1949.

Agriculture is practised at the high altitudes, as around Lake Titicaca, and at intermediate levels, particularly in the valleys. Agricultural methods are primitive and traditional, and the official agricultural services in Peru and Bolivia are making every effort to modernize them by establishing experimental farms and by technical publicity and instruction. In this connexion special reference should be made to the S.C.I.P.A.³ in Peru and to the Bolivian Development Corporation and the Society of Landowners of Yungas in Bolivia, and also to the Agricultural Banks of both countries.

Agricultural work, particularly in the native communities, is frequently carried on communally or with the assistance of relatives or neighbours, who are aided in their turn when necessary, thus establishing a system of mutual aid which has been operating without serious difficulties from time immemorial.

The Quichuas frequently live in communities. Generally speaking, and for the purposes of the present document, the community may be defined as an aggregation of family groups which have lived together and in the same place over a long period of time and are united by family and economic ties. The essential element in this union is the common ownership of most of the land, which is cultivated under a system of rotation. At the present time a constant increase in individual ownership of cultivable land by members of the communities is taking place.

Another means of subsistence, particularly on the *puna* or high plateau where, owing to the poverty of the land, agriculture gives scanty returns, is the pasturing of flocks, which are frequently left in charge of children or old people. Young people and adults do more arduous work.

Indians generally possess a certain number of llamas and alpacas. The former are used to carry light burdens. Indian stockbreeding yields poor returns, and often its products are destined for sale, and not for consumption by the owner and his family.

Handicrafts are rather widespread, the most important products being textiles, basket-work, ropes and, in some localities, rustic pottery, woodwork, etc.

Apart from these rural activities large numbers of Quichuas also work for varying lengths of time in the cities and manufacturing, industrial and mining centres, as well as in other agricultural regions.

Economic life centres in the local markets, held on certain days, generally Saturdays or Sundays. Except in some cattle markets, business is on a small scale and generally limited to the exchange of products between the Indians. An exception is coca leaf; it is, as a rule, paid for in cash. In such markets coca leaf is sold by the Indian who grows his own crop.

The rural home of the Quichua is poor, and almost entirely devoid of furniture. It usually consists of a fairly small house with one or, rarely, two rooms, the

³ *Servicio Cooperativo Interamericano de Producción de Alimentos* (Inter-American Co-operative Food Production Service); established with the co-operation of the United States of America by Agreement of 19 May 1943.

⁴ See *National Population and Employment Census for 1940*, vol. 1.

⁵ The 1940 census touches on the concept of race on two occasions (vol. I, pages xxi and clxxviii-clxxii. On both occasions

whole being made of adobe. All members of the family live in the same room, and sanitary or hygienic facilities are non-existent.

The existence of an Indian community does not necessarily imply that the homes of its members are grouped together and constitute a rural centre. Homes are dispersed and even distant from each other.

The concept of individual ownership is constantly spreading among the native landowning population. Many Indians, however, possess no land, and work for others or in the centres mentioned above.

Under the law men and women are equal; but equality is not always accepted, and women are often found in a subordinate position.

The supernatural has great importance in the life of the Quichua Indian. Religion and superstition, moreover, are intimately intermingled. In the superstitions of the Quichuas, the coca leaf plays an important part. Although in theory they are now rarer than in the past, the number of *fiestas* springing from religious beliefs and superstitions, and also from certain customs and usages, is very large, and each provides the occasion for purchasing and chewing coca leaves.

Peru

Some estimate of the Quichua and Aymara population of Peru, however approximate, must be made if we are to determine approximately the number of coca leaf chewers in Peru.

The 1940 census gives no figures for the Quichua population, but states the number of persons speaking the Quichua tongue. According to table 49⁴ the total number of persons over five years of age speaking Quichua tongue is 1,625,156. As has already been pointed out, language is not a reliable criterion for accurate demarcation of the various population groups. As the Commission was able to note both in Peru and in Bolivia, the Quichua or Aymara Indian quite often speaks a certain amount of Spanish, particularly when he has been to school or performed military service. This bilingualism was recognized in the 1940 census which shows 816,967 persons as speaking both Spanish and Quichua. This figure includes *mestizos* and Indians speaking both languages, but as the census gives no separate figures it is impossible to determine their respective numbers.⁵ However, an approximate computation of the Quichua population can be made if we consider, first, the percentage of Indians in the total population of Peru, and secondly, the ratio between the number of persons of Quichua tongue and of Aymara tongue⁶ which is approximately 8 to 1. Combining these statistical elements we may conclude that the total number of Quichuas, in round figures, is about 2,500,000 a figure which, though it should be treated with reserve, is probably not far from the truth.

Judging from this, the number of persons speaking Spanish and Quichua (816,967 according to table

a mere reference to Indians in general is made, no definite figure being given; 13 per cent of the replies to the question on race were given by the census population itself. Analysis of the replies led to a subdivision into only four racial groups, namely, white, native, black and yellow. The figures for *mestizos* were combined with those for whites.

⁶ *Ibid.*, statistical tables, 1, 41, 42, 46 and 49.

must include a greater number of Quichuas than had at first appeared probable on the basis of the considerations referred to above. The bilingual use of Spanish and Quichua should therefore not be considered as evidence of mixed race, but as the reflection of a cultural bilingualism due to the fact that education takes place in Spanish, that contact between the native population and urban, industrial and mining life is constantly increasing, and that military service has a marked influence in this respect. It should be noted that according to the 1940 census 65 per cent of the population of Peru speak Spanish. These linguistic data are of obvious importance in considering methods of education and propaganda to be used in any efforts for the solution of the coca-leaf problem.

The Quichua population is dispersed, in groups of widely different size, among the various regions of Peru. The most important centres, in descending order of magnitude, are found in the Departments of: Cuzco, Ayacucho, Puno, Ancash, Apurímac, Huancavelica, Junín, Huánuco.

The Commission decided from the outset that it was unnecessary to cover all the regions in which the coca leaf was produced and chewed. In preparing its itinerary and selecting the regions to be visited, it therefore took into account not only production and consumption, but all other factors which, in conjunction with these, would be likely to facilitate the study of the problem of the chewing and production of coca leaves. The second criterion was based on the following classification:

- (a) Regions where very large quantities of coca leaves are produced and consumed;
- (b) Regions of little or no production, but high consumption;
- (c) Regions in which there is little or no production or consumption. These are used as a basis of comparison for the two types referred to in (a) and (b).

Each of these sub-divisions involves different economic and social conditions, which it was essential for the Commission to grasp for the proper study of the problem assigned to it. The Commission accordingly decided to visit regions and localities in the Departments of Cuzco, Puno, Pasco and Huánuco, and, during its second visit to Peru, in the Departments of Cajamarca and La Libertad. The reasons for this choice were as follows:

Cuzco:

This Department has the following characteristics:

- (a) It possesses the greatest concentration of Quichuas in Peru;
- (b) It is the largest producer of coca leaves;
- (c) It is one of the largest consumers of coca leaves;
- (d) While predominantly agricultural, it has considerable industrial elements.

Huánuco:

This Department has the following characteristics:

- (a) Its population is almost entirely Aymara and Quichua;

⁷The population and density data for Pasco are somewhat unreliable in view of the fact that this Department was not established until 27 November 1944, prior to which it had been part of the Department of Junín. In fact, the 1940 census refers mainly

- (b) It is one of the largest consumer regions of coca leaves;

- (c) Coca-leaf production does not play an important role in the economy;

- (d) It is the most important stock-breeding Department.

*Pasco:*⁷

This Department has the following characteristics:

- (a) It is the most important metal-mining centre;
- (b) Its mean altitude is 3,400 metres and the capital is more than 4,000 metres high; it is thus the highest Peruvian massif of the Andes;
- (c) Its climate is generally severe and cold. It is estimated that of the 30,184 square kilometres of the Department, 20,000 square kilometres are more or less permanently covered by snow.

Huánuco:

This Department has the following characteristics:

- (a) It is essentially agricultural, and includes a number of widely different regions. In this Department, therefore, the Commission also visited the region of Tingo María, which has special characteristics and which produces coca leaves;

- (b) It has a very large Quichua and *mestizo* population, influenced by non-indigenous cultural, social and economic elements owing to its geographical situation, means of communication and relative nearness to Lima, etc.

The Commission also visited a number of localities in the Departments of Cajamarca and La Libertad in northern Peru. In these Departments, although Quichua is rarely spoken, there are large numbers of Quichuas. On the other hand, the native Quichua of Cajamarca, for historical reasons which cannot be examined here, is of a very different type, in habits and customs, from the Quichua of other regions of Peru.

La Libertad:

This Department has the following characteristics:

- (a) While it is predominantly agricultural it produces and treats its products by methods very different from those employed in the other agricultural regions visited;

- (b) Coca is also chewed in regions and localities not far above sea level;

- (c) In view of its coastal location, its population is influenced by cultural, social and economic factors largely absent in the interior of the country.

Bolivia

At the 1900 census the total population of Bolivia was 1,781,000. In 1949, according to the latest estimates, it was 3,922,000.⁸ The numbers of the various ethnic groups are not known, but the Indian population (Quichua and Aymara) is estimated to constitute about 52 per cent of the total population.

to this latter Department. A synthesis of data on the Department of Pasco is to be found in volume IV of the *National Population and Employment Census of Peru*.

⁸ Statistical Office of the United Nations, *Population and Vital Statistics Reports*, June 1949.

The Quichua population of Bolivia, which exhibits similar characteristics to that of Peru, cannot be accurately computed. As regards language, according to official data,⁹ Quichua is spoken by about 30 to 33 per cent of the total population; but this does not mean that the same percentage of the population must be considered as Quichua. The largest concentration of Quichuas are found in the Departments of Potosí, Cochabamba and Chuquisaca. In the Department of Oruro, Quichuas and Aymaras live side by side, although the latter appear to predominate. There is also a group of Quichuas in the province of Muñecas in the Department of La Paz.

The Commission decided to visit regions and localities in the Departments of La Paz, Cochabamba and Oruro, for reasons noted below.

La Paz:

This Department has the following characteristics:

(a) It is the largest and most populous Department. The population of the Altiplano and Yungas¹⁰ is for the most part Aymara;

(b) It is predominantly agricultural, and is the most important industrial Department, industrially and commercially;

(c) Climatically it comprises two differentiated zones, that of the high plateau and the semi-tropical zone of the Yungas.

Cochabamba:

This Department has the following characteristics:

(a) It is predominantly agricultural;

(b) Its population is for the most part Quichua;

(c) Its altitude is intermediate between the high plateau and the low-lying regions.

Oruro:

This Department has the following characteristics:

(a) It is essentially a mining Department;

(b) The mining population comprises both Aymaras and Quichuas as well as *mestizos*, particularly in the mining region of Catavi.

(c) It is situated mainly on the high plateau.

THE AYMARAS

Many of the general characteristics of Aymara life, usages and customs are similar to those of the Quichuas. Nevertheless, there are certain differences necessitating separate consideration, however brief, of the Aymara people, who appear to include large numbers of coca-leaf chewers.

Some of these differences may be due to the fact that the main groups of Aymaras live at high altitudes, where their inhospitable surroundings exert an undoubted influence on their culture and psychology. This

⁹ See *Demografía*, La Paz, General Board of Statistics, 1942.

¹⁰ Narrow gorges in the region of the Andes, with a humid climate especially in Bolivia, near La Paz.

habitat may even go some way towards explaining the more reserved personality of the Aymara, in contrast with the much more open temperament of the Quichua.

Agriculture, while important, does not play as essential a part among the Aymaras as among the Quichuas. The reason is that on the high plateau the land is poor and badly watered, except in the immediate neighborhood of Lake Titicaca and a few other regions. The result is that in many localities inhabited by Aymaras cattle pasturage is the most important occupation: it does not, of course, follow that this occupation brings great economic wealth. Owing to the high altitude economic returns from cattle pasturage are small, and in some high regions inhabited by Aymaras, only the alpaca and a few domestic animals can be bred.

Fishing has an important place in the economic life of the Aymara communities near Lake Titicaca. Usually each community has exclusive fishing rights in the part of the lake adjoining its territory.

Peru

The Aymara population is almost exclusively concentrated in the Department of Puno, particularly around Lake Titicaca. This does not mean, however, that the Department, which is of considerable size, is populated solely by Aymaras. On the contrary, there are many Aymaras, but fewer in number than the Quichuas who, generally speaking, inhabit the regions near the neighboring Department of Cuzco. There are small Aymara groups in the Departments of Moquegua and Tacna bordering the Department of Puno. All three departments are situated in the extreme south of Peru.

The numbers of Aymaras may be ascertained in the same way as those of Quichuas. On this basis it may be estimated with the necessary reservations that the Aymara population amounts to about 315,000. We consider as Aymaras not only almost all those persons described in the census as speaking solely the Aymara language, but also many of those speaking both Aymara and Spanish. As has already been observed, bilingualism cannot be regarded as the exclusive characteristic of the *mestizos*. In very many cases the Aymara Indian like the Quichua, is frequently able to make himself understood in Spanish. In accordance with the method indicated above the total Indian (Aymara and Quichua) population is estimated at 2,815,000. The total shown in the census is 2,847,196. It will thus be seen that the Commission's figures, while they must be accepted with caution, are not far removed from the official statistics data published in Peru.

Bolivia

The Aymara population is concentrated in the Departments of La Paz and Oruro. Any calculation of numbers would be hazardous. It may be said that the Aymara tongue is spoken by approximately 20 per cent of the population, which leads to the general conclusion that there are fewer Aymaras than Quichuas. In some parts of Bolivia, perhaps as a result of the former policy of transferring peoples, the population is of Aymara descent although the Quichua language is spoken.¹¹

¹¹ Under the Inca Empire this policy gave rise to the *mitima*. During the colonial regime the same policy continued to be applied.

Part Two

MEDICAL CONSIDERATIONS ON THE EFFECTS OF CHEWING THE COCA LEAF

Chapter IV

MAIN FACTORS DETERMINING THE PRESENT LIVING CONDITIONS IN PERU AND BOLIVIA

An analysis of the causes and effects of coca-leaf chewing makes it necessary to give a full description of the living conditions of the Indian. In the previous part, in chapter III, much has already been said of the milieu from the economic and social point of view. It only remains to add some points, which are of special interest from the medical view. These are general hygienic conditions such as medical care, housing, hospitals, education and—most important of all—nutrition.

GENERAL HYGIENIC CONDITIONS

Coca leaf is chewed in many different parts of Peru and Bolivia, but its real home is the Altiplano and the Sierra, where life is very hard. Cold winds blow over the bare flat country for many months of the year. There are no trees and altogether it is a very dour country. It is in surroundings like these, which give no comfort and only very limited choice of food, that coca-leaf chewing is most wide-spread.

In spite of this, the Indian is rather social-minded. He likes to walk to neighbouring villages; he drives his cattle and sheep to the markets, and visits "fiestas" as often as possible. One sees the Indians marching over the endless stony plane, barefoot or with sandals, wrapped in their primitive but warm ponchos (blankets), a cap with earcovers on their head.

Housing

Housing conditions are extremely poor in Indian villages. The "huts" are built from earth, and are long or round tower-like. They have one opening covered with a skin or mat, no windows and no chimney. Such are the houses of the Indians of Puno on Lake Titicaca in Peru, or of the even more primitive Indians behind Catavi and Uncia on the Sucre road, in Meokaimaja in Bolivia. They live a rather primitive life. Their houses (square in Puno, round towers behind Uncia) are built of mud bricks. There is no furniture. The Indians sleep on the bare earth on skins, children and grown-ups together. Fifty per cent (according to some, 60 per cent) die in the first year of life. No complete statistics are available. If the father is drunk, if any child or other member of the family is ill, results may be disastrous. Fire is not made against the cold; but only for cooking the primitive meals. There is no wood; the dried dung of llamas is used for fuel. Even then, much of it is sold, even to La Paz.

The sun goes down at 6 o'clock all the year round. There is no candle or light for the night.

Conditions are also bad in the towns, especially in the outskirts, where the Indian lives. Even in Lima the

conditions are miserable, but here the influx of a large Indian population into the rapidly growing town makes organizational action by the Government extremely difficult.

In La Paz the Indian population is being thrust more and more up on to the steep slopes of the valley, and little care seems to be taken to improve the standard of building in the new extensions of the Indian settlements. It would pay to provide better housing conditions, because this would reduce the prevalence of disease and the consequential expenditure.

In Cuzco City the poorer part of the population, consisting not of Indians but mostly of *mestizos*, live in old houses many of which are in extremely bad condition. The well-washed appearance and clean clothes of the school children contrasted amazingly with their very poor homes.

Living conditions in the workers' dwellings at the modernized factory centre of Lucre were extremely unhygienic. Workers had one-room lodgings in which they lived in the same way as the Indian in his hut. Chickens, guinea pigs and pigs shared the room. Sick children lay on a skin on the ground. The company management stated that they are going to build better homes.

In the mining region of Catavi in Bolivia, 6,000 workers and their families live in long rows of stable-like buildings. These provide one room and a small dark kitchen for each family. There is, however, no garden, or place to plant a few potatoes, etc., and nothing to lend any value to their home or make it desirable. A good school, community shops, a good hospital, can hardly offset the psychologically detrimental impact on the population of these housing conditions.

Education

In spite of the fact that education is discussed in another section we must emphasize that general hygiene is deeply influenced by education. Therefore lack of education is also one of the main factors which determine the present situation.

There is approximately a 75 per cent illiteracy rate amongst the Indians. It may be higher, since schools are often far from farms, not only on the Altiplano (Peru and Bolivia), but also in certain other regions in Peru, and Bolivia. A fine effort is being made by the Governments to change this. Laws have been enacted and schools built in larger towns. This has not escaped attention of the Commission, but it has not yet reached the Indians in most places.

Medical care

In Peru and Bolivia, doctors of good, sometimes of the highest, standards are to be found in the towns, but very few remain for the regions which are far from these centres and where the Indian witch doctor, if any, is the only person to take care of the Indian. Government efforts to organize medical treatment deserve nothing but praise, but outside the main cities, with very few exceptions (e.g., the hospitals of mining companies in Catavi and Oroya, or of planters' associations in Quillabamba), the hospitals of even the larger towns are poor and small. Many of them are looking for future help. In Coroico, Bolivia, a fine, new hospital has been built, but it cannot be opened because the money for the equipment is lacking.

At Puno, an extensive city sanitation plan has been worked out by the medical officer of health, but this, too, is held up for lack of funds.

In Peru, the provincial town hospitals are in need of more government help. At Huánuco, a new wing has been added to the old hospital, but more funds are badly needed. The doctors deserve the utmost commendation for the fine work they are doing, mostly under very difficult conditions.

Preventive medicine is in its beginning. There are some public health centres in the Puno country and probably elsewhere. They are mainly concerned with smallpox vaccination.

For the region of Puno Dr. Manuel Aragón Peralta has worked out a fine departmental health organization plan (*Plan Organizador de la Sanidad Departamental de Puno*. Original received).

A splendid anti-malaria campaign has been organized in Quillabamba region, the Cajamarca region, Tingo María, and, it is believed, further down in the Amazon plains. In the aforementioned regions, which were visited, it might be said that even the most isolated Indian hut has a sign showing that it has been disinfected with DDT. The Commission heard the report of the anti-malaria campaign leader in Quillabamba.

He said that some years ago the death toll from malaria amounted to several thousand, so that even the coca-leaf production decreased considerably; now malaria has practically disappeared.

Nothing seems to be done, however, against typhus fever, which might be fought by louse disinfestation; and there is no possibility of getting enough expensive yellow fever vaccine. Fortunately, the latter seems to be no real danger at the present.

Typhoid fever and dysentery are very general in the Altiplano. In the Sierra nearly everybody is infected with worms. Actually most patients in hospitals had either worms or broncho-pneumonic infections. It had been reported that tuberculosis is spreading; but relatively few cases were reported to us, and it was explained that the cases are often those of persons returning from the lowlands. Under the primitive living conditions in their huts they then become a centre of mass infection.

NUTRITION OF THE INDIANS IN THE ALTIPLANO

An exact knowledge of the food of the Indian would be of the greatest value for the further prosecution of this study.

It seems that no nutrition surveys have ever been made with methods which are above criticism. At the enormous height (nearly 4,000 metres) potatoes, beans and *quinua* are grown. For hundreds of miles there are no fruit trees and no vegetables to be seen. Modern transportation makes it possible for bananas, etc. to be sold in some markets, especially near railway lines or near the main roads where trucks from the lowland pass. The Commission saw the native Indian buying and eating these in Oroya, Tihuánuco, Catavi. This is the exception but points to an important possible development in the future.

There has also been no real study of the nutritional status of the population. There are various papers about diseases of nutrition. Especially in the publications of Kuczynski, nutritional oedema (hunger oedema, mostly through lack of protein), also pellagra, vitamin B₁ and B₂ deficiencies and even scurvy are mentioned. These however, were not statistical studies and, although occasional cases may be very instructive, they do not give a statistically significant picture of the nutritional status of the population. Guzmán Barrón saw no deficiencies in Huancayo or in Ancash.

The poorness of the diet was a constantly recurring theme in the statements made at the various conferences.

At Puno, one of the local doctors spoke of the diet as being deficient to a point at which the Indian felt the need for coca leaf. The medical officer of health of the city expressed the view that the main problem was the food supply, which he felt confident could be improved.

At Cuzco, another public health officer stressed the need for better feeding of the Indian as well as better hygienic conditions. According to another speaker, the whole food production of the Altiplano has been decreasing during the last few decades. Another medical doctor said that in Cuzco and its surroundings milk production and consumption were going down.

Emphasis was laid more specifically on the question of diet by a doctor of Quillabamba who attributed the prevalence of milder forms of chewing in that area to better food. Similar testimony was brought by doctors at Huánuco. At Catavi a doctor bore witness to the fact that if the work is less heavy and the living conditions better, especially the nutrition, chewing is very often automatically given up.

Emphasis on the poverty of the Indian diet also came from participants at the conferences at Achacachi, Huánuco and Coroico.

The Commission's own limited observations left the members with the impression that the native population is, generally speaking, underfed. Conditions vary from region to region, and there are certainly exceptions, as in the regions of Huánuco.

Especially instructive were the visits to schools. School children in Cuzco City are in the majority very thin, but are lively, and do not show any trace of nutritional diseases. There are certainly no rickets on the Altiplano, for there is abundant sun. There seems to be no scurvy, and this can be fully explained by the high ascorbic acid content of the potato, which is the main food in that region.

The children are less well grown than in Europe. This, of course, may be racial, but it is much more likely to be due to the lack of vitamin A, and of animal

protein. School children in Cuzco City or La Paz or in other places never see milk. There is practically no milk production. Cattle are raised in large numbers, but only for meat. Cheese is occasionally produced but is sold to the big towns and forms no part of the Indian's food.

There are of course exceptions such as the dairy farms in Arequipa and in Cajamarca (Peru). The latter of these have started but recently. In these towns there are plants where condensed milk is produced which is sold in the big cities. Milk products from the United States are, however, appearing and were seen in little shops in such remote places as Pucalpa and Tingo Maria (Peru).

The Commission was sorry to see that no system of school meals exists. Even in the modern school of the Patino mines in Catavi they could not adduce any data on milk distribution to children.

Nor did the Commission see much of the UNICEF activity. This, however, was expected to start in Bolivia next spring.

As mentioned above, the general impression on the Peruvian and Bolivian Altiplano is that of an undernourished population. They live almost entirely on a vegetable diet of potatoes, beans and *quinua*. Dried meat is also eaten (according to income level) once a week or more frequently. The diet is deficient in fat and animal protein and is probably calorically insufficient. All this should be confirmed by nutritional surveys.

NUTRITION RESEARCH IN PERU AND BOLIVIA

The following work, which is more or less the only existing one, cannot give a definite answer to these questions however valuable the details are.

Among the studies published, one which constitutes a more or less substantial survey is that of C. Mendoza (*Encuesta de Nutrición familiar*). It gives no conclusive picture of the situation, though it contains valuable details. This study deals with 69 families with 865 persons in Chíncha Alta. Mendoza reported the following deficits: calories, 435; protein, 33.4 per cent; calcium, 87.0 per cent; iron, 52.0 per cent; vitamin A, 56.5 per cent; thiamin, 84.0 per cent. In this list it is the protein and calorie figures which are of particular interest. No signs of avitaminosis were observed, but it is doubtful whether the inorganic and the vitamin values are rightly calculated.

Other papers published on the state of nutrition are the following:

R. Gutiérrez Chámez (*Actas trab. 2. Congreso de Química 2.362, 1948*), who observed in Azangaro that the diet was sufficient on great haciendas, but very poor in the rest periods at home.

M. Kuczynski-Godard and C. E. Paz Soldán (*Diseción del indigenismo peruano, 1948*), who observed in Tchu-pampa (Puno) a diet of 1½ kilogrammes potatoes per day, rising sometimes to 4 kilogrammes per day. The same author in *La vida bifronte de los Campesinos Ayacuchanos, 1947*, gives descriptions of nutritional status on a scientific basis, and some descriptions of vitamin deficiencies (*"Ariboflavinosis in Ayacucho," Ibid., p. 31*).

Guzmán Barrón (*"La química y la nutrición," 4. Congr. de Química S.A.*) gives the following data on protein in food for Peru per person and per day (table 2):

| | Grammes per day | |
|-------------------------|-----------------|-----------|
| | Peru | Argentina |
| Animal protein | 8 | 63 |
| Vegetable protein | 50 | 48 |
| | 58 | 111 |

He takes parallel figures from Argentina for comparison. In his papers on the *II. Congr. Indigenista Interamericano (1949)* he describes this malnutrition as above.

In the field of analysis of the nutritive content of foodstuffs, reference should be made to the work of Dr. Alberto Guzmán Barrón. In his paper *Sociedad Química del Perú, 15, 2, p. 1*, he writes:

"Of great importance to the nutrition of the indigenous population is the *Quinua*, a chonopodiacea (*Chenopodium quinua*) which grows between 3000-4000 metres altitude and which is cultivated over about 48,000 hectares in Peru, 91 per cent of this area being in the South. Production is 46,100 tons. The total annual consumption per person is 53 kilogrammes in Puno, 10 kilogrammes in Cuzco and 6 kilogrammes for Peru as a whole."

Alcázar Ampuero J. (*Monografía de la quinua, 1948*) quotes an analysis completed in Harvard Medical School. He and Guzmán Barrón report that in feeding experiments on rats, *quinua* showed a nutritive value like casein. This is explained by its amino-acid content, which is:

| | |
|-------------------|--|
| Histidin, 1.95 | } This is nearest to the composition of casein, and only a near relation of <i>quinua</i> , the <i>canihua</i> , showed similar values |
| Arginin, 5.14 | |
| Tyrosin, 2.21 | |
| Tryptophane, 3.89 | |
| Lysin, 6.25 | |

The calcium, thiamin, riboflavin and niacin content is also high. It is thus probable that *quinua* is the most important component of the Altiplano diet and should therefore be used even more widely than it is now.

In his paper (*"La deficiencia de alimentación de los habitantes del Perú"*), J. López Guillén described meat and fish consumption in Peru and came to the conclusion that there must be a great protein deficiency in Peru. He particularly discussed how far fish could remedy this deficiency, especially from the point of view of amino-acid content, and from the economic standpoint. He found that meat production from cattle and sheep is decreasing; and that the only solution would be an increase of fishing.

In other papers (1940) he estimated the vitamin-C content and vitamin-B content of different Peruvian foods (not directly connected with this approach to the food problem).

Probably the best data on three-year-old children's nutrition can be found in M. Aragón Peralta (*"Contrib. al estudio med. social de la Madre y Niño Indígena," II. Congr. Indigenista, Cuzco, 1949*). The Final Act of the Second Inter-American Indigenist Congress (24 June-4 July 1949) has recommended to Governments

(paragraph 9) "A research on the diet of Indians suffering from malnutrition; and to take proper measures in order that such groups obtain the supplementary food needed for the establishment of a well balanced diet." "That this resolution be presented to the Pan-American Sanitary Bureau and the Food and Agricultural Organization of the United Nations."

In the official reports of the Inter-American Co-operative Food Production Service (*Servicio Cooperativo Inter-Americano de Producción de Alimentos*, or S.C.I.P.A.) and the International Labour Office malnutrition was also stressed. *The Food Situation in Peru* is the title of a study by Luis Rose Ugarte published by S.C.I.P.A. in Lima in 1945. This deals with the Food Mission of the Institute of Inter-American Affairs and the question of under-nutrition and its causes.¹ The study describes surface and population, land and production, consumption and wages, importation and exportation. On pages 178 and 179 it deals with coca-leaf production and consumption. The analysis is presented in strictly economic terms, being figures in kilogrammes of food consumption and calculated on this basis (p. 3).

In 1946 the ILO published a study by V. G. Garcés (*Living conditions of the indigenous population in American countries*, Montreal, 1946) which stressed the existence of malnutrition.

Gabriel Garcés is famous as a member of the Inter-American Indigenous Institute. He says: "the food of Indians throughout the continent is defective and utterly inadequate to compensate for the energy used up by their daily work". On pages 20 and 21 it is stated: "More adequate nutrition would also contribute to wean the Indians away from fermented liquors. And although it is not reasonable to hope that their desire for alcohol, chicha and coca will disappear completely within a short space of time, measures should be taken to reduce the consumption of these poisons, which injure their health and aggravate all their problems".

Gutiérrez Noriega^{2, 3} has also mentioned general malnutrition, in his various papers, as the main cause of the misery of the indigenous population and the cause of coca-leaf chewing. Rightly he says that malnutrition causes coca-leaf chewing, but coca-leaf chewing also produces malnutrition through destroying the appetite, thus creating a vicious circle. He wrote in April 1949: "The main cause of the coca-leaf habit is the deficient production of food in the affected regions. Cocaine has

¹ *Separata de Informaciones de S.C.I.P.A. No. 13* gives material and personal information about this mission. It refers to the prevalence of malnutrition.

² C. Gutiérrez Noriega. "El hábito de coca en el Perú." *América Indígena*, 9, 2, p. 143, 1949.

³ Other recent publications by this author are: A paper on the social aspects of coca leaf chewing (*Revista de Farmacología y de la Medicina Experimental*, 1, 2, p. 232, 1948). *Observaciones sobre el cocaísmo obtenidas en un viaje al sur del Perú*. The following are the main chapters:

"Producción de coca." "Distribución geográfica del consumo de coca." "Sujetos habituados a la coca." "Habitua-ción a la coca." "Cocaísmo y trabajo industrial." "Cocaísmo y rendimiento de trabajo." "Cocaísmo y delincuencia." "Cocaísmo y alcoholismo." "Cocaísmo y patología."

"El cocaísmo y la alimentación en el Perú." *Anales de la Facultad de Medicina* (Lima), 29, 1, 1948.

the property of suppressing the sensation of hunger, etc."⁴

Gutiérrez Noriega makes a relation between food intake, calculated on data from the S.C.I.P.A. report mentioned above, and the use of coca leaf in the following way:

| Kilogrammes/year and person | Coca-leaf consumption | Food deficit (per cent) |
|-----------------------------|-----------------------|-------------------------|
| (1) 2-4..... | | 44.2 |
| (2) 1-2..... | | 27 |
| (3) 0-1..... | | 13 |

However, there is an objection to this method of study. One might just as well draw a parallelism with altitude as C. Monge did in his studies, because the first group lives in 3,000 to 4,000 metres of altitude, the second in somewhat lower regions, while the third lives in the lowlands. Such a comparison is hence of limited value. It must also be stated that the measurement of nutrition in grammes of food, even if accepted in the S.C.I.P.A. report, can be of only limited value. The comparison between the first and second groups, which might be the population of the Altiplano as against that of the Huánuco region, might entail a difference as between fruit and meat and, therefore, quite a different value from one which can be expressed in grammes. In his publication *Anales de la Facultad de Medicina*, 1948, he tries, on page 67, to express this value in calories; taking 767 grammes as equivalent to 1,900-2,000 calories, he counts a deficit of 1,200-2,100 calories (66-50 per cent). This is, of course, also not permissible for the same reason.

Angélica C. Roncal, too, in a publication of the Ministry of Agriculture in Lima (*Investigación sobre las costumbres alimenticias en las zonas rurales del Perú*, 1948) calculates a deficit of 500-2,000 calories. But here also (according to Gutiérrez Noriega, *op. cit.*), the method of estimation is unknown and not based on a systematic nutritional survey. This comparison cannot therefore be accepted as proof of this thesis. Of much greater value than such adapted statistical data is the direct observation that the nutrition of this people is deficient.

Gutiérrez Noriega states that on the poorest farms the greatest quantity of coca leaf is consumed (see *op. cit.* p. 151). He leaves open the question (p. 152) whether cocaism aggravates the effects of under-nutrition or even protects the body against the result of it: these are "problems on which experiments are promised".

INTERNATIONAL ACTION FOR THE IMPROVEMENT OF NUTRITION

The report of the Food and Agriculture Organization on the Latin American Nutrition Conference in Montevideo in July 1948 made public the shocking conditions of nutrition of the indigenous population of Bolivia.^{5, 6}

⁵ C. Gutiérrez Noriega and V. Zapata Ortiz: *Estudios sobre la Coca y la Cocaína en el Perú*. A book of 144 pages, published by the Ministry of Education in Lima, it gives practically all the work which this group had published up to 1948 and can be used as a general study to the coca-leaf question.

⁶ FAO Conference on Nutrition Problems in Latin America Document No. FAO.N.48/CO.2/11, Montevideo, July 1948.

⁷ Statement of the representative of Bolivia, Dr. A. Quiroga Camargo, 19 July 1948, "Naturalidad y extensión de los problemas de nutrición de la América Latina".

It stated, correctly, that "the extent of malnutrition in the Indian population and the labouring classes generally cannot be determined" and gave, as the reason for this: "that no nutritional survey exists. All published figures are doubtful, being based on production figures and population figures where no reliable census exists". (It is thought improbable, among other things, that the intake should be 1,110 calories, as against a normal requirement of 2,625.) The report refers to the economist, Edmundo Vásquez, who calculated that of 222,111 inhabitants, 72.7 per cent have not enough income to purchase the necessary food. A calculation of the Bolivian Social Security Agency for workers is to the effect that, among mine workers, 77 per cent have not enough income to buy food for a family of three persons. "The only solution is to produce more food".

The International Labour Office published in 1943 a study, *Labour problems in Bolivia* (Report of the Joint Bolivian-US-Labour Commission), which referred to coca-leaf chewing on pages 40 and 42, especially in connexion with nutrition, in the following terms:

On page 40: "There is much controversy as to whether the coca-chewing habit is the cause or the effect of improper nutrition, whether the worker chews coca to appease his hunger or whether the chewing of coca destroys his appetite . . . until such time as an authoritative study is made of the effects of coca chewing, no recommendation can be made with respect to its control or regulation by taxation or otherwise"; and

On page 42: "The Commission recommends that a survey must be instituted to determine the nutritive value and deficiencies of the present diets prevailing in different regions . . . and that, if the Bolivian Government so desires, it invite the U. S. Government to send trained dietitians to make such a study; that a special portion of such a survey be devoted to a thorough study of the production and consumption of coca, its effect upon physical and mental health, and upon diet and general deficiency . . ."

Bolivia has now founded a National Nutrition Institute. Dr. Quiroga, who is its director, has mapped out a large programme for its future activities in his paper to the FAO Conference. He has especially emphasized that, as Professor Escudero from Buenos Aires has pointed out, habit formation plays an enormous role in nutrition. While it is often difficult to influence century-old nutritional habits, it is also the best way to exert an active influence on nutrition, as many good results have shown.

In this connexion it should be mentioned that the United Nations Educational, Scientific and Cultural Organization also arranged conferences on nutrition in South America in 1949, during which malnutrition was considered.⁷

⁷ "Reports presented during the debates on man and his ailments", Montevideo, Lima, Quito, Santiago de Chile. UNESCO. Scientific co-operation centre for Latin America, Montevideo. 1949.

Chapter V

THE CHEWING OF THE COCA LEAF

METHODS OF CONSUMPTION

Apart from the medicinal use of the coca leaf and its derivatives, the natural product is used by the indigenous inhabitants to help them in enduring fatigue, hunger and thirst. The methods used by chewers of coca leaf will be described in the following paragraphs.

The Indian carries the dry leaves in a special bag. The bag is usually woven in very bright colours and is called a *chuspa*. In certain regions, the coca-leaf bag is made out of tanned leather and is known as a *pisca*. It can be made also out of the skin of a llama or an alpaca. In the latter case, preference is usually given to the skin covering the animal's skull, and the part covering the ears is retained; this gives the bag a bilocular shape, that is to say, it has two pockets.

The chewer usually picks over the leaves before chewing them. He carefully removes the mid-rib. Some chewers, more fastidious, also remove the brown or yellow spots which sometimes appear on the leaf. The leaves are placed in the mouth, between the inner side of the cheek and the gum of the same side, until they form a bolus or quid, which varies in size according to the habits of the chewer. In most cases, the bolus forms a more or less noticeable protuberance on the side of the face. Old chewers nearly always have a permanent deformation of one cheek.

The expression "chewing" is not quite accurate. As Dr. Zegarra (of Cochabamba, Bolivia) pointed out at one of the public meetings of the Commission, "the Indian does not chew coca". The expression used in Bolivia to describe this action is *acullicar*, which does not have exactly the same meaning as chewing. In Peru, the Quechuan expressions *chacchar* and *picchar* are preferred to describe the same operation.

The bolus of coca leaf is also called *acullico*, *piccho* or *chaccha*.

The methods of chewing may vary from one group of individuals to another. Some have the habit of taking a new bolus of leaves whenever they "load up" (the usual expression to describe the action of preparing the quid). The bolus is renewed on every occasion. Others confine themselves to adding new leaves to those which are already in their mouths and which have, therefore, been chewed for some time. When the bolus has been chewed sufficiently, it is spat out, although certain chewers habitually swallow it.

The Indians have known empirically for a long time that they can increase the pleasure derived from chewing the coca leaf by adding an alkaline substance to the bolus. A better taste and more noticeable effects are thus obtained. The composition of this alkaline substance varies according to the region. Generally speak-

ing, the alkaline substances used by addicts may be classified into three groups:

(1) Quicklime is used in various regions, such as Cerro de Pasco, Cajamarca, Ancash and so forth;

(2) The ashes obtained by the calcination of the *quinua* and the *canihua* are used, in particular, in the Peruvian Departments of Cuzco and Puno and in the Province of Huancayo. They are also used in Bolivia

(3) The calcareous powder obtained by grinding certain shells is used in some parts of the Pacific Coast and in certain places in the jungle (*montaña*).

When the alkaline substance is of a powdery consistency, it is kept in a small spheroid or oblong calabash, with a long neck, known under the Quechuan name of *iscupuru* (*iscu* — lime). The stopper of the *iscupuru* has a rod (*shipiro*) attached to it, which may be made of bone or metal and which reaches almost to the bottom of the vessel. The Indian takes the *iscupuru* by the neck and gently taps the vessel against the nail of his left thumb. Nearly every chewer is in the habit of previously dampening the rod (*shipiro*), in order that the powder might adhere to it more easily. The stopper to which the rod is attached is withdrawn and the bolus which has already been placed in the mouth is pinched with the rod, in order to alkalinize the leaves. The operation is repeated until adequate alkalinization is achieved. An experienced chewer always does this with great skill, taking care that the lime should not touch his lips or his tongue, since that would give rise to very unpleasant burns.

When the alkaline substance is prepared from vegetable ashes, these are hardened and moulded into balls, tablets or sticks of a dark grey or blackish colour. This form of preparation comprises two successive operations of dampening and drying.

The substance is sometimes placed in horn (*huaccras*).

In certain regions of Peru (Cuzco, Puno, etc.) and in Bolivia, it is known as *llypta* or *llupta*. (The pronunciation of this word varies greatly from one place to another: *llypta*, *llupta*, *llukjta*, *llupfta*, etc.) In other regions of Peru (province of Huancayo) it is known as *tocra*.

The Indians sometimes use small bone or horn spoons to administer the *tocra*.

The chemical composition of the alkaline substance used as an aid in the chewing of coca leaves has been thoroughly studied by G. Cruz Sánchez and A. Guillén. They contain potassium, calcium, sodium, magnesium

* *Revista de Farmacología y de Medicina Experimental*, 1, p. 8, 1949.

and phosphorus and very small quantities of iron and antimony. The pH of the 1 per cent solution varies between 10.6 and 11.5 and their alkalinity between 5 and 27.3. They increase the solubility of the basic cocaine in water, at different stages of concentration. Their destructive effect on this alkaloid, in its basic condition, is very inconsiderable, since it varies between 2.5 and 5.5 per cent in from half an hour to one hour and at the normal temperature of the human body.

QUANTITY OF COCA LEAVES CHEWED DAILY

The appraisal of the quantity of leaves chewed daily is a highly important matter and the Commission sought its information from all possible sources.

At a lecture given at the Medical Faculty of the University of Wisconsin, Professor Gutiérrez Noriega described coca-leaf chewing as follows:

"The daily dose of dried coca leaves chewed by the habitual user varies between 10 and 100 grammes, with 30 grammes as a mean value. In some few cases the daily dose varies from 200 to 500 grammes. The product is consumed by intensive chewing and the saliva serves as the extracting agent of coca alkaloids.

"Fifty to 70 per cent of the chewed leaves is swallowed, and the rest is thrown away. The coca addicts chew leaves two or three times daily, in particular before their work. A period of chewing lasts two or three hours."

Professor C. E. Paz Soldán, Director of the Institute of Social Medicine of the University of San Marcos, Peru, in the book *Diseción del indigenismo le peruano*, states (chapter 13) that Indian men chew one to two ounces a day, women less.

Another opinion was that elicited from a doctor at Huánuco, who put the daily ration of leaves at 30 grammes.

The literature on the subject is curiously contradictory. Many authors give 3,000 to 4,000 grammes per year per person as the maximum intake of coca leaves, i.e., about 10 grammes per day.

These figures illustrate the danger of resorting to statistical methods rather than to individual observation. The annual figures are presumably obtained by taking total annual consumption and dividing this by the alleged number of chewers, but the obviously erroneous daily figure of 10 grammes shows the unreliability of this method. Since regular chewers are chiefly adult men, it is probable that the number allowed by the statisticians was from two to five times too large. It is also possible, though less likely considering the accuracy of the excise estimates, that the total quantity of leaves consumed was put too low.

This method of calculation may, incidentally, account for the surprisingly low rate of daily consumption which Dr. Aste Salazar⁹ took for his calculations of cocaine absorption.

During its travels, the Commission repeatedly questioned chewers on their daily consumption, but usually found difficulty in eliciting an answer. It was seen that chewers carry the leaves in their coca-leaf bag and, two

or three times a day, chew for half an hour, keeping the bolus in their mouths for another two hours. Therefore the easiest way to find out is, no doubt, to enquire how much they buy. Poor Indians will reply that they buy a handful at the market. Another common answer is that a handful is used in the morning and another in the afternoon. According to the Commission's measurements this means twice 25 grammes, or 50 grammes in all.

At the Cancaniri mine (Catavi region) the community shops were found to be selling packages containing 125 grammes of coca leaf regarded as a two-days' supply, which would give a consumption of 62.5 grammes a day. The miners themselves, on being questioned, gave two *onzas* (or 56 grammes) as their daily ration. After considering all the evidence, the Commission came to the conclusion that the daily consumption per person was between 50 and 100 grammes, figures which agree generally with those of Gutiérrez Noriega.

There are instances of the use of much higher quantities, generally by old people, whose consumption is said to go up to 250 grammes a day or more. Many of these appear, according to the description, to be mentally deficient.

QUANTITY OF COCAINE ABSORBED DURING CHEWING

The first problem for experimental study is whether cocaine is liberated from the leaves during chewing and whether it is absorbed in quantities sufficient to induce chronic intoxication.

To the Commission's knowledge, work on these two questions is being conducted at two Peruvian laboratories, the first under Dr. Aste Salazar, and the second under Professor Gutiérrez Noriega, and his assistant, Dr. E. Ciuffardi. Their findings are contradictory.

The Commission acquainted itself with the work by paying several visits to the laboratories of both groups. It was also present at an important discussion between the above-mentioned scientists at the Symposium on High Altitude Biology held at Lima on 29 November 1949.

Dr. Aste Salazar presented the same findings that he had laid before the first meeting of the Commission and the National Coca Commission. He stated that the quantity of leaves chewed daily does not usually exceed 5 to 10 grammes, and that the cocaine can be recovered from the bolus to within 10 to 20 per cent. He showed crystals of cocaine sulphate isolated from the bolus. Given a cocaine content of 0.6 per cent by weight, ten grammes of leaves would contain 0.06 gramme of cocaine, of which, assuming a 20 per cent extraction rate, 0.012 grammes would be absorbed. From a daily ration of five grammes of leaves, only 0.006 gramme would be ingested, or 0.003 gramme if the extraction rate were taken at 10 per cent.

In the light of this, he concluded that cocaine is absorbed but in very small quantities, of which, moreover, none can say what proportion is subsequently destroyed or quickly excreted.

On the other hand, Gutiérrez Noriega and his pupil Ciuffardi found the daily ration of leaves to be not 10 but 50 and sometimes 100 grammes or over.

⁹ Symposium on High Altitude Biology, Lima, November 1949.

In Dr. Aste Salazar's experiments no account was taken of the action of *llipta*. Furthermore, parallel experimental series of these two authors yielded an absorption rate from the bolus of 80 to 90 per cent, only about 10 per cent being recovered. They questioned whether the crystals shown by Dr. Aste Salazar were pure cocaine and thought they might be also other alkaloids, which are certainly present in the leaves.

Dr. Ciuffardi's thesis, "*Contribución a la química del cocainismo*"¹⁰ records 135 papers on coca.

He describes a study of 71 chewers who chewed with *tocra* and 53 who chewed without it. He found that from 42.5 grammes of leaves chewed with *tocra*, 57 to 97 per cent, or an average of 87 per cent, of the cocaine content, i.e., 0.170 gramme, was ingested, whilst from 56 grammes of leaves chewed without *tocra*, 50 to 95 per cent, or an average of 83 per cent, of the cocaine content, i.e., 0.190 gramme, was ingested.

When leaves are chewed with alkaline substances, the effect is more powerful because these substances potentiate the stimulant action. They have not increased the rate of extraction of alkaloids from the leaves in the above experiments. The increase of the action, which is brought about by alkaline substances has also been studied by P. S. Butler.¹¹

According to Ciuffardi, the daily dose of total alkaloids is 0.200 to 0.260 gramme and the daily absorption of cocaine, 0.160 to 0.208 gramme. The quantity of leaves used at each chewing is 14 to 19 grammes, from which 0.06 to 0.08 gramme of cocaine is absorbed.

The findings of the two experimental groups thus conflict widely in respect of the daily rate of cocaine absorption, i.e., 0.005 gramme according to Dr. Aste Salazar, and 0.200 gramme according to Ciuffardi and Gutiérrez Noriega. If Aste Salazar is right, the problem of coca-leaf chewing is reduced to negligible proportions.

Role of alkali (llipta or tocra)

The general explanation is that the walls of the leaf-cells are destroyed by the alkali, and the alkaloid cocaine is liberated from its bound state. It is, at this stage, insoluble in water and non-diffusible, and would, therefore, not be absorbed from the intestine. It is, however, swallowed with the saliva, and in the stomach the alkali is thought to be neutralized by hydrochloric acid. Cocaine hydrochloride, which is easily absorbed from the small intestine, will then be formed.

Gutiérrez Noriega states that alkaline concomitants are not indispensable but slightly improve the extraction. He also shows experimentally that the action of cocaine is increased by them. He is, however, not sure whether this intensification results from increased absorption or action on the central nervous system.^{12, 13}

The next stage would then be that the alkaloid passes through the portal circulation to the liver. Whether any proportion and, if so, how much is destroyed there, is not known. The undestroyed part

¹⁰ E. Ciuffardi, *Revista de Farmacología y Medicina Experimental*, 2, 1, pp. 18-93. 1949.

¹¹ P. Salomón Butler, *Ibid.*, p. 14.

¹² Gutiérrez Noriega, *Revista de Farmacología y de Medicina Experimental*, 5, 1, pp. 266, 279, 341. 1944.

¹³ P. Salomón Butler, "Potenciación del efecto neuroestimulante, etc." *Ibid.*, 2, p. 14. 1949.

reaches the arterial blood. Some of the cocaine may be destroyed in the body cells, the rest is excreted by the kidneys. All this is not definitely settled, in spite of all the work which already has been done.

EFFECTS OF CHEWING

General considerations

To sift the evidence regarding the harmfulness or otherwise of the continued use of coca leaf is no easy task.

The literature¹⁴ on coca-leaf chewing contains many a passage written as early as the seventeenth and even the sixteenth century, which stigmatizes the habit as harmful. In spite of this, it was a long time before the leaf was really held to be toxic. José Agustín Morales' book, *El Oro verde de los Yungas* (La Paz, 1938) sets forth a long and impressive collection of opinions on the so-called value of coca.¹⁵

In Bolivia and Peru, contradictory opinions have been expressed not only by administrators but by the medical profession. Opinion falls generally into three groups. Some vaunt the usefulness of coca-leaf chewing, others condemn it utterly, and a third and smaller group believes that the problem is but of minor importance, with little claim to prior attention while so many other social and hygienic problems remain unsolved.

In the course of the round table conferences¹⁶ held during the Commission's visit, opinions based upon popular, political and historical pronouncements and writings were advanced, nearly always by non-medical men, to convince the Commission of the value of coca leaf. Other participants spoke against its use.

In this report account will be taken more particularly of the opinions expressed by doctors who attended these conferences as well as those of some engineers and workers.

It may seem surprising that contradictory opinions can be given by medical men; and the difficulties of the whole subject matter, which may lead at times to their having to correct even some of the facts advanced, should therefore be explained.

The cause of divergences of opinion lies mainly in the fact that until recent years judgment was based exclusively on general (clinical) observations. It is, however, extremely difficult to judge the therapeutic activity of any pharmacological substance from clinical observations alone, as every medical man well knows.

Of the need for good clinical observation and of its effectiveness there can be no doubt. How, otherwise, could any new drug possibly be introduced? But the history of modern medicine offers numberless instances in which the high hopes entertained of the therapeutic value of some new drug were dashed by the findings of the majority of later observers.

The main difference between ancient and modern medicine is that the latter has introduced the experi-

¹⁴ See the annotated bibliography in annex 2.

¹⁵ This book is published by the coca-leaf-producing industry, but that is not to say that its quotations are unreliable.

¹⁶ At Arequipa, Puno, Cuzco, Quillabamba, Huánuco, Cerro de Pasco, Lima, La Paz, Coroico, Chulumani, Catavi, Cajamarca, Cochabamba, Trujillo, and with the Army in Peru and Bolivia.

mental approach, so that nowadays opinions are based primarily on experimental findings and not on clinical observations alone.

The possibility of genuinely divergent opinions is therefore obvious, and the Commission wishes to reject utterly any suggestion that those medical men who spoke strongly in favour of coca-leaf chewing as a very valuable thing were influenced by the financial interests of the producers. It is—to give a parallel—not usual for medical journals which accept contradictory opinions about a drug to suppose that the authors were influenced by other than medical considerations. If it were so, there would be an end to a great part of medical literature.

Examples of medical opinions in favour of coca-leaf chewing can be quoted, both from coca-leaf producing areas, such as Quillabamba (Peru), Huánuco (Peru), Chulumani (Bolivia), and from cities such as Lima and La Paz.

Some less affirmative or more non-committal opinions were encountered as follows:

A medical practitioner and member of the hospital staff at Cuzco urged the great importance of proving scientifically that chewing is toxic, and thought that this had not been done as yet. However, he did not know the newest literature. So far, he contended, the harmfulness of coca remains a *deductio a priori*. (Such an opinion is, of course, dangerous because it can inhibit any action against coca-leaf chewing, in spite of the conviction which this medical practitioner himself shares, that coca leaf is in fact harmful.)

A city school doctor, medical practitioner and professor of anthropology in the University of Cuzco, also stressed the point that the harmfulness of coca leaf has not been scientifically established. He seemed to attach no credence to clinical observations, and even went as far as to say—in contrast to many good observers—that the actual work output increases under the influence of coca leaf. He does not seem to realize that the problem is not one of single undernourished individuals—and their comparative state without and with coca leaf—but of a comparison over longer periods of the work of groups of non-chewers with that of chewers. The same view regarding work capacity was re-echoed by the manager of the Aduana de la Coca at Cochabamba, who said that “the Indian who does not chew cannot do good work”.

The diametrically opposite opinion came from another doctor of Cuzco who was sure that an Indian who does not chew will produce more.

That the evidence of injurious effects is inadequate was also the belief of a doctor from Huanuco. Quoting, like many others, from Monge, he emphasized that the harmfulness of chewing still remains scientifically unproven.

Finally, at Cochabamba the same line was taken by the representative of the Mayor, who supported his argument that no proof has been adduced by pointing to the many controversial publications which are still appearing on the subject.

The third group of opinions recorded is that of those who are convinced of the harmfulness of coca-leaf chewing.

In the literature on the subject, reference may be made to a passage in the study on Peruvian native life by C. E. Paz Soldán and M. Kuczynski-Godard.¹⁷

Their view is that small quantities do not produce serious harm if the chewer is well fed. They note that many chew only during work and not more than one ounce. But the habit becomes harmful if 100 grammes a day are chewed; and, in two such chewers, intoxication as though with cocaine was in fact observed. These persons were even chewing two or three times in the night. This chronic chewing leads to a “stupor”. The authors consider it “absurd” that a medical man (F. Cabieses Molina, 1946) should argue that coca-leaf chewing is not toxic.

In both Bolivia and Peru the military authorities have firmly taken the line that coca-leaf chewing does harm, and have prohibited it.

They are satisfied that the physical condition of the troops has improved in consequence, and intend to back their opinion in the matter, leaving the scientific justification for later discussion.

At Arequipa, in Peru, the capital of a department in which consumption of coca leaf is not so wide-spread as in other departments, the experience of medical practitioners derives from contact with Indians in the rural districts. They are greatly in favour of prohibition. That there should be a strong body of opinion in this centre is no doubt understandable, since it is the home of the main pioneer of anti-coca-leaf legislation, Dr. C. A. Ricketts, who has not the slightest doubts about the toxicity of coca-leaf chewing.

At Cuzco City, one of the most impressive statements was made by the President of the Agricultural Society, who spoke against the use of coca leaf, despite the fact that he represents the producers. Placing his duty as a citizen above such considerations, he asserted that the non-chewer is more efficient and more intelligent, and that chewers cannot be used satisfactorily as machine tenders or on tractors. The City Medical Officer of Health, and six more doctors of the town, were sure of the inferiority of the chewer. They all stressed the prevalence of under-nutrition. Whether coca leaf would have any influence on resistance, especially resistance against tuberculosis, could not be proved statistically and seemed improbable.

At Cerro de Pasco, an engineer confirmed that chewers have more accidents, and the Director of American Copper Mines said that for higher work, as on machines, only non-chewers are used. This was also confirmed by a professor at the Mining Institute, a mining director and an engineer. In this connexion it must be pointed out, however, that the more highly skilled workers do not chew in any case.

A definite belief in the harmfulness of coca leaf was also recorded by one of the medical practitioners at Coroico, a centre situated in the Yungas, Bolivia. The Roman Catholic priest, incidentally, dissented.

At Catavi, a large mining town where a round-table conference was held, the opinion of two engineers was that coca leaf is a stimulant for a while. According to

¹⁷ C. E. Paz Soldán and M. Kuczynski-Godard, *Diseción del indigenismo peruano*, (1948). Chapter 13: “El cocaísmo indiano”.

others, it decreases the working capacity. Save for one engineer, everybody thought that coca leaf is dangerous.

At Cochabamba, a very definite opinion was expressed by a doctor who was also a coca-leaf producer. He said that his economic interests might prompt him to speak in favour of coca-leaf chewing, but as a doctor he was fully convinced of the harmfulness of coca-leaf chewing. The majority of doctors in this locality were of the same opinion.

Cocaine concentration in the blood

Two United States chemists, Dr. Barbella and Mr. Yates, have been working for one year with Professor Hurtado's group. They are studying methods to estimate cocaine concentration in the blood with the Beckmann spectrophotometer. Cocaine gives a strong absorption spectrum in the ultraviolet, which, however, is disturbed by other accidental absorption. Their aim is to make this method so specific that the blood concentration of cocaine can be estimated exactly.

Dr. Barbella read an extensive report at the Symposium on High Altitude Biology in which he showed that:

(1) If a known quantity of cocaine is added to blood serum only 50 per cent is recorded. The possibility was contemplated of the destruction of cocaine in the blood, perhaps by an (unknown) enzyme.

Dr. Guzmán Barrón criticized this finding, saying that a part of the cocaine might be in the blood corpuscles and that whole blood, not only plasma, should be analysed.

(2) The second statement was that in a few cases of coca-leaf chewers a maximum concentration of 0.5 per cent cocaine per 100 cubic centimetres of blood plasma had so far been found. It was also stated that the technical error is + 0.5 per cent. The conclusion had been that the cocaine concentration in the chewers' blood was very low, but no practical inferences were drawn.

Viewing this result, we must say that little can be deduced from the concentration of cocaine in the blood until the toxic concentration is known. Nobody has studied this, even in a case of acute cocainism. It may be that the concentration is extremely low, whilst the toxicity is already very high. It may also be that the toxic principle passes quickly into the central nervous system, where it may act and be destroyed, without reaching a high concentration in the blood plasma.

At the present stage nothing can be concluded from these estimations. It may be, however, that, at a later stage, a parallel between chewers, non-chewers, acutely intoxicated cocainists, etc., will further the solution of this problem.

Detoxification and excretion of cocaine

G. Cruz and A. Guillén,¹⁸ two co-workers of Professor Gutiérrez Noriega have studied the excretion of cocaine in the urine, after 20 grammes of leaves were chewed. If only the leaves were chewed, 10-20 per cent of the cocaine ingested was recovered in the urine dur-

¹⁸ G. Cruz and A. Guillén. "Eliminación de la cocaína en sujetos no habituados". *Revista de Farmacología y de Medicina Experimental*, 2, 1, p. 8. 1949.

ing the first six hours, while if leaves were chewed with alkali, 21-34 per cent was recovered. The maximum elimination rate was reached after one hour, the cocaine reaction in the urine was still present at 36 hours. It had disappeared however in a 48-h sample. They estimated the intake at 65-82 milligrammes from which 16-24 milligrammes was found in the urine in the first six hours.

More recently E. Ciuffardi T.¹⁹ republished experiments on the renal excretion of alkaloids in coca-leaf chewers.

In six well-inured coca-leaf chewers, the urine was collected after a certain quantity of leaves had been chewed; 121.4 milligrammes cocaine (other alkaloids counted as cocaine) was taken up (absorbed?) and the excretion was, as calculated from his values:

| Hours | Per cent |
|---------------------|----------|
| 0 - 1..... | 10.1 |
| 1 - 6..... | 14.5 |
| 6 -24..... | 8.7 |
| 24-48..... | 9.7 |
| Total in 48 hours.. | 43.0 |

Thus the excretion in the urine is most rapid in the first hour and then continues slowly for more than two days. The fact that the full quantity is not recovered may be explained by the destruction of about half of the ingested quantity in the body. Repeated chewing increases the amount excreted. It is calculated that 20 grammes of leaves yield 121 milligrammes of cocaine with a content of 0.600 gramme per 100 grammes. While it is open to discussion whether the analysis of the bolus before and after chewing really gives the quantity of absorbed cocaine, this experiment leaves no doubt that cocaine was absorbed from the intestinal tract, for at least 43 per cent had passed into the circulation and had been recovered. Thus the habitual coca-leaf chewer does not destroy at least 43 per cent of the cocaine absorbed (i.e., in the above experiment 50 milligrammes of cocaine), and this must act in his body. If this experiment is not rejected on the basis of technical errors in the estimation, which is improbable, it proves finally that coca-leaf chewers continuously take up large quantities of cocaine.

Cruz and Guillén (*loc. cit.*) came to similar results in non-habitual chewers. Their experiments also show clearly that large quantities are absorbed.

It is not known where the amount representing the difference between ingested and excreted quantity was destroyed. It might have been in the stomach, in the liver, before it reached the arterial blood, or only in the other organs of the body.

The action of cocaine

There is ample proof of acute and chronic intoxication with cocaine; and this knowledge has been much used for propaganda about the dangers of coca-leaf chewing. We are not dealing here with the problem of cocainism, but only with that of cocaism. It is, however, necessary to know how far the knowledge of the former can be related to the latter problem.

¹⁹ E. Ciuffardi T. *Contribución a la química del cocaísmo*, p. 18; *Trabajo para la Academia de Ciencias Exactas*, 12 December 1949; *Excreción renal de alcaloides en habituados a la coca*.

For the experimental pharmacology of cocaine see: F. Poulsson, *Handbuch der experimentellen Pharmakologie*, 1920, II. 1. 103, and Trendelenburg, 1924, II. 2. 1167, and also L. S. Goodman and A. Z. Gilman, *The Pharmacological Basis of Therapeutics*, New York, The Macmillan Co.

The pharmacology and clinical appearance of cocaism in man is fully discussed in the book of H. W. Mayer (Professor of Psychiatry in Zurich): *Der Kokainismus* (Leipzig, Thieme, 1926).

Of modern pharmacological research on this subject, that of Gutiérrez Noriega, Professor of Pharmacology at the University of San Marcos in Lima, has become famous. His experiments are performed on dogs with daily intravenous injections of cocaine sulphate.²⁰ He produced cocaism and showed very impressive results.

It should also be mentioned that pharmacological literature contains not only facts which prove the harmful effects of cocaine. There is also a large number of papers on the "anti-fatigue" effect of cocaine and some workers have explained it as an increase of the anti-fatigue effect of adrenaline. This has been used in the discussion about the scientific basis of action against the use of coca leaves, in the article of Fernando Cabieses Molina.²¹

Before the questions of the ultimate physical and mental effects of prolonged coca-leaf chewing and of addiction are discussed, it will be useful to consider first what action is exerted on the organism by the products ingested from any person chewing coca leaf.

Gutiérrez Noriega states that "the stimulating action begins half an hour, more or less, after the chewing started, and is noticeable three to four hours later. If the . . . subject repeats the dose of coca, the stimulating action may last two to three hours more, but if chewing is stopped, a depressed condition may follow . . . the heart rate and blood pressure show very low values and a feeling of fatigue is experienced . . ."

Coca leaf and fatigue

It is established that cocaine diminishes the feeling of fatigue in man. From the physiological point of view, this may be due either to a peripheral action on proprioceptive nerve endings of the muscles, or to a central action. The latter, as a part of the mechanism of intoxication by cocaine, seems to us more probable.

That central nervous fatigue develops much earlier than peripheral muscular fatigue is well known. It is probably correct to say that the central fatigue protects man against exhaustion; it is this central fatigue which cocaine inhibits. To this extent its action can be called "doping" of a special kind (not excitatory, but inhibitory). As a doping substance its action may be such as to lead to excessive work by reason of the fact that the feeling of tiredness is lacking; but, so long as the opposite is not demonstrated experimentally, it has to be assumed, on the basis of all existing physiological knowledge of energy expenditure in metabolism, that

²⁰ C. Gutiérrez Noriega and V. Zapata Ortiz. *Estudios sobre la coca y la cocaína en el Perú*. Ministerio de Educación Pública, 1947.

²¹ Fernando Cabieses Molina "La acción antifatigante de la cocaína," etc. *Anales de la Facultad de Medicina* (Lima), 1946, p. 316.

the work done exhausts the reserves, which have then to be replenished.

Though the total energy output over a longer period cannot be larger than is permitted by the energy intake, it is possible to do exceedingly large amounts of work during short spells, and this temporary effect may be misleading.

It is generally agreed that the total work capacity of the Indian is relatively small. In Morococha it was said to be only one-third of the working capacity of an Italian miner. It may well be found that the amount of work done over a certain relatively short period is large, but the total work done over longer periods may be small. This may be the effect of coca leaf, but also apart from coca leaf, the effect of race, nutrition and general social conditions.

Thus, while coca-leaf chewing admittedly diminishes fatigue, it is not thought to produce a real increase in the total work output.

Unfortunately no experimental research on this has been undertaken so far. The work of Professor Hurtado (see his lecture at the Peruvian Coca Commission and at the Symposium on High Altitude Biology) has brought evidence of high working capacity with a changed metabolism at high altitudes. This is very interesting from a physiological point of view, but it has not touched the question we are facing, whether, over longer periods, coca chewers have a larger working capacity than non-chewers.

Certain facts have been reported to the Commission which might be useful.

In La Paz it was mentioned at the medical centre of the stadium that the football teams of workers, who are Indians and *mestizos* and chew coca leaf, never achieve a higher grading. Their effectiveness may be reduced owing to the coca leaf.

In Cajamarca, no answer to this question was given, as it was considered to be impossible to judge.

In Cerro de Pasco, the director of the mines was of the opinion that for "special work" he would choose non-chewers. He was referring, however, to mental rather than to physical work.

The opinion of all army surgeons was that the working capacity of the soldiers is certainly not diminished after chewing has been prohibited.

While such opinions certainly cannot be used as experimental data, they give the impression that the "observed increased working capacity" is a temporary one, and for the individual, therefore, it is an "energetic fallacy" for which he has to pay out of his metabolic balance.

No more than a passing reference is perhaps required to two physicians, of Huánuco, who believe that there is a mysterious substance in coca leaf explaining its marvellous anti-fatigue action.

Another opinion, on somewhat similar lines, was put forward by a lawyer at Cochabamba, who remarked that the problem was still under study and that nothing could be proved yet, but insisted that "coca contains a valuable energetic factor, which is still unknown, but whose potential power must be investigated thoroughly and carefully".

Coca leaf and hunger

The connexion between coca leaf and hunger was referred to in the study on labour problems in Bolivia, published by the International Labour Office in 1948.²²

In a paper published in the transactions of the Second Medical Congress of South America in 1943, Dr. C. A. Ricketts of Arequipa, Peru, a pioneer of anti-coca-leaf legislation and for twenty-five years an active opponent of coca-leaf chewing, asserts that: "the more the Indian eats, the less he chews" and emphasized that the problem is mainly one of hunger, which should be fought by social methods. In a letter to the latter, a representative of the American Bible Society, expressing a similar view, writes in inverted terms: "I can only express a certain doubt as to whether it is desirable that the Indian leave off the coca so long as he cannot get an adequate diet". This information was obligingly given to the Commission by Dr. Ricketts.

A very different view was taken by the Bolivian representative on the FAO Nutrition Conference of 1948.²³ On page 5 of his report on Bolivian nutritional problems he says: "The low diet on which the native population of the country lives creates a condition of chronic hunger, alleviated or covered up by the use of coca, whose properties and action in the organism are a matter of controversy between investigators in this field."

Proceeding from this to call attention to the latest analyses of coca leaves which "disclose the presence of nearly all the vitamins in fairly appreciable quantities", he recorded his view that this vitamin content plays a part in the nutrition of the Indian.

On page 18, paragraph 6, there is again a reference to the nutrition and the coca-leaf problem: "He—the Indian—consumes habitually coca-leaf and alcohol, but who knows whether the latter is not taken to supplement the caloric value of his very poor and meagre diet?"

Describing the splendid physical status of the indigenous Indian, his good health, his splendid eyesight, his longevity, he uses the phrase: "this native race . . . probably a type of nutrition biologically different from that of the half-breed and white races of the country".

This hypothesis is one more reason for urging a thorough investigation, with nutritional surveys, of the nutritional status of the indigenous population. Since the problem is basically related to the coca-leaf problem and has been raised at the FAO Conference, it seems to the Commission that if FAO could direct this research with its experts, this would help greatly to deal not only with the coca-leaf problem, but with the nutrition problem in Bolivia and Peru as well.

The very interesting point raised by the Bolivian representative, namely, the vitamin content of the coca leaves as a factor in the nutrition of the indigenous population, has been found so important by the Commission that it has asked for an analysis of the leaves which were collected in different parts of Peru and Bolivia during its journey.

²² *Labour Problems in Bolivia* (Report of the Joint Bolivian-United States Labour Commission), 1948, pp. 40 and 42.

²³ Dr. A. Quiroga, Report on the Montevideo S.A. Nutrition Conference of FAO, Document FAO/N.48/Co.2/35.

These assays for vitamins B₁, B₂ and C have been made by the Food and Drug Administration, Federal Security Agency (Washington, D. C.). The data included in appendix to this part.

The vitamin content in dried leaves is given as remarkably high. A quantity of 100 grammes dried leaves could supply a considerable part of daily human requirements in the above vitamins.

In spite of this fact, it would by no means be advisable to supply these requirements by coca-leaf chewing because it must be emphasized once again that the toxicity of coca leaves (due to their cocaine content) would never allow a safe use as a nutrient.

The same amounts of vitamins could be supplied by vegetables and fruits if the indigenous population could be taught how to develop and use their own food resources.

Coca leaf and sensitivity

At the request of a member of the Commission a test was made in the City Hospital of La Paz to ascertain whether coca-leaf chewers have a change in sensitivity relatively to non-chewers.

A doctor reported, in a letter to the Commission, experiments on the sensitivity of the pharynx, which he performed in his clinical department. The normal vomiting reflex when the dorsal pharyngeal wall is touched, which is always present in non-chewers, is generally lacking in the coca-leaf chewing Indians. This was also confirmed by other laryngologists of La Paz who have long known the decreased sensitivity of the pharynx in the Indians. This might be explained as a result of a continuous local anaesthesia through the cocaine contained in the saliva of the coca chewer.

Even more important to the understanding of the status of coca-leaf chewers are the following experiments, which were then reported, on the sensitivity of the cornea. Thirty-five chewers and ten non-chewers were tested for the sensitivity of the cornea in the usual clinical way, the surface being touched with cotton wool. In all chewers the sensitivity of the cornea was decreased compared with the non-chewers.

This was confirmed by the Ophthalmological Department of the Hospital of La Paz. It was explained that the Indians, as a result of this decreased sensitivity, are unaffected by the pain of keratitis and conjunctival corneal ulcers.

It was also said that for local anaesthesia of the conjunctiva and cornea a 4 per cent solution of cocaine is used, while in non-chewing whites 1 per cent is enough. This would mean that the Indian, who might be taken in this case as identical with "coca-leaf chewer", has an increased resistance to cocaine.

Another doctor gave the information that, on the contrary, he, as a general surgeon, cannot find any change in reaction against the local anaesthetic action of "procaine" (novocaine) in the Indian. The same doses and concentrations are used for Indians and whites in his department.

These facts show that: (1) The coca-leaf chewing Indian has a decreased corneal and conjunctival sensitivity because he is under the influence of cocaine; (2) He therefore needs higher doses of cocaine for

local anaesthesia. (3) This greater anaesthetic dose is not necessary for a different chemical substance, the synthetic anaesthetic "procaine" (novocaine) because no decreased general sensitivity has evolved to this but only to cocaine.

These experiments strengthen the Commission's opinion that coca-leaf chewers are chronically under the influence of cocaine.

Physical alterations

A statistical study of the general physical condition of the chronic chewers would certainly show that it is quite inferior to that of individuals of the same race living in the same regions who do not chew. In the area of Puno (Peru), for instance, the Indians who live in the Adventist communities and do not chew present a far better appearance. In Bolivia, at the rural school of Huarizata, the teachers and the pupils, both of Indian stock, obviously enjoy much better health than the other Natives who are still coca-leaf chewers. It is not considered, however, that coca-leaf chewing is the only cause of poor health.

Effects on circulation

A thorough study has been performed by Gutiérrez Noriega and Zapata Ortiz.²⁴ These investigators have observed the behaviour of the circulatory functions during the process of chewing and have come to the conclusion that a slight modification takes place in the majority of cases under such experimental conditions. Their results can be partially summarized in the following table:

Observations upon 40 "habituated" individuals (before and after the process of chewing)

| | Increase during the process of chewing | | Decrease during the process of chewing | |
|------------------------|--|---------------------------|--|----------------------|
| | Mean val. (initial) | Mean Frequency (per cent) | Mean | Frequency (per cent) |
| Pulse rate..... | 68 | 6.8 | 72.5 | 12.5 |
| Blood pressure. 103-66 | | 11-19 | 77.5 | 9-1 22.5 |

They have also proved a higher incidence and a greater intensity of the "stimulating" reactions among the individuals who were chewing greater quantities of leaves.

The Commission asked a great number of physicians whether they observed a higher incidence of cardiovascular diseases among the chewers. Their answers were always negative but they could not provide statistics.

Effects on respiration

Several researches^{25, 26, 27} have been carried out on this subject, but it has not been proved that coca-leaf chewing might produce any significant alterations of the respiratory functions.

In a paper read to the Wisconsin School of Medicine in April, 1949, Gutiérrez Noriega refers to an increase in the respiratory rate.

²⁴ C. Gutiérrez Noriega and V. Zapata Ortiz. *Revista de Farmacología y de Medicina Experimental*, 1, 1, p 1-32. 1948.

²⁵ *Ibid.*
²⁶ V. Zapata Ortiz. *Revista de Medicina Experimental*, 3, p. 132. 1944.

²⁷ *Ibid.*, p. 307.

Alterations of the mucous membranes

The above-mentioned authors noted an alteration of the mucous membranes of the mouth which the Commission itself also saw in coca-leaf chewers. This is produced by the highly alkaline substances that are mixed with the leaves, chiefly the pure "lime", used in some regions, which is the most caustic. At the beginning, mainly burns occur; later a cicatrized tissue appears which constitutes a real scar. These lesions appear mainly on the mucous membranes of the lips, the gums and on the inner part of the cheek. The gingival mucous membrane is generally strongly congestive and bleeds easily.

Glossitis and stomatitis, Gutiérrez Noriega thinks, might be a result of *Ullta* or *tocra* (lime) and the mechanical action of the leaves.

Alterations of the skin

Generally the skin is dry and dehydrated. Follicular hyperkeratosis is extremely frequent. Gutiérrez Noriega and Zapata Ortiz²⁸ have made the following findings in the individuals they have examined:

| | Per cent |
|------------------------------|----------|
| Hyperkeratosis | 38 |
| Dehydrated and dry skin..... | 56 |
| Furunculosis | 8 |

One cannot say that coca-leaf chewing is the only aetiological factor in the production of this alteration. The malnutrition of the chewer is a very important factor and such alterations can frequently be charged to an insufficient diet and poor general hygiene conditions.

Certain alterations are observed on the skin of the fingers used by the chewer to catch and handle the leaves. The Commission noticed them, too, on the Indians who harvest the coca leaves, even if they are not chewers themselves. At the beginning, the skin may be irritated and congestive; it may even become abraded. Later on, corns may appear.

Alterations of the teeth

The apologists for coca leaf quite frequently insist on the fact that "coca-leaf chewers have excellent teeth and do not know the existence of caries". It is astonishing to hear even many doctors repeating such statements. However, Gutiérrez Noriega and Zapata Ortiz,²⁹ after a careful examination of the group studied by them in Huancayo, arrived at the following figures:

| | Per cent |
|----------------------------|----------|
| Dental caries | 66 |
| Lack of several teeth..... | 82 |

The Commission saw many chewers with very poor dentition. The fact mentioned by some odontologists that "they do not see coca-leaf chewers attending the dental clinics" cannot be taken as evidence in favour of the apologists for coca leaf, for the very simple reason that the Indian does not readily patronize such health services, even if they are absolutely free.

²⁸ *Ibid.*, p. 132.

²⁹ V. Zapata Ortiz. *Revista de Medicina Experimental*, 3, p. 307. 1944.

Other functional disturbances produced by coca-leaf chewing have also been registered by Gutiérrez Noriega and co-workers.^{30, 31, 32} Their results can be summarized as follows:

As an acute result of coca-leaf chewing in addicts they describe changes in reflex excitability of the oculocardiac reflex, which was inverted; sensibility for faradic stimulation of the skin was decreased and an increase of reaction time was observed. Less characteristic are the changes of muscular strength and blood sugar curve. Muscular strength during abstinence shows even lower values compared with non-chewers. Optimal doses for stimulating muscular strength vary between 2-4 milligrammes of cocaine per kilogramme of body weight.

Ciuffardi³³ reports that the physical effects of chewing are: Increase of pulse rate from 70 to 80 per minute; no characteristic change in blood pressure; increase of body temperature from 36.7 to 37.2 degrees C after two hours, increase of respiratory rate from 20 to 22. Also N. Chamochumbi M.³⁴ found that 20 grammes of coca leaves increase the basic metabolic rate for two to three hours. Alkaline substances enhance their action to the extent of 20 to 30 per cent.

Ileus paralyticus was considered by the Dean of the Medical School at Cochabamba to be at least partially due to the coca-leaf chewing habit. He presented several patients suffering from ileus. They were all coca-leaf chewers. The Dean informed the Commission that the incidence of this complaint was high, i.e., 5 per cent, always among chronic chewers. He attributed this variety of ileus to three main factors: (1) special anatomical characteristics of the Indian race, i.e., the congenital "megastigma"; (2) the highly fermentative carbohydrate diet of the Indian; and (3) the chronic chewing of coca leaves.

Psychical alterations, especially in chronic abuse of coca-leaf chewing

In the paper published by C. Gutiérrez Noriega³⁵, the acute action of chewing is analysed as suppressing the sensations of hunger, thirst, cold and warmth and tiredness.

It often gives an autistic satisfaction and mostly euphoria.

Only in very few cases were disturbances in perception seen, even more seldom, hallucinations, and very seldom, changes of consciousness.

The chronic chewers show a type of alterations of which even this greatest expert on cocaism has to say:

"There is no evidence that they are due to the toxic effects of coca leaf, since other factors might intervene.

³⁰ C. Gutiérrez Noriega. "Acción de la coca sobre la actividad mental de sujetos habituados", *Ibid.*, p. 1. "Observaciones en enfermos mentales habituados a la coca", *Actualidad Médica Peruana*, 9, p. 154, 1944. "Alteraciones mentales producidas por la coca". *Revista de Neuro-Psiquiatría*, 10, p. 145, 1947.

³¹ C. Gutiérrez Noriega and V. Zapata Ortiz. "Observaciones fisiológicas y patológicas en sujetos habituados a la coca", *Revista de Farmacología y de Medicina Experimental*, 1, 1, 1948. *Estudio sobre la coca y la cocaína en el Perú*, Lima, 1947.

³² V. Zapata Ortiz. "Modificaciones psicológicas y fisiológicas producidas por la coca y la cocaína en los coqueros". *Revista de Medicina Experimental*, 3, p. 132, 1944.

³³ E. Ciuffardi T. *Contribución a la química del cocaísmo*, p. 18.

The author inclines, however, to the view that coca is the principal cause of the changes affecting the personality, thinking, intelligence and memory."

The characteristics are diametrically opposed to those of the chronic alcoholic: an asthenic autistic attitude against an asthenic hypomaniac attitude in the latter. Intelligence tests³⁶ gave the result that:

(1) The I.Q. of coca chewers assessed by the Binet Test was very low as compared with the values of non-addicted Indians;

(2) The Portens maize test gives a mental age of 3 to 10 years as against 12 to 14 years for non-chewing Andeans;

(3) Hamburgo attention tests gave very low values relatively to the normal.

In his Wisconsin lecture Gutiérrez Noriega said that 80 per cent of coca-leaf addicts have a subnormal I.Q. (according to the Binet-Simon, Portens and Terman tests). In their book on coca and cocaism in Peru, Gutiérrez Noriega and Zapata Ortiz³⁷ mention also studies with the Rorschach test, but do not draw any final conclusions.

But the "authors do not conclude, momentarily, that the coca habit is the cause of the intellectual impairment found among coca addicts . . . Additional factors must be taken into account . . . (geographical and social isolation, economic misery . . . bad feeding . . . etc.). It is tentatively suggested that the intellectual impairment found in coca addicts is caused by the synergistic action of several factors, the coca-leaf habit being among the most important of these factors."³⁸

They say, however, that although acute psychological alterations are of minor importance, cocaism causes introversion and moral decay. They add that "prolonged abuse of high doses may lead to states of insanity". "At the ordinary doses of 30-60 g/day this never happens.

Addicted natures, they say, are introvert, non-addicted more extrovert. "In general, coca-leaf chewers present emotional dullness or apathy, indifference, lack of will-power and low capacity for attention. They are mistrustful, shy, unsociable and undecided. Many of them are vagabonds and dress like beggars. Among Peruvian natives not addicted to coca leaves, the above mentioned psychological characteristics are really unusual."

In the course of different conferences the following opinions were heard:

A doctor of Cuzco denied that coca leaf makes the Indian introvert. He regarded him as racially "oligophrenic" and "lazy" and argued that it is not the coca leaf which is to blame.

³⁴ N. Chamochumbi M. *Efectos de la coca sobre el metabolismo basal en sujetos no habituados*.

³⁵ C. Gutiérrez Noriega. "Alteraciones mentales producidas por la coca". *Revista de Neuro-Psiquiatría*, 10, 2, 1947.

³⁶ C. Gutiérrez Noriega and V. Zapata Ortiz. "Estudio de la inteligencia en sujetos habituados a la coca." *Revista de Farmacología y de Medicina Experimental*, 1, 1, p. 32, 1948.

³⁷ C. Gutiérrez Noriega and V. Zapata Ortiz. *Estudio sobre la coca y la cocaína en el Perú*. Lima, Ministerio de Educación Pública, pp. 59-61, 1948.

³⁸ C. Gutiérrez Noriega and V. Zapata Ortiz. "Estudio de la inteligencia en sujetos habituados a la coca". *Revista de Farmacología y de Medicina Experimental*, 1, 1, p. 32, 1948.

Special reference should be made to another well-known doctor of Cuzco who was most sincerely convinced that coca leaf is disastrous for the Indian. By way of contrast he pointed to the Adventists of Puno and Juliaca. He explained the habit in the following way: "The Indian is racially an oligophrenic, perhaps as the result of centuries of oppression. Coca leaf makes him forget his difficulties, but at the same time damages his moral personality; he becomes dirty, smelly, negligent. This closes him out of society and he is looked down upon by *mestizos* and whites."

To the question why some of his colleagues do not see any harm in coca leaf, his answer was: coca leaf does no physical harm, its action is psychical. Such doctors see only the body, in which they really cannot notice any change.

The "mental" effects of cocaism were also specially emphasized by a physician of Cochabamba who was convinced of the harmfulness of coca leaf to the Indian's personality. He stressed at the same time the influence of illiteracy and of the poor standard of life of the indigenous population. He emphatically declared that those Indians who were chronic coca-leaf chewers were very poor soldiers during the Chaco War, compared with non-chewers. He contended that ". . . the mental decay and the social inferiority of the Indian are due to: (a) a lack of education; and (b) the influence of two toxic substances, i.e. coca leaf and alcohol . . .".

In this connexion it may be noted that a medical doctor of Catavi found that accidents in the mines occur more frequently in the afternoons when the coca leaf is acting. This was confirmed by a worker, who thought that mine accidents happen to chewers more frequently because they pay less attention to their work.

Race degeneration

The usual opinion of the fighters against coca-leaf chewing is that it has led to a general degeneration of the Indian race. This phrase is much used in politically-coloured discussions, especially in Peru. In its extreme expression this opinion holds coca-leaf chewing responsible for all the backwardness of the Indian. Thus it is that the great amount of semi-popular medical literature on the coca leaf—which rests on no real scientific foundation but is influenced by a well-meaning desire for social improvement—attempts to explain the great problem which besets these countries, i.e., the difficulties encountered in the education and absorption of the Indian population. This race, it is said, once produced a high culture and now lives at a primitive level. This is attributed to race degeneration through coca-leaf chewing.

It is characteristic that the same logic is also used, though in a different way, by the political supporters of the Indians, who contend that this race was able to produce all the marvels of pre-Incan and Incan art, and is still endowed with the same capacities. Nothing could be more characteristic of the unfortunate confusion of social, political, economic and race problems with a purely medical problem, than this question of "race degeneration".

As a proof of the so-called race degeneration of the Indians, especially those of the Altiplano and the Sierra, where they chew coca leaves, the difficulties in education are often adduced. The Commission visited schools

and spoke with teachers. There seems to be nothing one could not teach an Indian child. Teachers, who are conscious of the difficulties of the *milieu* for children's education, fully realize that their peculiar difficulties arise out of this.

In contrast to what one would expect, school children are relatively clean, brush their hair, are neatly clothed and often in their uniforms. In Cuzco City, children are likely to be of mixed breed (*mestizos*), but some of them were pointed out as pure Indians. The Commission saw a probably pure Indian five-year-old boy in the kindergarten of a school in Cuzco; he was writing and counting as children of six and seven years of age do in Europe.

In a country like Bolivia, where illiteracy (officially 75 per cent) prevails, the Indians cannot be blamed themselves for their backwardness.

Admirable results in education were, however, observed by the Commission in the agricultural school of Huarizata on the Bolivian side of Lake Titicaca. Children between 6 and 18 years of age were taught gardening. A substantial number of teachers were pure Indians and expounded their views with clarity to members of the Commission.

At a rural school the teachers believed, it is true, that the children whose parents were coca-leaf chewers were mentally and physically inferior to those whose parents did not chew. Unfortunately, no methodical and systematic tests had been made. It should be remembered, on the other hand, that the economic status and living conditions of the chewers are exceedingly poor.

An opinion, which is perhaps more important, is that of the school director at Chulumani, who said that the Indians are somewhat delayed in their reactions, but if one educates them, one finds the same qualities as in the white race. It is the environment of the children which changes their reactions from the earliest time on. There are no idiots and there is no decreased mental capacity in the Indian children. Thus he denied any "race degeneration" through the use of coca leaf.

It may be added, incidentally, that most schools in Peru and some in Bolivia seem to teach that chewing is unhealthy. This knowledge is spreading and the case may be cited of a 14-year-old boy who was eating something in the ancient Incan village of Pisac (Peru): he was quite offended when the Commission interpreter asked him (in Quechua) whether he was chewing coca leaf. The Commission has not much hope—as some teachers have—that this morality may spread from the children to the parents. It is, however, rather remarkable how, in the mining region of Morococha and Catavi, younger people are chewing less, and chewing seems to decrease as the younger generation grows up.

Another point, which speaks against a race degeneration, is the high educability of the Indian for industrial work. In the factories of Estrella in Cuzco or in that of Lukre, both producing carpets, shawls and clothes, the Commission saw pure Indians working skillfully and handling modern machinery.

In the laboratory of the copper mining industry in Oroya all the laboratory assistants were Indians and were used in the same way as laboratory technicians are in Europe. The same is true of the analytical lab-

oratory of the tin mines of Catavi (Patiño Corporation), where one chemist can make 1,000-1,500 quantitative analyses a day, with the assistance of mostly Indian laboratory assistants.

On the other hand, the indigenous population of the Altiplano, especially round Lake Titicaca, which lives under very difficult environmental conditions, none the less works its fields with care and a knowledge, which, of course, must be judged in relation to its resources. The Commission admired the acres of potatoes, which were dug up on slopes where few European peasants would have tried to grow their crop.

Some officers and a military doctor in Arequipa claimed to be pure Indians from the Altiplano.

In another region, reference should be made to the former Director of the National Museum of Archeology in Lima and a famous archeologist himself. He claimed to be of pure Indian race.

In the University of Cuzco there is a strong feeling against the idea of "Indian race degeneration"; however, this is connected with the *Indigenista* movement and was especially underlined in the Second Indigenist Congress in Cuzco in the summer of 1949. This Congress adopted a resolution refuting opinions on physical or intellectual degeneration of the Indians (see annex 1).

The views expressed to the Commission at different round-table conferences were, on the whole, contrary to the idea of race degeneration. At Cerro de Pasco, one workers' representative believed, however, in the "race-degenerating capacity" of the coca leaf, even though he thought it a necessity for the Indian for which he could see no substitute.

A doctor of Cuzco, on the other hand, was against such "nonsense" as the use of coca leaf leading to race degeneration, of which he saw no signs.

A medical doctor of Huánuco also had found no sign of race degeneration among adults or children.

Gutiérrez Noriega and his co-workers found a high frequency of degenerative stigmata, skeletal and cranial deformities, deaf mutism, dwarfism, etc., in chewers, but they are careful enough to say: "Of course, coca addiction is not the direct cause of these disturbances."

In his lecture to the Wisconsin School of Medicine, Gutiérrez Noriega refers to other possible causes such as malnutrition.

The fact is that if, as seems to be the case, degenerative cases have a higher frequency in certain regions where the coca leaf is chewed, these regions are, at the same time, those which are socially the most backward.

If the coca leaf is also to be mentioned as a cause, it has first to be proved that: (1) race degeneration actually exists; and (2) that coca leaf takes more part in it than the above-mentioned factors. The Commission has the impression that no signs of racial degeneration can be demonstrated among the indigenous population of the Altiplano and the Sierra, especially none, that are related to coca-leaf chewing. If there were any such signs, they are much more likely to be due to syphilis, alcoholism or chronic starvation.

Cretinism

Cretinism is mentioned as one of the proofs of race degeneration, and without any hesitation one author made the coca leaf responsible for it. The Commission occasionally observed goitre, mostly in women, and always in an endemic form in certain villages. Near Huánuco, Sta. María has much goitre, but nearby the people have none and are very well grown. In Sta. María, a typical cretin girl of about 20-25 years with goitre was seen. The clinical picture of her and of the other goitrous people was very much the same as in endemic regions in the Alps in Switzerland. Similar observations were made near Quillabamba, where two cretins and a great deal of goitre were seen. The Commission believes that lack of iodine may, here too, be the explanation, and proposed to the doctors of Huánuco to try iodized salt distribution. They had thus far taken no notice of the goitre problem, or of cretinism. To call cretinism a sign of race degeneration is not correct.³⁹

Growth

Growth was stated to be subnormal in Indians, especially in women, and in some regions; but it is well known that growth is a racial characteristic and largely influenced by diet. There is every likelihood that the children grow up in a state of chronic starvation. At least, after weaning they never see milk again. This matter has already been discussed in the chapter on general nutritional status.

Epilepsy

The opinion of Kuczynski was that in coca-leaf chewing regions the number of epileptics is higher. This might or might not be connected with coca leaf. Federico Saly Rosas (Psychiatric Clinic, Lima) has worked on the relationship between epilepsy and the high altitude and different climates of Peru (Symposium on High Altitude Biology, 1949). No final conclusions about any connexion can be drawn. The director of a hospital at Quillabamba, whilst noting the relatively high incidence of epilepsy in his area, did not believe that it had anything to do with coca-leaf chewing.

Liver diseases

Liver diseases are said to be a sign of race degeneration or in some way related to coca-leaf chewing. They could, of course, be the result of a chronic intoxication. On the other hand, the various infections to which the populations concerned have been subjected could fully explain certain liver damage. Alcoholism might be a further factor.

Alcoholism

A frequent remark in discussions of the coca-leaf problem in Peru and Bolivia is that it is "not coca leaf but alcohol which is the major evil which ruins the Indian".

The main alcohol-containing drinks of the Indian are *chicha* and *aguardiente*. *Chicha* is a product of fermentation of maize, and sometimes of other grains. The yeasts are wild, certainly not pure; according to the opinion of a cultivated (Bohemian) beer-brewer, they

³⁹ The problem of goitre in the Peruvian Andes was already discussed in the *Société d'anthropologie* of Paris in 1861 (*Bulletin de la Société d'anthropologie*, Paris, 2, 86. 1861).

are highly infected. The product is said to have 5 to 13 per cent of alcohol. It is mostly "home-made". Great quantities of *chicha* are drunk, but since the alcohol content seems in general to be no more than that of beer, its effect is relatively slight. Much more dangerous is *aguardiente*, which is produced from sugar cane. It was explained to the Commission that, in many places, the greater part of plantation sugar is used for its production and, indeed, in many regions—such as the Huánuco country—every sugar plantation seems to contain a plant for alcohol production. The opinion was expressed that the extremely heavy intoxication of *aguardiente* drinkers is perhaps partly caused by toxic by-products.

The Indian is generally not a regular (daily) alcohol consumer. His main consumption is connected with his fiestas. Since the number of these is rather large, however, occasions for drinking are frequent. He generally drinks also after finishing a business deal, in markets after selling his cattle, etc. Burials are a special occasion for getting drunk.

It was agreed that crime is generally connected with alcoholic intoxication. At the same time, police officers and judges unanimously denied that coca-leaf chewing had any influence on crime in the life of the Indian.

No connexion between coca-leaf chewing and alcoholism was unambiguously affirmed at any of the Commission's conferences. As an answer to its questions, it was sometimes said that the connexion was possible, but no comparisons and no analyses of this question have ever been made. The Commission, therefore, cannot affirm that the existence of such a connexion has been proved.

The Commission might, however, question whether coca-leaf chewing has any influence on alcoholism and thus, indirectly, on crime. If one concedes that inveterate coca-leaf chewing, like cocaineism, changes the moral personality, it might be possible that it could lead to an abuse of alcoholic beverages, ending in those extreme bouts of drunkenness which quite often can be seen among Indians. This relation of coca-leaf chewing to drinking has not yet been studied.

Alcoholic abuse is primarily a health problem (many of the liver cases attributed to coca leaf might rather have their origin here). It is, furthermore, a problem of crime; finally, it is an economic problem, for it leads to the irresponsible spending of money which could otherwise be used for the family's nutrition. This is a disaster, especially in the mining regions.

There is, however, one point to be mentioned on the other side. *Chicha*, the "beer" which contains from 5 to 13 per cent alcohol, may add to the otherwise deficient nutrition, in the same way as beer in the Munich diet. A litre of *chicha* with 100 grammes of ethyl alcohol represents about 500 calories; this is a large proportion of the very deficient diet of the Indian, which ranges between 1,000-2,000 calories. This point was also mentioned in the Bolivian Report to the FAO Conference of 1948. It might be added that the B₁ and B₂ vitamin content of *chicha* is certainly high, too, since it is still in a state of fermentation.

It is certain that, as coca-leaf chewing, alcoholic abuse represents also a great social, economic and criminological problem.

Coca-leaf chewing as a habit or addiction

To elucidate the position, some consideration is required, in the first place, of what is in fact meant by addiction. On the plane of legislation there have been many discussions on the question whether the chewing of coca leaves ("cocaineism") is a habit, or, like cocaineism, an "addiction" (toxicomania).

In general usage the term habit describes an innocuous, customary action. Addiction, on the contrary, means by its origin, the Latin *addicere*, "surrendering to a master" (Dr. P. O. Wolff).

It must not be forgotten that a "habit" may become an "addiction".

The difficulties of framing a definition of habit and addiction led the Commission on Narcotic Drugs of the Economic and Social Council to request the World Health Organization to give a definition of "drug addiction" and "habit-forming drug". The "Preliminary Consideration"⁴⁰ of the second session of the Expert Commission on Habit-forming Drugs clearly shows the difficulties of an exact differentiation between the two terms.

The Expert Committee on Drugs Liable to Produce Addiction gave the following definition of addiction at its meeting of 9-14 January 1950.⁴¹

"Drug addiction is a state of periodic or chronic intoxication detrimental to the individual and to society, produced by the repeated consumption of a drug (natural or synthetic). Its characteristics include:

"(1) An overpowering desire or need (compulsion) to continue taking the drug and to obtain it by any means;

"(2) A tendency to increase the dose;

"(3) A psychic (psychological) and sometimes a physical dependence on the effects of the drug."

In the light of this definition, the observations of the Commission show that coca-leaf chewing is not an addiction (toxicomania) but a habit. It may, however, in some individuals, become an addiction, but generally it can be given up like other habits.

Coca-leaf chewing has all the characteristics of a habit. It is easy to teach the young soldier not to chew. No abstinence symptoms are seen. But if he comes back to his former surroundings, where everybody chews, he quickly becomes a chewer again.

Chewing in primitive Indian society means to be grown up, manlike, and is the reason why most boys chew after they reach puberty.

As a habit, coca-leaf chewing is not bound to certain climatic conditions. Workers from the Altiplano who work on the San Lorenzo Islands, near Lima, were found to chew. They were absent from their homes for about six months, but had not abandoned their habit.

The Commission learned that wild Indians of the Urubamba Valley, from the jungle of the plainland south-east of Quillabamba, acquired the habit of chewing from contact with the half-civilized Indian workers.

⁴⁰ Document WHO/HFO/19.5.I.1950.

⁴¹ WHO Technical Report Series, No. 21, 1950.

At Cajamarca, a medical doctor recorded his conviction that coca leaf creates an addiction. At Cuzco, on the other hand, the Rector of the University stressed the point that for any radical suppression of coca leaf one would need scientific proof of a toxicomania, which in his opinion does not exist.

At Chulumani, a medical doctor expressed himself in favour of coca-leaf chewing, asserting his belief that it is harmless, and arguing that, before any action is started against chewing, it has to be proved that it is a harmful toxicomania.

A doctor at Huánuco also declared that during the course of twenty-one years he never saw any signs of coca-leaf addiction. Another local physician took the same view.

This habit can be influenced by education, teaching, example as by Adventists in Puno, or by prohibition, as in the armies of Peru and Bolivia.

This seems to be different from addiction to poisonous drugs, like cocaine, opium and its derivatives, cannabis, etc. Those who are addicted to these are not easily influenced by education or reason.

The absence of abstinence symptoms has been variously reported.

Ciuffardi notes that there is no acquired tolerance, or acquired sensitivity in the coca-leaf chewers of long

standing, whilst in his lecture to the Wisconsin School of Medicine, Gutiérrez Noriega records the fact that coca-leaf chewers have no increased tolerance, and abstinence symptoms appear only in the inveterate coca-leaf addicts.

On the basis of the observation that, even in the inveterate coca-leaf chewers, abstinence symptoms are slight and less prolonged than those observed in other drug addictions, some assert that coca-leaf chewing is not a drug addiction (Paz Soldán, Monge), but a habit.

Gutiérrez Noriega, however, says to this: "They forget that cocaine addicts also have, in some cases, no abstinence symptoms or but very slight ones. Moreover, the defenders of cocaism seem to forget that, as always happens among drug addicts, coca-leaf chewers show strong cravings for their drug." On this basis he counts coca-leaf chewing as an addiction.

The Commission thinks that it would be a pity if legislative action were to be influenced by such nomenclature. It might easily be that the use of coca leaf in moderate doses is a habit, which might, however, occasionally become an addiction with large doses. So long as it is a habit, it is easy to give up; no strong craving and no abstinence symptoms will be seen. The Commission desires, however, to state that the habit of coca-leaf chewing is also dangerous, because the leaves contain a toxic substance—cocaine.

Chapter VI

CONNEXION BETWEEN COCA-LEAF CHEWING AND LIFE AT HIGH ALTITUDES

MEDICO-BIOLOGICAL RESEARCH

The initiator of medical biological research on high-altitude biology in Peru is Professor Dr. Carlos Monge, the Director of the Institute of High Andean Biology. He published, as early as 1928, a volume of over 300 pages, on his and his group's work: *La enfermedad de los Andes* (Anales de la Facultad de Medicina, Lima). After much detailed work, he published, in 1948: *Acclimatization in the Andes, Historical confirmations of climatic aggression in the development of Andean man* (Baltimore, The Johns Hopkins Press, 1948); and further: "*Acclimatación en los Andes*" (Revista Universidad, San Agustín de Arequipa, 1948, pp. 79-108); and "*El problema de la coca en el Perú*" (Anales de la Facultad de Medicina (Lima), 29, 4, p. 311. 1946).

Monge inaugurated research on the physiology of the Andean man, for which he organized his institute in Huancayo (3,200 metres), the new laboratory in Morococha (4,500 metres) and La Cima (5,030 metres). His work has been approved by the Symposium on High Altitude Biology, which was held under the auspices of the United Nations Educational, Scientific and Cultural Organization from 23-30 November 1949, in Lima.

He also inaugurated the study of the problem of whether coca-leaf chewing is connected in a useful way with life in high altitudes.

In his article, "On the problem of coca in Peru", he wrote the following: "It is therefore logical to suppose that the response to coca leaf taken through the chewing of leaves, and to the alkaloids absorbed, will be likely to assume special forms in the physiological processes of adaptation and acclimatization to altitude . . . one could be inclined to accept the necessity and innocuity of the drug considering the strenuous conditions of life at the high altitudes . . .". The last sentence establishes a direct connexion between the problem of coca-leaf chewing and high-altitude research. He added: "To sum up, it may be concluded that the coca-leaf-chewing habit does not cause a clinically established disease, and does not present the characteristics common to drug addiction. It is, however, possible to suppose that it acts as a pharmacological agent intensifying the humoral reactions which raise the level of individual performance. It is this last working hypothesis which is now under study by the Institute of High Andean Biology."

Since, therefore, as the leader of scientific research on high-altitude physiology, and at the same time the Chairman of the Peruvian National Coca Commission, Professor Dr. Carlos Monge gives coca leaf such an

important place in high-altitude physiology, it appeared important to get as much information on his work as possible. In this connexion, it was known that the Professor of Pharmacology at San Marcos University in Lima, C. Gutiérrez Noriega, had criticized Monge's views in his article "*Errores sobre la interpretación del cocaísmo en las grandes alturas*".⁴²

The holding of the Symposium on High Altitude Biology at Lima during the Commission's stay there gave it a unique opportunity of securing directly the opinions of Peruvian research workers.

As a result of these contacts, the following pages will be devoted to a discussion of the acclimatization to high altitudes in the Andes, especially the following points which Dr. Monge and his group study: general physiological conditions of the Andean man; fertility; reaction to drugs; is the Andean man a physiologically different race, or simply completely acclimatized to high altitude?

GENERAL PHYSIOLOGICAL CONDITIONS OF THE HIGH ANDEAN MAN COMPARED WITH THE ACCLIMATIZED WHITE MAN

As has long been known to physiology, man at 3,000-4,000 metres of altitude is different in many ways from man living at sea level or up to 1,500-1,800 metres:

(1) *Blood*. It is well known that at 3,500 metres the oxygen saturation of the arterial blood is only about 85 per cent O₂ compared with 97 per cent at sea level. The erythrocyte count is increased, at 4,000 metres to about 6,500,000 per cubic millimetre as against 5,000,000 at sea level (both numbers being, of course, mean values). Reticulocytosis and increased viscosity are found.

(2) *The respiratory apparatus* shows increased lung volume.⁴³

(3) *Circulation* is altered: Hypertrophy of the heart, especially of the right ventricle is seen. The functioning of the heart at 4,500 metres is close to its maximum capacity (Rotta). There is a pulmonary congestion (Hurtado), and sometimes a decreased circulation time.

(4) *The haemoglobin dissociation curve* is displaced to the right (acidosis).⁴⁴

⁴² *Revista de Farmacología y de Medicina Experimental*, 1, 1, p. 100, 1948.

⁴³ A. Hurtado, *American Journal of Physiology*, 100, p. 487, 1932; *Journal of the American Medical Association*, 120, p. 1278, 1942. F. Verzar, *Archives de Physiologie*, 232, p. 322, 1932; *Schweizerische Medizinische Wochenschrift*, 76, p. 932, 1946.

⁴⁴ H. Aste Salazar and A. Hurtado, *American Journal of Physiology*, 142, p. 733, 1944

(5) *Tissue respiration* changes are discussed (increase of myohaemoglobin (Hurtado)).

(6) *Internal secretion* changes (adrenal cortex? thyroid? anterior pituitary) and changes in the excitability of the autonomic nervous system have been observed.

There are changes which, as far as is known from actual research, are present in the same way in white men who live at this altitude.

Some of these changes are different as between newcomers and permanent inhabitants, as a result of acclimatization; such are changes in respiration, blood pressure increase, pulse increase, lactic acid in the blood plasma, etc.

This is not the place to discuss these various acclimatization changes, which have, in the past, been studied only in short-term experiments under the conditions of the high altitude stations in Europe or in the United States of America, and by Hurtado and his group in the Andes. It will be possible, in future, especially in the new Morococha laboratory (4,500 metres), to study the physiology of the indigenous population more extensively. It is already known, however, that in the indigenous population respiration ventilation is not increased, blood pressure is rather low, and circulation, measured by the heart minute volume, not to be increased. Hurtado, Aste Salazar and especially Rotta, are studying these questions in Peru. There seem to be also some metabolic differences.

Hurtado has recently pointed out that physical work is done by the indigenous population with great efficiency and more vigour than by people at sea level. However, all this seems only to show that the Indian, who was born on the Altiplano, is a fully acclimatized man, who has shed off the transitory acclimatization effects which were known from former short-term research. There is as yet no evidence which compels the belief that he is racially different in his physiological behaviour from the white man.

This work of the laboratory of Professor Hurtado is not connected directly with the coca-leaf-chewing problem but is concerned with acclimatization to high altitudes. His work, which is conducted on a highly scientific basis, has nowhere led to the opinion, or to a confirmation of the opinion, that the Andean man is racially different from the white man.⁴⁵

⁴⁵ List of scientific papers on acclimatization to high altitudes, which have been studied by the Commission:

(1) A. Hurtado and others. "Studies of total pulmonary capacity and its subdivisions". *Journal of Clinical Investigation*, 12, pp. 793, 807, 833. 1933; 13, pp. 169, 1027. 1934; 14, pp. 81, 94. 1935.

(2) A. Hurtado and H. Aste Salazar. "Arterial Blood Gases", etc. *Journal of Applied Physiology*, 1, p. 304. 1948.

(3) A. Hurtado and others. "Study of the blood . . . Blood volume". *Journal of Clinical Investigation*, 13, p. 999. 1934. "Affinity of haemoglobin for oxygen at sea level". "Studies of myohaemoglobin at high altitudes". *American Journal of Medical Sciences*, 194, p. 708. 1937.

(4) Hurtado and others. "Influence of anoxemia on the haemopoietic activity". *Archives of Internal Medicine*, 75, p. 284. 1945. C. F. Merino and C. Reyna Farje. "Bone marrow studies in the polycythaemia of high altitudes". *Journal of Laboratory and Clinical Medicine*.

(5) A. Hurtado. "Chronic Mountain Sickness". *Journal of the American Medical Association*, 120, p. 1278. 1942. "Even the native can lose his adaptation. 'Monge's disease' in eight Indians shows that the main signs are the loss of adaptation with a simultaneously high erythrocyte count."

In Bolivia Dr. Quiroga has written a memorandum, "*Consideraciones biotipológicas del hombre de los Andes*", which also contains much valuable data from this country.

FERTILITY

Professor Monge has pointed out in his last book, *Acclimatization in the Andes* (1948), in a special chapter, "II. Fertility and Acclimatization" (pages 26-46), that changes in fertility occur in high altitudes, and has given this fact a prominent part in his teaching on the racial differences of the Andean man.

The facts are: Andean man is extremely fertile. The white man arriving here is said to be less fertile than before. The same is said of animals which are brought up to 3,000-4,000 metres of altitude from sea level.

At the Institute of High Andean Biology, Dr. San Martín, a member of the Veterinary Faculty of the University of San Marcos in Lima, has done a series of researches on this problem. He read papers referring to this question at the Symposium on High Altitude Biology. There seems to be no doubt that when animals are brought up to high altitudes their fertility frequently decreases for a while. Oligospermia has been observed. So far as can be gathered from a number of carefully weighed reports, however, the animals become adapted after a certain time and then no differences can be seen.

An engineer, Luis Monge C., from the Institute of High Andean Biology, gave the Symposium a report on the fertility of bulls and sheep in Huancayo. There was no statistically significant difference. The mathematical accuracy was doubted by others, but the fact remains, so it would seem.

The Commission collected data from the State Experimental Farm of the Ministry of Agriculture in Caíra, near Cuzco, where the Director was careful to point out that, besides altitude, many environmental changes such as food, temperature, etc., can influence fertility. His work is not done in conjunction with the research of the same kind undertaken by the Institute of High Andean Biology, and is therefore valuable as a control. The farm is at 3,253 metres altitude. In steers brought from the lower land, fertility varied between 17 and 45 per cent, in pigs it was "high", in sheep 49.7 per cent (Romney Marsh, England, ten

(6) A. Hurtado and others. "Physiological characteristics of flight personnel". *Journal of Aviation Medicine*, 18, p. 406. 1947.

(7) A. Rotta. "Physiological condition of the heart in the Natives at high altitudes". *American Heart Journal*, 33, p. 669. 1947.

(8) E. D. Febres. "La bilirubinemia". *Anales de la Facultad de Medicina* (Lima), 32, p. 29. 1949.

Prof. Monge is connected intimately with Hurtado's group and the following papers belong to his group of the Institute of High Andean Biology:

C. Monge, M., Leoncio Contreras, T. Velásquez and others. "Adaptaciones fisiológicas de los habitantes del trópico en relación con los cambios de altitud." *Ibid.*, 31, p. 431. 1948. This gives many facts about acclimatization of inhabitants from altitudes of 4,500 metres if they go down to sea level. The adaptation was not complete after four months.

C. Monge Casinelli. "Glucosos ácido láctico y ácido pirúvico al nivel del mar y en altura". *Ibid.*, 32, p. 1. 1949.

F. Cabieses-Molina. "Contribución al estudio del sistema nervioso vegetativo . . . en las alturas". *Ibid.*, 29, p. 316. 1946.

F. Cabieses Molina. "La acción antifatigante de la cocaína y la habituación a la coca en el Perú." *Ibid.*, 29, p. 3. 1946.

males). Chickens gave 135, 82, 58, and 40 eggs in successive years. But no low-altitude parallels exist. More studies will be made.

The FAO report of Dion ("Agriculture in the Altiplano of Bolivia", FAO, 1949) states, on page 28 ("Livestock"):

"Agricultural reports customarily state that the altitude is unfavourable to livestock generally and that as a result the animals 'degenerate' quickly, and have low reproductive rates (Colley, B. I. "The haciendas of the Cerro de Pasco Copper Corporation". *Mining and Metallurgy*, 26, p. 568. 1945). We are satisfied that these difficulties can be attributed to faulty nutrition as a result of: (1) overgrazed ranges and very low carrying capacity; (2) a shortage of phosphorus in the herbage as a result of phosphorus-deficient soils. No marked improvement can be expected in the general quality of the livestock until these conditions are corrected."

This explains why only some students have observed decreased fertility. If it were due to the lack of oxygen, it should be general. Actually the Dion report states, on page 33: "There is no good reason why the Altiplano should not supply all of Bolivia's beef requirements; in spite of the fact that, at present, Bolivia imports large amounts of beef from Argentina . . ."

It has long been known that certain disturbances in the menstruation period in humans occur after journeys to high altitudes.

La Paz in Bolivia affords excellent opportunities for studying the problem of fertility in human beings. The town is located at 3,800 metres altitude, with a large white, *mestizo* and Indian population. The white population has increased during the last ten years by perhaps 20,000-30,000 or more European immigrants. The Commission visited a chief gynaecologist who is in charge of the Obstetrics Clinic of the University. He did not have the impression that the fertility of the European immigrants had changed at this altitude. On the contrary, his opinion was that, after they had had years of great hardship in Europe, when they arrived in the safe and healthy conditions of their new country, they immediately started to have families and were, in fact, extremely fertile.

Private information from a doctor at La Paz, who had married a German girl, and a missionary who had been living in Puno for eighteen months, showed that they have children as fast as is possible, and their wives had easy births and no complications whatever, at 3,800 metres altitude.

As a result of these inquiries, it can be accepted that the first weeks or even months may be attended by disturbances, which arise primarily out of a hormonal unbalance, especially as regards the function of the pituitary gland, but it is not thought that there is any lasting disturbance of fertility in man at high altitudes and no racial difference can be proved on this score.

CHANGED PHARMACOLOGICAL EXCITABILITY

One of the proofs, according to the teaching of Monge, that the Andean man is a specific race, is the different reaction to drugs. Since Monge has concluded that the Andean might also react differently to cocaine,

the reality of these theories has to be discussed. In 1946, Monge wrote: "The Andean is a being physiologically and chemically different from sea-level man",⁴⁶ and in 1943: "Thus, for instance, they (the Andeans) can stand intravenous doses of atropine three times as large as do the coastal people, without showing any sign of intolerance to the drug."⁴⁷ Confirmation of this has been sought from others, without result.

Professor Hurtado mentioned in the Symposium, as medical practitioners had already mentioned, that sulfa drugs are of higher toxicity at high altitudes. This has already been published by Granier M.⁴⁸ It has also been stated that narcotics are generally more toxic at high altitudes.⁴⁹ But these observations are hardly enough to conclude that there is a difference in the reactivity of the high Andean man. It is very probable also from the high-altitude work in Switzerland, that the vegetative nervous system is influenced by the low oxygen saturation of the blood. Vagotonic but also sympathico-tonic effects are observed. A changed reaction to neuromimetic drugs might well ensue from this.

The coca-leaf chewer has in no way a tolerance for cocaine, but the contrary—as a result of continuous cocaine absorption. Anaesthesia of the cornea and decreased reflex excitability have been described above.

THE ADAPTATION OF THE ANDEAN MAN TO HIGH ALTITUDE

If we scan all the collected material which should afford proof that the Andean Indian is a physiologically different human race, perhaps reacting differently to cocaine, we arrive at the following:

All physiological data on the Andean man has, as yet only shown that these people are fully acclimatized and have acquired a normal working capacity at high altitudes.

The adaptation to high altitudes even in the Indian is not always complete. "Monge's disease" is a loss of this adaptation. Hurtado described such Indian patients; if they were brought to sea level, their disturbances vanished and they were cured.

The reverse is more often seen. If Indian workers go down to the sea level for some time (a year or longer) their acclimatization to sea level often takes several months. They lose their adaptation to high altitude. If they return to their high-altitude home they get *soroche*, or mountain sickness, in the same way as an unadapted white man who arrives for the first time at this altitude.

All this clearly proves that the Indian is not physiologically different from the white man. At high altitudes he is fully adapted but he loses this adaptation at sea level, and has to acquire it again in the heights. His splendid physical state in his home land on the Altiplano and Sierra is the result of complete adaptation.

There remains the changed muscular mechanism in Hurtado's experiments, which have been mentioned earlier but have not yet been published. No explanation can be given as yet for these, but there is no reason

⁴⁶ *Anales de la Facultad de Medicina* (Lima), 29, p. 4. 1946.

⁴⁷ *Pesce. Monge Physiological Reviews*, 23, p. 166. 1943.

⁴⁸ *Revista de Sanidad y Asistencia Social*, 9, pp. 1-21. 1944.

⁴⁹ A. Loewy. *Physiologie der Höhenklimas*. 1932.

why this should be a racial difference, rather than an effect of acclimatization.

Not only the Indian is adapted but the *mestizo* and the white man, who do not chew, adapt themselves fully to high altitudes. Even the highest athletic prowess is reported.

CAN THE WHITE MAN BE FULLY ACCLIMATIZED AT THE 4,000-METRE ALTITUDE?

In view of the importance which is given to the hypothesis that Andean man is a special, physiologically different race, it must be seen whether complete acclimatization of the white man in these altitudes of 3,000 to 4,000 metres is also possible. The conclusion is that white people become fully acclimatized if they live long enough in these altitudes, and if they are fairly young and healthy when they arrive from the lowlands. The children of white people, who grow up here, are as well adapted as the local Indians.

In Peru, in the high altitude cities, such as Cuzco, Cerro de Pasco or Aroya, the white man is in a minority. He is generally a visitor for a certain time, an engineer in the mines, an officer of the army, etc. The indigenous population is almost totally Indian and *mestizo*, with all the signs of total acclimatization. The answer is easier in Bolivia than in Peru. In La Paz, Bolivia, a city at the 3,800-metre altitude with 300,000 inhabitants, there is a large white population, partly of Spanish origin, settled there for centuries, and there are also new European immigrants, whose number has increased more particularly during the last ten to twenty years.

In La Paz, at the National Stadium, a group of ambitious young doctors are engaged in sports medicine (*Gabinete Médico del Comité Nacional de Deportes*). They publish their own *Archivos del Gabinete Médico*. Their director was in Europe at the time of the Commission's visit, but other members were met by the Commission. They reported on sports at this altitude of 3,800 metres, and were of the opinion that, after acclimatization of ten to thirty days, full adaptation can be reached. Football is played continually, as well as tennis and other sports.

It was rather surprising to hear that comparison of the performance at sea level and in La Paz of players or athletes, who either came up or went down, and played and competed a few days after arrival, did not show the results at high altitudes to be inferior. Actually they were better. This embarrassing result has not been analysed so far.

There is no doubt that after-effects on respiration and circulation are increased, and especially in the 880-metre run the resulting effect is distinctly slower. For the almost anoxybiotic 100- and 400-metre runs the times are better. The whole problem, which is much discussed in South American sports circles, is interesting because it provides an answer to the question of adaptation to high altitudes. It is important for our problem that, at this altitude, adaptation progresses in a relatively short time to the point at which full working capacity is recovered.

The minutes of the third meeting of the *Congreso Extraordinario de Médicos* in La Paz on 16 October

1948, *al V. Campeonato Extraordinario Sudamericano de Atletismo*, record the decision: "(1) that it is possible to hold international championships in the city of La Paz and at similar altitudes". They proposed ten days for adaptation prior to tests.

The difficulties of adaptation for certain elderly people at this altitude are fully realized. But the working capacity in La Paz of doctors and of professors and scientists who were born and are living in La Paz confirmed their view that the white man can adapt; and in their case is fully adapted, to this altitude.

In the Medical Clinic of La Paz, as at other high altitude hospitals, the Commission was told several times that the pathology, even of circulatory disturbances, is not different there. The white, *mestizo* and Indian patients were all believed to be equally adapted to this high altitude.

IS COCA LEAF NECESSARY OR USEFUL FOR ADAPTATION?

It was supposed by Monge that coca leaf is necessary for the life of the Andean man. It was never experimentally proved, but some supposed that it contained a substance—either cocaine or something else—which: (1) helps adaptation to high altitude; (2) adds to the insufficient nutritional value of the food; or (3) changes muscular efficiency in high altitudes.

It was especially pointed out (Monge) that, with relatively small exceptions, which were called "statistically insignificant", coca-leaf chewing is a habit of high altitudes. At altitudes over 3,500 metres, actually 100 per cent of the population chew. It was concluded that chewing must bear a relation to the life of these altitudes.

The counter-proof is not difficult. There are fully adapted, very active working men in high altitudes who do not chew coca leaf. There is first the white man who comes into this region and the *mestizo* who do not chew.

There are also colonies of Indians who have given up chewing, like the Adventist group around Puno. Their preacher told us about 4,000 Indians who do not chew. He stated that their prosperity and social status is higher than that of their fellow countrymen who do chew.

A hospital doctor and practitioner at Cuzco, who also teaches physiology at the University, told the Commission: "The Indian is excellently adapted to fight altitudes but for this he needs no coca leaf. There are enough examples of non-chewers and *mestizos* and whites who do not chew, and who are also adapted to the same excellent degree. The Indian is not stronger than a non-chewing *mestizo* or white."

At Trujillo the round-table conference also felt that "altitude was not the only factor involved in the production of the habit".

Kuczynski and Paz Soldán have produced much evidence of coca-leaf chewing in much lower, even in tropical, regions. In Cajamarca, Quillabamba and Huánuco, chewers were found in great numbers. It may be that the quantity which is generally chewed there per person is less than on the Altiplano. Still, very high quantities are sometimes chewed, and cases

with psychic disturbances were reported in Kuczynski's reports from this lowland.

There is finally the great experiment of the military service. There is no doubt that chewing would not be prohibited in the Peruvian and the Bolivian armies if the working capacity of the Indian soldiers (who constitute more than 90 per cent in the Bolivian army) were decreased when chewing is prevented.⁵⁰

It may be concluded that there is no proof that coca leaf is useful or is even necessary for adaptation to work and to life in general at high altitudes.

C. Gutiérrez Noriega in his Wisconsin lecture wrote: "Some . . . have arrived at the erroneous conclusion that coca-leaf chewing is indispensable for South American natives living in high altitudes . . . Unfortunately that absurd hypothesis has always been a powerful argument to preclude all the legislative projects to eradicate the coca-leaf addiction" (page 11).⁵¹

⁵⁰In general, it should be noted that coca-leaf chewing is prohibited in the armies of both Peru and Bolivia, and this ban applies to garrisons stationed at high altitudes as well as to others in lower stations or virtually at sea-level. Information obtained direct from military commanders, officers and doctors shows that this deprivation does not lead to abstinence symptoms. The conscript quickly becomes used to it, gains weight and improves physically and mentally.

In a paper on "Haematic and chemical changes in the Peruvian Native during his service in the army" submitted to the Second Inter-American Indigenist Congress by Lt. Col. Dr. A. Guzmán Barrón and Second Lt. Percy Salomón Butler, both

There is no proof that the Indian owes his adaptation to coca leaf. The other groups adapt themselves without coca leaf in the same way. If it has been said occasionally that for mountain-climbing coca leaf was useful, this was an example of "doping", well known with other substances also to mountaineers.

The conclusion is thus that neither is the Indian a physiologically different man who would need, or could tolerate coca leaf or cocaine differently from other races or man, nor is his high adaptation unique. The white man can adapt himself also. No coca-leaf chewing is needed for this. The so-called relation between high altitude and coca-leaf chewing is a reflection of other factors—the difficulties of life of the high Andean man, which facilitate his habit for a drug that deadens his sufferings. These other factors have now to be discussed.

of the Central Army Laboratory, the following argument is presented: Anthropometric, haematological and chemical investigation shows that most conscripts enter the army with pronounced physiological defects, and that their physical condition improves appreciably during their life in barracks, with adequate food and hygiene and suitable physical exercises. Both in Peru and in Bolivia coca-leaf chewing is prohibited by the military regulations and not by a law of decree promulgated for that purpose.

⁵¹See also *Revista de Farmacología y de Medicina Experimental*, 7, 1, pp. 107, 56, and 2, 1, p. 170.

Chapter VII

COCA-LEAF CHEWING AS A CHARACTERISTIC OF THE INDIAN'S LIFE

Coca-leaf chewing is so much a characteristic of the Indian's life in the Altiplano and Sierra that it would be a great mistake to look at it without considering the whole social life of the Indians.

After having lived three months in Peru and Bolivia and much of this time among the Indians, the Commission is convinced that it was a logical error for a large, partly medical, partly popular and partly political literature, which began with Ricketts' political action, and continued with the work of Saenz in Lima and many others, to condemn coca-leaf chewing as responsible for the miserable social conditions of the Indian, for his poverty, his inability to attain a higher social status, for the difficulties in his education, for his depressive introversion, and so on.

When one has seen how the Indians live, one rather has the impression that this well-meant activity against coca-leaf chewing was putting the responsibility for the wretched social conditions on coca leaf and overlooking the fact that the real responsibility lies not only with coca leaf, but also in the other circumstances which keep this people in their extremely low social status. Nor is the opposite view correct, though an observer might easily come to that conclusion, that coca leaf has to replace something that is lacking. The Commission does not agree with the theory that coca leaf contains a biologically active substance of nutritional value or one necessary for high altitudes which makes life possible there. But it is its conviction that coca-leaf chewing is a habit and may sometimes become an addiction because in such very low social conditions it helps, through its hunger- and fatigue-depressing action to counteract the hardness of their life by deadening their feeling of hunger and fatigue. If it is accepted that this habit of coca-leaf chewing is harmful, then the only way to abolish it is to reduce the difficulties of the Indian's life and better his whole social status.

That this conception is right can be proved by the following observations:

Not all Indians in the same region chew coca leaf. It was found first in the well-organized Estrella factory in Cuzco and in the factory at Lukre, where Indians were working on the weaving machines, that not one person in a hundred was chewing. Then a big laboratory was seen in the mining centres of Oroya and another one in Catavi, where a substantial number of laboratory workers were Indians. Not one was chewing when working.

In the tin mines of the Patiño Company, 700 metres under ground, the chief man, who was driving the drilling machine and who had to use his judgment to decide where to follow the mineral (a difficult business

with tin, because it has no mineral appearance as has copper in the mines of Morococha and Cerro de Pasco), was a Chilean *mestizo*, highly paid. He was not chewing. But the ordinary Indian miner, who could only be reached by crawling on the hands and knees, and who was actually hammering the metal from the rock under the most arduous, tiring and dangerous conditions, was chewing.

Asked why they chewed coca leaf, both surface and underground workers of the Catavi region gave replies which may be summarized as follows:

- (1) Because coca leaf assuages hunger and even provides a substitute for water and food.
- (2) Because coca leaf gives greater strength or energy and thus prevents fatigue or sleepiness during work.
- (3) Because by keeping a plug of coca leaf in the mouth, mine dust is prevented from entering.⁵²
- (4) Because they had been chewing coca leaf since youth.
- (5) Because they liked it.

In Morococha two miners, who were mining in a lonely shaft, when asked "Why do you chew?" answered: "It makes me brave". In Catavi the answer was: "It makes me strong". "It gives me strength". In the same two mines, which are about 2,000 kilometres distant from each other (Morococha, 4,600 metres, three hours from Lima, Peru; and Catavi, 4,500 metres, 800 kilometres from La Paz), and of which the former is mining copper, the latter tin, the boys at the lifts, who had to do easier but also more intelligent work (for lifts in mines need very responsible attendants), were not chewing. They did not give any explanation for that. They denied that they were not chewing merely because they were taught in school not to do so. They merely seemed not to need it.

From this and many other similar observations it may be concluded that the same type of man does not always chew. He automatically gives up chewing if he has more intelligent work, which needs watchfulness

⁵² It was stated at a public meeting held at Catavi on 16 November 1949 and attended by doctors, teachers, local authorities, engineers and employers' and workers' representatives, that protective masks were available to keep out the dust, but that miners could not get used to them. The Commission found:

- (a) That none of the miners, whether coca-leaf chewers or not, wore a protective mask underground, and only a few did so in the workshops; and
- (b) That a certain number of coca-leaf chewers gave the desire to protect themselves against dust as their sole reason for coca-leaf chewing, or as a reason additional to those stated in (1) and (2) above.

and responsibility, and is also interesting. Together with this better type of work he has higher pay and therefore better food, a more complete diet, and perhaps some relaxation.

In the soldier's life, the good diet during military service is the main difference. This makes him forget chewing and he does not miss it. The tendency of the Indian to be more like the *mestizo* or the white man, who does not chew coca leaf, leads him to give up chewing.

Teaching, like that of the missionaries in Puno, can also make the Indian give up chewing. The theme was discussed (at the round-table conference in Puno) that the converts' total social status is changed once they are converted. They build better houses, eat better, work better, and it may be this change to a better *milieu* rather than the spiritual conviction which helps them to give up the habit of chewing.

School education also plays a part. Actually, in young men, chewing is becoming more and more rare. Examples have already been mentioned in which young people showed revulsion. A distinguished practitioner in Bolivia estimated at fifteen years the period he thought would be required to raise a Native stock which would not want to chew coca leaf because it had learned that it is unhealthy.

Besides the teaching of the Baptist and Adventist missionaries, of the public schools in Peru, and of the Military in Peru and Bolivia, mention should also be made of the teaching of the workers' unions (syndicates, etc.). It was rather remarkable that in Cuzco, where a special meeting was held with the workers' representatives, they were of the unanimous opinion that coca-leaf chewing should be abolished. In Catavi (Bolivia), too, at the round-table conference, workers' representatives unanimously spoke against coca-leaf chewing. In both places, of course, they pointed out that general living conditions should be altered first. Their remarks left the impression of a centrally directed teaching within the syndicates against coca-leaf chewing.

Especially interesting was a description by C. Gutiérrez Noriega⁵³ about his impressions in the same regions in which the Commission was also travelling: Cuzco, Puno, Quillabamba. They saw some of the same villages and factories (Pisac, Lukre), but he saw more. It matters not that his publication has been read only after the Commission's return. It is the more valuable since his observations and conclusions are more or less identical with those already reached by the Commission, and were arrived at absolutely independently, at an interval of two years. In his Wisconsin lecture (page 9), Gutiérrez Noriega says that: "School children between 7 and 12 years of age use coca leaf very often". In Peru and Bolivia all schoolmasters and the Minister of Education in Bolivia (a former schoolmaster) denied it. It may occur in regions where no schools exist.

He then states that the children who began coca-leaf chewing later "became vagabonds . . . , etc.". This observation was made in a *milieu* which was already extremely miserable. The Commission thinks that vaga-

⁵³ C. Gutiérrez Noriega. "Observaciones sobre el cocaísmo obtenidas en un viaje al sur del Perú." *Revista de Farmacología y de Medicina Experimental*, 1, 2, 1948.

bondage and chewing are both results of the same *milieu*.

Its main criticism is that the author is too much impressed by these rare cases of addictions with psychic disturbances, and extrapolates the deleterious effect onto the larger part of the population, where, certainly because they chew much less, no recognizable disturbances are seen.

Care should be taken not to give to the minds of less scientific fighters against coca-leaf chewing a false or over-emphasized picture of the harm done by coca leaf. This will produce a tendency to make coca leaf mainly responsible for all the misery of the Indians, the well-meant but false logic of *post hoc, ergo propter hoc*.

During the Commission's tour, a strong emphasis on the part played by social and hygienic factors was evidenced by the statements made at the various round-table conferences.

At Huánuco, emphasis was laid on the need for raising the general living conditions of the Indian. Certain doctors, though not convinced of the importance of the nutrition factor, agreed that the living conditions of the Indian are bad and that, if they became better, chewing would cease.

At Trujillo, the round-table conference emphatically pointed out that education and improvement of living conditions were the most adequate means for a gradual suppression.

At Cochabamba, the representative of the Mayor said that the so-called "mental poverty" of the Indian was due to his "economic poverty" and to hard work at high altitudes, whilst the Prefect testified to the improvement in the condition of army recruits given better food and living conditions.

At Cuzco, a doctor stressed the social conditions under which the coca-leaf chewer lives: hunger, fatigue, cold, as well as dirt, bad smells and all the disadvantages of low social class. For the poorer Indian, chewing is his solace and pleasure. He would have more conflicts in life if he did not chew. Suppression would be harmful without changing his whole situation. He did not believe, however, that ceasing to chew would alleviate the Indian's melancholy which is so characteristic.

Nobody has given a more thorough picture of the miserable hygienic and social conditions of the Indian than Kuczynski.⁵⁴ It has to be remarked that, in this picture, coca-leaf chewing plays only a relatively small part, as a vice which is the result of all the Indian's social conditions. Nowhere does he say that it is the cause of these. He describes it, not merely as a consequence of hunger, as others do, but as a result of general social conditions. Already in his paper of 1939 (in his second study of the Perené Colony, page 37) he discussed coca-leaf chewing in connexion with under-nutrition and general social conditions. He even saw five-year-old children chewing. At that time he hoped mainly for education as the method to fight cocaism. The coca-leaf problem is a problem of hunger, an economic problem for the *cocales* and a social problem for the Indians. Appropriate education stops chew-

⁵⁴ Kuczynski-Godard. *Diseción del indigenismo peruano* (Lima). Publicaciones del Instituto de Medicina Social, 1948.

ing. But great economic and social changes have to be prepared at the same time.

The conclusion from the opinions of all these authors is the same as that which follows from the Commission's own observations: The chewing of coca leaves is not the cause but the result of the poor hygienic conditions and the low social status of the Indian.

To sum it up, it may be said that coca-leaf chewing is a habit which is connected with the extremely low standard of living of the Indian. The toxic action of cocaine makes him partly forget his hard life. It diminishes his hunger, it deadens his feeling of fatigue and thus helps him to work more. But if his general living conditions change, if his nutrition is bettered, or his work becomes more interesting, or his life approaches a little nearer to that of higher-class standards, then the habit disappears.

The Commission has, therefore, reached the conclusion that the habit of coca-leaf chewing is deeply rooted in the general social conditions. Improvement of those conditions, and particularly better and richer food, better housing, schools, medical care, would result in a disappearance of this habit. This would be accelerated by appropriate education. (See Conclusions and Recommendations, part V.)

As long as the social conditions of the Indians remain what they are now, it would not be advisable, and it might be even dangerous, to withdraw coca leaves from them abruptly, and to attempt an immediate suppression of the habit.⁵⁵ It should be possible, however, to eradicate this harmful habit within the lifetime of one generation and even in a shorter period if the measures required to improve economic and social conditions were carried out systematically.

APPENDIX

ANALYSIS OF COCA LEAVES

Note:

The coca leaves utilized in the attached analyses were collected by the Commission during its stay in Peru and Bolivia (11 September to 3 December 1949). As soon as the Secretariat of the United Nations received the leaves, it set in motion the administrative machinery needed to have the analyses made.

The analysis of the alkaloid content of the coca leaves was carried out by the Treasury Department of the United States of America, and the result obtained was communicated to the Secretariat of the United Nations on 7 April 1950.

The analysis of the vitamin content was made by the Federal Security Service of the Food and Drugs Administration, Washington, D. C., and sent to the Secretariat on 22 May 1950.

A list is included indicating the origin of the coca leaves utilized in the analyses.

⁵⁵ The Commission on Social Sciences in Relation to Extension Work in its report on "Experience with human factors in agricultural areas of the world" (Extension Service and Office of Foreign Agricultural Relations, U.S. Department of Agriculture, 1018 (11-49) 1950) strongly emphasized that programmes of this type should be carried out with great care in understanding the social organization of the under-developed areas. This report might be profitably read in connexion with the above recommendations.

I. ALKALOID CONTENT

COCA LEAF SAMPLES

(First box)

| Number | Place | Approximate amount (ounces) |
|--------|---------------------------|-----------------------------|
| 1 | Chaullay, Quillabamba | 5 |
| 2 | Mandor, Quillabamba | 2 |
| 3 | Las Delicias, Tingo María | 7 |
| 4 | Shapajilla, Tingo María | 5 |
| 5 | Derrepente, Huánuco | 3 |
| 6 | Chinchao, Huánuco | 2 |
| 7 | Chihuongala, Huánuco | 2½ |
| 8 | La Capellania, Bolivia | 6 |
| 9 | Santa Rosa, Bolivia | 6 |

(Second box)

| | | |
|----|----------------------------|----------------|
| 10 | San Antonio, Bolivia | 4 |
| 11 | Finca Sacaya, Bolivia | 6 |
| 12 | Espirito Santo, Cochabamba | 6 |
| 13 | Santa Rosa, Celendín | 6 |
| 14 | Balsas, Cajamarca | 3 ¹ |
| 15 | Collombay, Libertad | 6 |
| 16 | Cajamarca, Libertad | 5 |

ALKALOID ANALYSIS²

(Dry basis)

| Sample No. | Wash Lab. No. | Moisture (per cent) | Ether soluble alkaloids (as cocaine) acid titration (per cent) | Ether soluble alkaloids (as cocaine) after hydrolysis (per cent) |
|------------|---------------|---------------------|--|--|
| 1 | 77018 | 5.35 | 0.79 | 0.81 |
| 2 | 77019 | 5.45 | 0.66 | 0.64 |
| 3 | 77020 | 5.50 | 0.64 | 0.64 |
| 4 | 77021 | 5.55 | 0.64 | 0.68 |
| 5 | 77022 | 5.65 | 0.76 | 0.74 |
| 6 | 77023 | 5.65 | 0.71 | 0.70 |
| 7 | 77024 | 5.20 | 0.74 | 0.70 |
| 8 | 77025 | 5.70 | 0.90 | 0.83 |
| 9 | 77026 | 5.55 | 0.57 | 0.61 |
| 10 | 77027 | 6.25 | 0.61 | 0.66 |
| 11 | 77028 | 5.30 | 0.64 | 0.69 |
| 12 | 77029 | 5.70 | 0.75 | 0.82 |
| 13 | 77030 | 5.75 | 0.64 | 0.66 |
| 14 | 77031 | 5.55 | 0.57 | 0.52 |
| 15 | 77032 | 5.40 | 0.87 | 0.80 |
| 16 | 77033 | 5.90 | 0.70 | 0.74 |

All figures given are average of the determinations for each component on each sample.

REMARKS ON THE OFFICIAL METHOD

No true crystals for cocaine were obtained with platinum chloride on the residue from the ether-light petroleum when dissolved in dilute acid. Crystals were obtained but they were hybrids and not characteristics of cocaine. This difficulty was overcome by shaking the ether-petroleum ether extract with 10 millilitres of 2 per cent aqueous solution of potassium permanganate, allowing complete separation and discarding the permanganate layer. This treatment in no wise affects the subsequent acid titration for cocaine.

The addition of about 10 per cent of ethyl alcohol (96 per cent by volume) to the ether used in the extraction of ground leaves tends to reduce emulsions and thus shorten the time required for analysis without affecting the results.

¹ Entire sample.

² League of Nations Method, volume VII, Extract No. 6. For locality or origin see above.

ALKALOID ANALYSIS
(Non-official method)

| Sample No. | Wash Lab. No. | Moisture (per cent) | Ether soluble alkaloids as cocaine (per cent) | Ecgonine (per cent) |
|------------|---------------|---------------------|---|---------------------|
| 1 | 77018 | 5.35 | 0.79 | 0.69 |
| 2 | 77019 | 5.45 | 0.66 | 0.56 |
| 3 | 77020 | 5.50 | 0.64 | 0.68 |
| 4 | 77021 | 5.55 | 0.64 | 0.62 |
| 5 | 77022 | 5.65 | 0.76 | 0.78 |
| 6 | 77023 | 5.65 | 0.71 | 0.64 |
| 7 | 77024 | 5.20 | 0.74 | 0.90 |
| 8 | 77025 | 5.70 | 0.90 | 1.04 |
| 9 | 77026 | 5.55 | 0.57 | 0.83 |
| 10 | 77027 | 6.25 | 0.61 | 0.78 |
| 11 | 77028 | 5.30 | 0.64 | 0.67 |
| 12 | 77029 | 5.70 | 0.75 | 0.67 |
| 13 | 77030 | 5.75 | 0.64 | 0.07 |
| 14 | 77031 | 5.55 | 0.57 | 0.06 |
| 15 | 77032 | 5.40 | 0.87 | 0.05 |
| 16 | 77033 | 5.90 | 0.70 | 0.03 |

II. VITAMIN CONTENT
OF
COCA LEAF SAMPLES

| Number | Place | Gross Weight |
|--------|----------------------------|--------------|
| 1 | Chaulay, Quillabamba | 10¼ oz. |
| 2 | Mandor, Quillabamba | 4¾ oz. |
| 3 | Las Delicias, Tingo María | 20 oz. |
| 4 | Chapajilla, Tingo María | 15¼ oz. |
| 5 | Derrepente, Huánuco | 4¼ oz. |
| 6 | Chinchao, Huánuco | 3¼ oz. |
| 7 | Chihuangala, Huánuco | 3¼ oz. |
| 8 | La Capellania, Bolivia | 16¼ oz. |
| 9 | Santa Rosa, Bolivia | 11½ oz. |
| 10 | San Antonio, Bolivia | 8¾ oz. |
| 11 | Finca Socaya, Bolivia | 29 oz. |
| 12 | Espirito Santo, Cochabamba | 21 oz. |
| 13 | Santa Rosa, Celendin | 15¼ oz. |
| 15 | Collambay, Libertad | 12 oz. |
| 16 | Cajamarca, Libertad | 14¾ oz. |

COCAINE AND TOTAL ALKALOIDS OF COCA LEAVES

(Non-official method)

The official method is followed with these exceptions:

A 10-gramme sample is used. Approximately 10 per cent of ethyl alcohol (95 per cent by volume) is added to the ethyl ether in the initial extraction of the leaves. The extraction time is four hours. The watery liquid, remaining after the extraction with ether and light petroleum, is placed in a 150 millilitre beaker; 5 millilitres of concentrated nitric acid are added followed by 5 millilitres of phosphotungstic acid solution (10 grammes phosphotungstic acid in 90 millilitres of water and 10 millilitres concentrated nitric acid). The solution is warmed on a steam bath, with occasional stirring, to effect granulation of the precipitate, removed, allowed to stand an hour or overnight, then filtered through a weighed, sintered glass crucible. The ecgonine phosphotungstate is washed with 1 per cent nitric acid solution and finally with 10 millilitres cold water. After drying for one hour at 100 degrees C, cool and weigh. The weight of the phosphotungstate, divided by 3.64, multiplied by 10 (weight of sample), equals the percentage of ecgonine in the leaves.

VITAMIN ANALYSES

These samples were examined for vitamin B₁, riboflavin and vitamin C with results as follows:

| Sample No. | Vitamin B ₁ | Microgrammes | Milligrammes |
|------------|------------------------|--------------------------|---------------------------------|
| | | per gramme Riboflavin | per 100 grammes Vitamin C |
| 1 | 7.5 | 10.1 | 10.6 |
| 2 | 7.5 | 8.8 | 9.2 |
| 3 | 6.5 | 9.0 | 10.6 |
| 4 | 6.7 | 9.7 | 10.0 |
| 5 | 6.5 | 8.3 | 7.1 |
| 6 | 6.88 | 8.7 | 9.2 |
| 7 | 6.5 | 7.7 | 6.1 |
| 8 | 6.5 | 8.8 | 6.6 |
| 9 | 6.9 | 10.0 | 12.2 |
| 10 | 6.4 | 8.9 | 12.2 |
| 11 | 6.1 | 11.4 | 9.2 |
| 12 | 7.5 | 12.0 | 7.5 |
| 13 | 6.7 | 8.8 | 22.8 |
| 15 | 5.2 | 9.3 | 10.6 |
| 16 | 7.5 | 8.7 | 9.2 |

Part Three

**SOCIAL AND ECONOMIC CONSIDERATIONS ON THE EFFECTS
OF CHEWING COCA LEAF**

Chapter VIII

REGIONS IN WHICH COCA LEAF IS CHEWED

As the Commission was able to observe, the habit of chewing, practised by small groups or even by individuals, considerably transcends the bounds of the regions regarded as centres of coca-leaf chewing. This fact is due to the constant migratory movements of the Indian population in the interior of Peru and Bolivia. While it does not advance this as an incontrovertible fact, the Commission estimates that, except in regions immediately adjoining those inhabited by Aymaras, greater numbers of Quichuas than Aymaras take part in this migration. This may be explained by two facts: first, that in both countries there are more Quichuas than Aymaras, and secondly, that by virtue of their personalities, the Aymaras are more attached to the regions which they have inhabited since early times. In determining the regions where coca leaf is chewed, it should therefore be understood that while those referred

to below are the most important, this does not mean that it is not also chewed in other regions.

PERU

In some cases, as in the Departments of Cuzco, Ayacucho, Huánuco, Cajamarca and La Libertad, the regions where coca leaf is chewed coincide with those in which it is produced.

The following list of regions where coca leaf is chewed must not be understood as implying that coca is chewed throughout the Departments in which they are situated, but solely that the Department in question contains regions where most of the population chew coca leaf, or sections in which the habit is practised.

On the basis of the data collected, the most important coca-leaf-chewing regions are found, in descending order of importance, in the Departments of:¹

TABLE 1

| | Population | Indians (Per cent) | Consumption of coca leaf 1943-1944 (kg.) | Essential economic characteristics | Education (Per cent illiterate) |
|-----------------------|------------|--|---|---------------------------------------|---------------------------------------|
| 1. Cuzco | 565,468 | 72 (Quichua) | 2,200,000 | Agricultural | 82 |
| 2. Puno | 646,385 | 92 (Quichua and Aymara) (predominantly Quichua) | 1,100,000 | Agricultural-stockraising | 85 |
| 3. Huánuco | 276,883 | 62 | 800,000 | Agricultural | 72 |
| 4. Ayacucho | 414,208 | 74 | 700,000 | Agricultural | 85 |
| 5. Pasco | 99,829 | 60 | 600,000 | { Agricultural-mining } | 59 |
| 6. Junín | 400,332 | | | | |
| 7. Cajamarca | 568,118 | 14 | 500,000 | Agricultural-industrial | 64 |
| 8. Apurímac | 280,213 | 70 | 500,000 | Agricultural-industrial | 87 |
| 9. Huancavelica | 265,557 | 78 | 500,000 | Agricultural-stockraising | 83 |
| 10. Ancash | 465,135 | 55 | 500,000 | Agricultural-industrial | 68 |
| 11. La Libertad | 404,024 | 15 | 300,000 | Agricultural-industrial | 49 |
| 12. Arequipa | 270,996 | 26 | 300,000 | Agricultural-industrial | 38 |
| 13. Amazonas | 89,560 | 20 | 100,000 | Agricultural-industrial | 55 |
| | 4,746,708 | | 8,100,000 | | |

Peru has twenty-three Departments and one Constitutional Province, Callao. The groups of population enumerated above represent somewhat more than 53 per cent of her total population (7,023,111 inhabitants, 1940 census).

These Departments may be divided into the following zones:

¹ The figures given are based on data of the 1940 census, on official and semi-official statistics submitted to the Commission and on data collected by the Commission itself.

TABLE 2

| North | Centre | South |
|-------------|--------------|----------|
| Amazonas | Huánuco | Apurímac |
| Cajamarca | Pasco | Ayacucho |
| La Libertad | Junín | Cuzco |
| Ancash | Huancavelica | Puno |
| | | Arequipa |

On the basis of this classification the consumption of coca leaf would be as follows:

North 1,400,000 kg., centre 1,900,000 kg., south 4,800,000 kg.

These consumption figures were compiled and published by the S.C.I.P.A.² and reproduced by the *Caja General de Depósitos y Consignaciones* in the statistics which it submitted to the Commission. These figures are based on figures referring solely to coca leaf on which tax has been paid, and not to all coca leaf actually produced in Peru.

Coca leaf is also chewed in the following localities and regions:

(1) *City of Lima*. The extent of coca-leaf chewing at Lima cannot be accurately determined. Neither the City nor the Department of Lima are mentioned in the production and consumption statistics, but the coca-chewing habit certainly exists in both, though not to any great extent. In the immediate environs of the central market at Lima, coca leaf could be bought without any difficulty in some shops. In a single street adjoining the central market there were four places of sale. The revenue statistics for 1946 show that in that year 16,000 kg. of coca leaf were brought into Lima, without specifying whether this refers only to the capital or to the entire Department of that name. It should be noted, moreover, that an Act of 8 February 1930 introduced a special tax on coca in the Cajatambo province of this Department. On the basis of the rate of tax and the figures for the period 1945-1946, it may be calculated that 6,624 kg. of coca leaf were brought into this province in the period stated. Cajatambo province is situated in the north of the Department of Lima, in the mountainous region bordering on the Department of Huánuco.

Other parts of the Department of Lima where taxes are collected on coca leaf brought in for consumption are the Barranca, Cañete and Huacho districts. The province of Cañete is largely coastal. The information available does not enable the Commission to compute, even approximately, the quantities of coca leaf consumed in these localities.

(2) *Islands of San Lorenzo*, near Callao. The Commission found on visiting these islands that a certain number of the workers were coca-leaf chewers. Almost all these workers come from the Sierra and remain to work in the islands, where guano is collected, for a period of three to four months. These migratory groups are mainly Quichua Indians.

(3) *Department of San Martín*. This does not appear in the S.C.I.P.A. or other statistics consulted, either as producer or consumer of coca leaf. The Commission was not able to visit this distant Department, but was informed during its visit to the Tingo María and Cajamarca regions that the Uchiza district of the Department of San Martín contains coca-leaf plantations of some importance, and that part of the coca leaf produced is chewed in the district and part sent to

² See *Food Situation in Peru*, Ministry of Agriculture (S.C.I.P.A.) by Luis Rose Ugarte, Lima 1945, particularly tables 99 and 100. The *Caja de Depósitos y Consignaciones* was placed under the Coca Monopoly by Decree-Law No. 11046 of 13 June 1949.

Tingo María via the Pucallpa-Huánuco road. The existence of these plantations was later confirmed by the Huánuco office of the *Caja de Depósitos y Consignaciones*, and on the production map of the Department prepared by this office at the Commission's request, Uchiza is shown as a producer and consumer region in the boundary zone of the Department of San Martín. No concrete figures for production and chewing in the Uchiza district could be obtained.

(4) *Tacna*. This Department, too, is not shown in the statistics referred to above as a consumer of coca leaf. However, the tables giving the figures for taxation levied on coca leaf brought into the Department show that it includes a small number of localities in which coca leaf is chewed.

This is due to the fact, already referred to, that the Department contains groups of Aymaras, although these are small.

(5) *Lambayeque*. This Department, too, does not appear in the general statistics as a producer or consumer. However, the statistics on the coca tax show that it is a consumer of coca leaf, though on a small scale.

(6) *Ica*. The same applies to this coastal Department, where some coca leaf is chewed by some workers. The coca-leaf tax statistics show that the tax is collected in the regions of Chinca, Ica and Nazca. Consumption is not great, being highest in the Nazca region, on the sea-coast.

The Commission could prolong this list of localities or regions which are outside the Departments having the highest consumption of coca leaf, but nevertheless contain fairly large groups of coca-leaf chewers. The existence of scattered groups of coca-leaf chewers in the above-mentioned Departments and in those of Lima, San Martín, Tacna, Lambayeque and Ica, as well as in others which might equally well be mentioned, does not affect the fact that coca leaf is chewed to a varying extent in most of the Departments of Peru, or that most coca-leaf chewers in these Departments come from the Sierra and reside in the above-mentioned regions temporarily, since, generally speaking, this migration continues throughout the year. It would appear, moreover (although no precise information is available) that, owing to social and economic influences, internal migration by Indians is tending to increase in certain localities and to remain fairly stable in others, and in some cases seems to be penetrating to communities and regions hitherto apparently free from the coca-leaf-chewing habit. During its visit to Quillabamba the Commission was informed that in some localities in the Urubamba valley, which geographically constitutes the northern boundary between the Departments of Loreto and Cuzco, the primitive Indians had learned to chew coca leaf through contact with Indian workers arriving from coca-leaf-chewing regions.

From the foregoing it may be concluded that coca-leaf chewing is habitually practised in Peru not only in the regions hitherto well-known as the main coca-leaf-chewing centres, but also, though to a lesser extent, in other regions which must equally be taken into consideration in any study of the problem of the coca leaf

BOLIVIA

In Bolivia, as in Peru, there are regions where intensive coca-leaf production co-exists with widespread chewing. This applies particularly to the Yungas regions of the Department of La Paz, and to the Palmar de San Antonio, Paracti, Tiraque, Totora and other regions under the Coca Excise Authority of the Department of Cochabamba.

Subject to the reservations explained in dealing with the Departments of Peru, the most important coca-leaf-consuming regions in Bolivia are found in the following Departments:

TABLE 3³

| Population (mainly) | Main economic characteristics | Education |
|------------------------|---------------------------------------|---|
| 1. La Paz....1,276,500 | Aymara Agricultural- industrial | } According to the latest esti- mates, 75 per cent of the total population of Bolivia is illiterate. ⁴ |
| 2. Cochabamba 654,000 | Quichua Agricultural | |
| 3. Oruro 215,000 | Aymara and Quichua Mining | |
| 4. Potosí 812,900 | Quichua Mining | |
| <u>2,958,400</u> | | |

Bolivia comprises nine Departments, with an estimated population of 3,990,200 inhabitants. The population of the Departments listed above represents rather

more than 74 per cent of the total, and while it cannot, of course, be asserted that all their inhabitants chew coca leaf, they contain the largest groups of coca-leaf chewers. The Commission was not able to determine the amounts of coca leaf consumed in each Department.

Coca leaf is also chewed, although to a lesser extent, in some regions of the Department of Chuquisaca and in other regions of smaller size in Santa Cruz and Tarija.⁵ The Departments of Tarija and Potosí adjoin the Jujuy province in the Argentine Republic. This province and the province of Salta contain large groups of Quichuas and Bolivian workers among whom coca leaf is chewed.⁶

³ Figures compiled by the General Board of Statistics of Bolivia in September 1949.

⁴ See Federal Security Agency, Office of Education, *Education in Bolivia*, Bulletin No. 1, 1949, page 4.

⁵ In Santa Cruz coca leaf is produced and chewed. In Tarija coca leaf is imported for chewing. The Act of 4 December 1923 introduced a tax of 2 bolivianos on every consignment of coca leaf imported into the Department. This tax was raised to 8 bolivianos by an Act of 12 November 1938 and to 10 bolivianos by the Act of 27 November 1945.

⁶ In 1946 and 1947 Argentina imported from Bolivia 416,091 kg. and 403,504 kg. respectively of coca leaves.

By resolutions No. 23134 (25 February 1950) and 23159 (20 March 1950) the Government of the Argentine Republic set up a technical commission on the coca leaf for the:

(a) Study of the biological and toxic effects of coca-leaf chewing;

(b) Amendment of the actual legislation on coca leaf so as to establish a gradual and complete suppression of the chewing of the coca leaf;

(c) Determination of the quantities of coca leaf which would be imported.

These resolutions are reproduced in annex IV.

Chapter IX

FACTORS WHICH MAY BE CONSIDERED AS DETERMINING THE HABIT OF CHEWING THE COCA LEAF

Apart from the above-mentioned factors, the climate, altitude and diet are also determining in the chewing of coca leaves. These last factors are purposely not mentioned here, because they are examined in the medical part of this report. However, their economic role will not be forgotten in the present part.

The economic effects of high altitude are due to the fact that the higher the altitude, the more difficult it becomes under present conditions to gain a livelihood by agriculture or stock-raising. But this unfavourable effect could be appreciably reduced if all living conditions of work and production in these regions were improved.⁷

The social effects of high altitude are equally clear, but their harmful consequences could again be considerably reduced if present social and cultural conditions were improved.

Coca-leaf chewing, as already stated, has been habitually practised for centuries by large sections of the population of Peru and Bolivia. While the economic and social conditions of these groups are tending to improve owing to the endeavours of their respective Governments, they cannot yet be considered as satisfactory.

In view of the widespread nature of coca-leaf chewing, therefore, this study of the factors determining the habit was made on the basis of the following assumptions:

(1) That while coca-leaf chewing is more prevalent in some regions than in others, the habit affects not only the coca-leaf-chewing regions but also others where chewing is virtually non-existent.

(2) That while it is the outcome of a number of widely different factors, coca-leaf chewing may also be considered as an influence which, in conjunction with others, produces certain harmful results distinct from the habit of coca-leaf chewing. This goes to confirm the theory of the cyclical nature of all social phenomena. An analysis of the causes of any social phenomenon always falls into two parts; first, an investigation of the

⁷ The economic improvement of these regions is dealt with in chapter XVII, "Replacement of coca leaf cultivation". Suffice it here to note that the economic improvement of the high plateau regions near Lake Titicaca has been mentioned by the Agricultural Bank of Bolivia, which considers that there is no reason why wheat should not be produced at an altitude of 3,800 metres. See Agricultural Bank of Bolivia, *Annual Report for 1947*, La Paz, 1948, page 44.

⁸ Annex 2 to the present report comprises a bibliography on the effects of chewing the coca leaf.

⁹ It should be added that in Peru there is a General Department of Native Affairs, at present under the authority of the Ministry of Labour. The Commission made contact with this Department immediately on its arrival, and was supplied with information both by the Department itself and by its repre-

sentatives in all the regions visited. Many laws on Indian affairs have been adopted in Peru, and they have recently been collected in a single publication (see *Indigenist Legislation of Peru*, published by the General Department of Indian Affairs, Lima, 1948). In Bolivia the Minister of Education is at the same time the Minister for Indian Affairs, and here too there are special laws on Indian affairs. The "Declaration of Arequipa" (November 1945), issued jointly by the Ministries of National Education of Peru and Bolivia, declared that the Indian problem is a problem of State. It should nevertheless be noted that neither the Peruvian nor the Bolivian Native laws include any regulations prohibiting or restricting the use of coca leaf for chewing.

(3) That neither as the outcome of a number of causes nor as a phenomenon itself producing fresh consequences can coca-leaf chewing be considered in isolation. It must in both cases be taken in intimate connexion with other causes and effects, within the framework of an economic and social system which is examined as far as is possible within the bounds of the present report.

(4) That an exhaustive study of all the factors determining the coca-leaf-chewing habit would require much more space than is available in the present report. In selecting the factors for study the Commission has therefore taken into consideration the following:

(i) The reports of the second, third and fourth sessions of the Commission on Narcotic Drugs and the records of the Commission's discussions on the problem under consideration;

(ii) The views placed before the Commission of Enquiry during its stay in Peru and Bolivia, and the official and semi-official documents collected in those countries;

(iii) The Commission's own observations in both countries; and

(iv) The views of a number of authors who have dealt with this question.⁸

LIVING CONDITIONS⁹

The living conditions are examined here from the social and economic standpoints under the two following heads:

(1) Living conditions in the regions where coca-leaf chewing is most widely practised,¹⁰ and

sentatives in all the regions visited. Many laws on Indian affairs have been adopted in Peru, and they have recently been collected in a single publication (see *Indigenist Legislation of Peru*, published by the General Department of Indian Affairs, Lima, 1948). In Bolivia the Minister of Education is at the same time the Minister for Indian Affairs, and here too there are special laws on Indian affairs. The "Declaration of Arequipa" (November 1945), issued jointly by the Ministries of National Education of Peru and Bolivia, declared that the Indian problem is a problem of State. It should nevertheless be noted that neither the Peruvian nor the Bolivian Native laws include any regulations prohibiting or restricting the use of coca leaf for chewing.

¹⁰ The legal provisions governing working conditions in the production of coca leaf are examined in the present report.

(2) Living conditions in the regions visited by the Commission.¹¹

For the purpose of this study of living conditions, coca-leaf chewers were divided into the following groups: (1) agricultural workers, and (2) miners.

This classification must be interpreted with some elasticity since owing to internal migration by the Indians and *mestizo* populations both in Peru and in Bolivia, the agricultural worker, whether or not he lives in a community, frequently becomes a miner or an industrial worker for certain parts of the year. This fact was particularly noted by the Commission on its visits to the mining regions of Peru and Bolivia.

AGRICULTURE

Both in Peru and Bolivia, agricultural labour is performed almost exclusively by Indians. The backward economic and social conditions of the coca-leaf-chewing Indians are reflected in his home and manner of life. In the high plateau regions where animal herding and agriculture are combined, his home generally consists of a small adobe house of one room occupied by the entire family and frequently by a few domestic animals as well. Usually there are no windows, and the door is the sole opening providing any ventilation. There are no beds; the Indians sleep on a rude bedstead, or more frequently on mere rectangles of adobe which are also used as seats. These are covered with cloths or hides serving as mattresses. The kitchen is ordinarily a primitive hearth fed with *yareta* or *taquia*¹² or, more rarely, with firewood. There is little furniture. A reserve store of potatoes and maize, and also the working implements, are kept in the same room. The roof is made of straw or, more rarely, of tiles, and is not separated from the living room by a ceiling. The floor, with rare exceptions, is the earth itself. Near the house there are usually one or more rough enclosures where the animals and farming tools are kept.

Agricultural workers who are tenants, etc., on a ranch usually receive some of the materials required to build a house, or are given the house left by their predecessors. In either case the dwelling is similar to that described above.

There are no sanitary arrangements, even of the most primitive kind.

Ordinarily, native Indians are shod with *ojotas*, a kind of sandal usually made out of pieces of old rubber tires. These *ojotas* are sold in the village markets and in cities. Children generally go barefoot.

Indian clothing is scanty, and can hardly be considered as sufficient to provide protection against the rigours of the climate in the high plateau regions. Clothes are frequently woven by the women; but In-

dians also wear clothes of western cut, particularly when they live in cities, or during their temporary work on the roads or in the factories or mines. Costume in each region has its special characteristics, particularly among the women. In general it may be said that men show a greater tendency than women to abandon their traditional costume for town clothes. The Commission also noted that with rare exceptions clothes were worn out to the fullest possible extent, and were frequently covered with variegated patches or had holes.

In the semi-tropical regions, where coca leaf is frequently both produced and chewed, the dwelling is nothing more than an oblong of bamboo and boards, usually covered with plantain leaves. The interior is arranged as described above.

Some smallholders or partners owning coca-leaf plantations enjoy better living conditions owing to the fact that they are better off economically than the tenants or labourers working on large estates. On the latter, temporary workers are usually given living accommodation, normally in large huts made of adobe or, in the best cases, cement, divided into one-room cubicles occupied by the labourer and his family. On other plantations, such as those visited in Tingo María and Quillabamba, the dwelling consists of a large room containing large bedsteads placed along opposite walls. On these the labourer sleeps and places the bundle containing his clothes and personal belongings. In some cases there are separate rooms for the women. If the labourer is married, his wife shares with him the bedstead, which is also used by those who are unmarried. As a rule there is no furniture of any kind, and no sanitary arrangements. Sometimes there are primitive outside installations.

MINERS

Both in Peru and in Bolivia the mining companies generally provide their miners with dwelling accommodation, either at moderate rents or free of charge.

The Commission saw some of these dwellings on its visit to Catavi (Bolivia). They may be described as follows. They are mass-constructed in the form of long huts, and consist of a small room with a tiny kitchen, but without water supply or sanitary arrangements. The whole family, however large, lives in this room. There is no adequate ventilation; frequently the only vent is the entrance door. Nearby there are public fountains where the women and children frequently queue up to obtain water. Clothes are washed in the gutters, in water which cannot be regarded as clean.

The sanitary arrangements are used in common by a number of huts, and leave much to be desired. Not all dwellings have electric light, and where this does exist it is of poor quality.

nous populations of Latin America in many reports and studies arising out of various resolutions. A bibliography of these will be found in the publications listed above, and also in the above-mentioned document prepared by the Secretariat. The Inter-American Indigenist Congresses of Patzcuaro (Mexico) 1940 and Cuzco (Peru), 1949, also dealt with this problem. The Inter-American Indigenist Institute at Mexico City has published a number of interesting and valuable contributions on this subject in its *América Indígena* (Indigenous America) and *Boletín Indigenista* (Indigenist Bulletin).

¹² The *yareta* is a small bush or shrub compressed for use as fuel. *Taquia* is dried llama dung.

¹¹ A preliminary general study of living conditions was provided by the Secretariat in the working paper submitted to the Commission of Enquiry before its tour of Peru and Bolivia (see annex I). A more general study than that embodied in the present report may be found in two ILO documents: *Living Conditions of the Indigenous Populations in American Countries*, by V. G. Garcés, Montreal, 1946, and *Living and Working Conditions of the Indigenous Populations of Latin America*, Geneva, 1949 (Fourth Conference of the American States Members of the ILO, Montevideo, April 1949, Report II).

The ILO has dealt with the living conditions of the indige-

The new houses built by the company consist of dwellings of two larger rooms and a kitchen. While these new homes are better than the old ones, they still cannot be regarded as models.

Other miners live close to the dwellings described above, in hovels made of piled-up stones and affording little protection against the weather. They consist of a mere oblong space in which the family lives. There are no hygienic or sanitary arrangements, water supply, electricity, etc., of any kind.

Generally speaking, the hygienic and sanitary conditions of the dwellings described are extremely primitive. In some cases, no doubt, the better-paid miner is in a position to remedy certain deficiencies, but for various reasons he does not often do so.

Information obtained from both the miners and from representatives of the company show that minimum daily earnings vary between 60 and 90 bolivianos. There are basic daily rates, for each category, of 64, 68, 74, 78, 80, 104, 106 and 110 bolivianos. All overtime work, whether by the hour or by the job, is paid for.

In Cerro de Pasco (Peru), minimum and average wages varied in each company. In some, the lowest wages were from 6.80 to 7.80 soles, and average wages were from 10 to 11 soles; in others the minimum was 7.30 and the average 10.50 soles. Some companies stated that wages were shortly to be raised by 2.85 soles per day. Generally speaking, miners spend 40 per cent of their daily wage in the *mercantiles*.¹³ *Mercantiles* are the shops kept by the mining companies, where workers and employees can buy food, clothes and other essential and non-essential articles for cash or credit. The *pulperias* are in Bolivia the equivalent of the *mercantiles* at Cerro de Pasco (Peru).

Both in Peru and in Bolivia the companies stated on interrogation that weekly or daily wages were paid solely in cash, and not partly in coca leaf. In both countries this statement was made in the presence of workers' representatives, and was not contradicted by them.¹⁴

In Bolivia in June 1940, a decree establishing new regulations for the *pulperias* in the mining regions was promulgated. This decree laid down rules regarding the fixing of prices and empowered the Ministry of Labour and Social Welfare to inspect the *pulperias*. The *pensiones* in Bolivia are restaurants where miners are served food at controlled prices. The diet of the mining population cannot be considered as satisfactory. In the Catavi region, the Commission visited the *pulperias* and *pensiones*, and the workers' homes. It gained the impression that the diet was scanty, incomplete and inadequate. Vegetables and fruit are rarely eaten and cost more than a miner in the medium or lower wage categories can afford. Many essential articles can be obtained in the *pulperias*, frequently in canned form, but although they cost less than they would in ordinary stores, their prices are not always within the reach of the miner, who frequently has a large family. In the *pensiones* which are privately run

¹³ At the time the Commission visited Peru and Bolivia the Peruvian sol was equivalent at the unofficial rate of exchange to US\$0.19 and the boliviano to US\$0.09. In November 1949 the Government of Peru abolished the differential dollar exchange rates, and the dollar fell slightly. A Peruvian sol was then equivalent to 6.60 bolivianos. The Commission gives these exchange rates merely for the sake of information, and does

restaurants, the miner can eat his lunch and supper, but while the prices are moderate, this benefits the individual miner rather than his family: an important distinction when it is borne in mind that there are also coca-leaf chewers, although in smaller numbers, among the miners' families. Coca leaf is sold in the company's *pulperias* together with essential articles. It is obtained almost exclusively from the Department of La Paz and sold at the price of 56 bolivianos per kilogramme. Coca leaf is also sold at a higher price at the *pensiones*, at small booths at the pithead entrances and exits.

The companies supply miners and their families with drugs, medical, hospital and maternity services. At Oroya and Catavi the Commission investigated such services, which were found to be good. They are all supplied free of charge.

The following figures should be noted with regard to the price of food per kilogramme in Peru:

TABLE 4

| Zone | Soles |
|--------------|-------|
| North | 0.98 |
| Centre | 1.02 |
| South | 1.46 |

If we bear in mind (1) that the national average daily expenditure on food is 50 centavos, and (2) that some of the inhabitants have less than this average sum to spend, it must be concluded that in many regions a family cannot afford even as much as 30 to 40 centavos for its outlay on food. As has rightly been pointed out, this "explains why the peasants of the Sierra, father, mother and children, down to the very smallest, are forced to work, and also why they migrate to the mines, the roads and the large ranches on the coast".¹⁵

LABOUR

The Commission was repeatedly told, both in Peru and in Bolivia:

(1) That coca-leaf chewing alone enabled the Indians to cope with the rough and arduous labour of agriculture and mining.

(2) That Indians, and sometimes *mestizos* too, refuse to work unless they can obtain the coca leaf which enables them to do this work.

(3) That the amount of strenuous work which can be done by the Indians is proved by the grandiose monuments constructed in the days of the Incas.

The Commission was able to obtain abundant data on these opinions which were in any case contradicted directly and indirectly by many of the speakers at the public meetings which it organized. These data lead to the following conclusions.

not claim that they provide any guide to comparative living conditions in the three countries concerned.

¹⁴ In the *mercantiles* and *pulperias* of Peru and Bolivia, coca leaf is also sold on credit, the amounts being deducted from daily or weekly wages. At Cerro de Pasco only one company said that coca leaf was sold for cash only.

¹⁵ See the text referred to in footnote 2.



Rough and arduous nature of the work done by Indians Agricultural labour

With rare exceptions, agricultural labour is carried on with the most primitive and rudimentary tools.¹⁸ The land is prepared, cultivated and harvested by methods and with implements dating from the colonial era. Frequently Indians do not possess the draught animals necessary to till the soil. It is true, of course, that in many regions the nature of the soil itself, particularly in the coca-leaf plantations, makes it impossible to use machinery, but this does not preclude the use of agricultural implements of a more modern type, and therefore more adequate than those at present used by the Indians. In the model experimental farms visited in Tingo María and Cochabamba the Commission found equipment more suited to the requirements of modern agriculture. Such equipment also exists on some of the larger estates in both Peru and Bolivia.

Such primitive methods entail longer and harder labour by the worker; but they are not essentially different from those practised in other regions or districts of Peru and Bolivia where coca leaf is either not chewed at all or chewed only to a small extent. The Commission found during its visits to the plantations that at one and the same plantation and within a single group of workers, while the majority were coca-leaf chewers, there were others, subject to identical economic conditions, who did not chew. The following examples may be cited:

On the Amaibamba plantation (Quillabamba, Cuzco), where coca-leaf cultivation has been virtually replaced by tea cultivation with satisfactory results, coca-leaf chewers and non-chewers do the same work. The same applies to the Mandor and Chaulay plantations in Quillabamba. In Tingo María (Huánuco) the Commission noted that in groups of workers doing identical or similar work, while the majority were coca-leaf chewers there were also men who chewed only a little or not at all.

Similar conditions were noted in Bolivia. On the Capellania (Coroico) and Santa Rosa (Coripata) ranches, there were more chewers than non-chewers, but both do identical or similar agricultural work. At Santa Rosa it was found that the number of coca-leaf chewers is tending to fall, particularly among the young workers. Young coca-leaf chewers often chew at night after work. It is significant that this nocturnal coca-leaf chewing was explained by the fact that the young men were ashamed to chew in public during the daytime.

Mining

A distinction should be made between miners properly so-called, i.e. underground workers; and surface or outside workers, employed in the workshops, laboratories, stamping and grading plants, loading and unloading sheds, etc.

Miners properly so-called. Generally speaking, underground work is much harder and more tiring than surface work. The proportion of coca-leaf chewers among underground workers is much higher than among surface workers. This may be due to the following facts:

(1) Most miners actually engaged in extraction, i.e. doing the hardest work, are Indians, or *mestizos* hardly distinguishable ethnically and socially from Indians. This is equally true of the workers doing the simplest tasks underground. The following are common to both groups:

- (a) Lower wages;
- (b) Worse living conditions;
- (c) Less food; and
- (d) More coca-leaf chewing.

(2) In these circumstances the general belief that coca leaf stimulates the strength, spirits or energy or deadens fatigue, hunger or thirst, has a greater influence and encourages coca-leaf chewing.

On the other hand the Commission was able to note:

(1) That in a single gang or "team" of miners doing the same work, although coca-leaf chewers predominated, there were a minority who did not chew coca leaf. Many of these were young men with some education.

(2) That some really arduous jobs, such as drilling, were generally done by workers who were almost invariably *mestizos* and non-chewers. Such skilled workers earn much higher wages than ordinary miners, and their living conditions are better.

Surface workers. The Commission found that fewer of these were coca-leaf chewers, although the work done in some workshops is really arduous. Surface wages are often lower than those earned underground. Many of the surface workers are Indians, who do both light and heavy work. Coca-leaf chewers always predominated among them. Finally, the Commission found on inquiry that many of the workers in the stamping and grading plants, where work is much less arduous than underground, were coca-leaf chewers. There are considerably fewer coca-leaf chewers among the lower-grade workers in the laboratories, but some of them chewed during night-work. It was explained that this was done in order to prevent sleepiness or fatigue, or when there was some particularly urgent job to do. Another possible explanation might be the fact that in many cases a worker or assistant in some laboratories is virtually alone on night-work, and can then chew unobserved. Generally speaking, workers who chew coca leaf are not employed in the laboratories.

Refusal of the worker to work unless he can obtain coca leaf

Here again a distinction should be made between the agricultural labourer and the miner.

Agricultural labourers

On many ranches, particularly those where the coca leaf is cultivated, it is an old custom for workers to be given a handful or two of coca leaves before beginning their daily work, in addition to what they themselves bring from their homes or can obtain during the working day. This custom is not considered obligatory, and some landowners have abolished it, particularly where coca-leaf production has been replaced by other types of cultivation (Amaibamba ranch). Other land-

¹⁸ See annex V.

owners, too, do not give their workers coca leaf. The Commission found that on the Las Delicias ranch, Tingo María (Peru), and on the Capellania and Santa Rosa ranches in Yungas, Department of La Paz (Bolivia), where coca leaf is produced, the owners do not distribute coca leaf to their workers as an inducement to work. In these cases the workers buy from the landowners for a few centavos the coca leaf which they need or bring it from their homes. In Peru one landowner said that he had wished to distribute roasted maize instead of coca leaf. After a time he was compelled to go back to coca leaf. Many of those who took part in the discussions said that better diet would reduce the need for coca leaf.

At the public meeting held at Cuzco on 14 October 1949, some workers' representatives said that agricultural labourers asked for coca leaf before working owing to the ignorant belief that coca leaf mitigated hunger or fatigue. It was added that when a Native worked in a town, where his living conditions were better than in the country, he never demanded coca leaf from his employer. Other workers' representatives considered that the distribution of coca leaf was a method of maintaining the existing living and working conditions of the Native agricultural labourer, conditions which placed him in a situation of subordination or dependence in relation to his employer or landlord, and which should be abolished.¹⁷ It was said again and again that the need of the Indians for coca leaf could be eliminated by the following methods, applied concurrently:

- (1) Higher wages.
- (2) Better education for the Indians.
- (3) Better diet.
- (4) Agrarian reform.

No coca leaf is demanded as an inducement to work by the Indians now working in increasing numbers on the roads and highways. The fact that Indians chew coca leaf is taken into consideration only where large numbers are employed, and in such cases those responsible for workers' supplies see to it that coca leaf is forthcoming. At the public meeting held at Trujillo (24 November 1949), it was pointed out that Indians employed on large-scale road-making obtained better wages than they would be paid in agricultural work, and that this enabled them to eat more satisfactorily, leading in some cases to a gradual reduction of coca-leaf chewing.

At the Cerro de Pasco mines (Peru), coca leaf is considered, at the request of the workers, as an essential article of supply. This practice was defended by the workers.¹⁸ On the basis of the data on the habit of coca-leaf chewing obtained by the Commission, it seems that most Indian miners and a certain number of *mestizo* miners consider coca leaf essential.

The foregoing, as well as the other information received, appear to justify the following observations:

¹⁷ As Cuzco is the most important coca-leaf producing and consuming Department, the Commission held five public meetings there, four in the chief town and one at Quillabamba. The meeting referred to above, and held, like the other three in the departmental capital of Cuzco, under the chairmanship of the Prefect, took place at the premises of the Cuzco Workers' Federation, which comprises both local workers and

(1) The requirement that the employer should supply coca leaf as an inducement to work is most prevalent among the agricultural workers, and particularly in the coca-leaf plantations.

(2) Coca leaf is more generally distributed in regions and districts of most intensive coca-leaf production (Cuzco, Huánuco and Yungas de la Pa). Nevertheless, coca leaf is not distributed invariably (see exceptions referred to above).

(3) The custom of distributing coca leaf does not exist in the mining districts. Miners are able to obtain what coca leaf they need for chewing.

(4) The practice also does not exist in industrial factories or workshops.

(5) In any case, the belief that coca leaf is essential is intimately connected with the factors examined in the present report.

Grandiose Inca monuments as evidence of the Indian capacity for strenuous work

The Commission was told on three or four occasions that there was a close relation between the colossal monuments erected by the Inca Empire and the chewing of coca leaf. More specifically, it was declared that "The Inca civilization was built up on coca-leaf chewing". According to this view coca-leaf chewing should not be considered as harmful, or be abolished.

These beliefs and conclusions were contradicted by other speakers at the meetings, who said that the habit of coca-leaf chewing was not general under the Inca Empire, where it existed only as a privilege granted to certain persons.

It would appear from the historical works which the Commission has been able to consult that:

(1) The most widely accepted opinion is that under the Inca Empire coca-leaf chewing was practised as a privilege granted by the Inca to a small number of members of the upper classes.

(2) The privilege probably began to be granted more widely in the final epoch of the Inca Empire, and was due to the decadence of the Empire preceding the arrival of the Spaniards (1532).

PREVAILING BELIEFS

In studying the factors determining the chewing of coca leaf, the Commission decided at the outset to include any intellectual factors which might be considered as directly or indirectly favouring the habit. An intellectual factor means here a complex of elements of knowledge or beliefs attributing certain properties to the coca leaf and giving rise to customs or practices in which the coca leaf plays an important part.

At its public meetings and in collecting all other data the Commission therefore endeavoured to obtain

workers from the rest of the Department. Representatives of ten trade unions, groups and ranches took an active part in the meeting.

¹⁸ Representatives of the miners' trade unions of Cerro de Pasco stated that this was due to the lack of food, which was sometimes completely unobtainable, whereas there was never any shortage of coca leaf.

much information as possible on these beliefs, which, by ascribing certain properties to the coca leaf, encourage the persistence of coca-leaf chewing. They are examined here with due regard to the two main groups into which coca leaf chewers must be divided, i.e. Indians and miners. The term "Indian" should ordinarily be interpreted to mean the Indian agricultural labourer, but does not exclude the Indian temporarily doing other work. In any event, most Indian coca-leaf chewers are to be found among the peasants. It should be borne in mind that despite their mineral and other wealth, both Peru and Bolivia are essentially agricultural countries. The term "miners" includes both Indians and *mestizos* employed more or less permanently in the mines. These are not so generally influenced by prevailing beliefs on the subject of coca leaf as the agricultural workers; but owing to the increasing migration of Indians to the mines, these beliefs also hold in the mining regions.

Indians¹⁹

Beliefs on the properties of coca leaf give rise to a variety of customs and usages in connexion with religious holidays, family celebrations, agricultural tasks, illnesses, witchcraft spells, delinquency, etc.

These beliefs have a common origin: the fact that for centuries, and particularly under the Inca Empire, coca leaf has been considered as the plant *par excellence*, the sacred plant with the aid of which results unobtainable by any other method could be achieved.

The most prevalent and important belief held at present is that coca-leaf chewing dispels or relieves hunger, thirst, fatigue, weariness and even desire for sleep. This belief is largely due to:

- (1) The Indian's poor living conditions.
- (2) His lack of education.

It is difficult to determine exactly when this belief originated. It is highly probable that the properties of coca leaf were known before the days of the Inca Empire, which would largely explain its privileged position and its use in certain ceremonies under the Inca Empire. The fact is that this belief still exists, and that it has given birth to a tradition.

This in its turn gives rise to imitation, since a son observing his father chew coca leaf ends by chewing coca leaf himself. This imitation, again, strengthens the influence of factors (1) and (2) cited above. It is encouraged when a boy begins to work in the fields with his father and the rest of his family. This takes place between the ages of twelve and fifteen, although before then children perform a number of minor domestic, pastoral or agricultural tasks, besides attending an elementary school more or less regularly. The habit of coca-leaf chewing begins among men, with a few exceptions, at this age.

Although coca-leaf chewing is due basically to factors (1) and (2) cited above, which affect women equally

with men, women are debarred by tradition from chewing coca leaf to the same extent as men. This difference is due to a number of factors, the most important of which are probably the following:

(1) Indian girls never chew. Coca-leaf chewing spoils the face and later stains the mouth and teeth a greenish-black colour.

(2) Women do domestic work. When women do the same work as men, they tend to chew coca leaf, although always in smaller numbers than men and later in life.

(3) There are more coca-leaf chewers among old women, and the women age prematurely even when they do not do severe or arduous work.

(4) Indian women chew more than *mestizo* women; a reflection not only of the similar ratio existing between the *mestizo* man and the Indian, but also of the *mestizo* woman's higher matrimonial status, even among the lower classes.

The customs and practices which are frequently accompanied by coca-leaf chewing may be classified as follows:²⁰

Holidays

Although there are few official holidays, in practice there are many local and regional fiestas in which the chewing of coca leaf plays an important part. Most of these are religious.

Deaths

Every death is followed by a family reunion, which provides another opportunity for those present to chew coca leaf and drink alcohol.

Agricultural tasks

Frequently agricultural tasks are surrounded by a ritual in which coca leaf, the plant *par excellence*, plays an important part. Coca leaves are periodically offered to Mother Earth (*Pacha mama*). It is believed that in August, i.e. spring, the earth is alive, and offerings of coca leaves are therefore made as a protection against bad harvests. Usually the whole family takes part in the ceremony, and selected coca leaves are mixed with incense and other substances and burnt, the ashes being buried.

Illnesses

Except in the large Indian villages there are no medical or pharmaceutical services of any kind. Medicine is practised by men and women, generally in accordance with more or less magical or superstitious rites in which again coca leaf plays an important part. Coca-leaf plasters are used to rub the aching part, or, tied to the forehead, to relieve headaches or toothache. Frequently, too, a patient is made to chew coca leaves in order to deaden his pain.

¹⁹ The Commission is well aware that certain distinctions should be made between the practices and customs of the Quichuas and Aymaras. Since we are not so much concerned here with a special study of these customs and practices as with the fact of the existence of certain beliefs, the Commission decided to examine those beliefs on coca leaf which may be considered as common to both Quichuas and Aymaras.

²⁰ In most of the customs and practices cited, alcohol is usually consumed as well as coca leaf. When drafting this part of the report the Commission used not only the information gathered directly, but also that contained in the *Handbook of South American Indians* edited by Steward, volume 2 of *The Andean Civilizations* published by The Smithsonian Institution, Washington, 1946.

Magical practices

Magic is highly important in the lives of the Quichuas and Aymaras, both races recognizing a good or white magic and an evil or black magic. The object of the first is to prevent misfortunes of all kinds, and of the second to provoke them. Both are connected with various categories of spirits. Each type of magic has its own magicians and practices, and a special terminology to designate its various classes and categories. Among the Aymaras, these are comparatively numerous, and often not easily distinguishable. While both men and women can perform these magic rites, the former predominate.

In many cases magicians also have medical functions, since sicknesses are frequently treated in accordance with supernatural beliefs.

Coca leaf is used in many ceremonials, particularly those intended to bring rain, combat plagues, ward off or provoke evils or sicknesses, interpret dreams or diagnose pains, invoke good or evil spirits, etc. It is also used to detect thieves, whose identity, and the direction in which they went, are discovered by throwing a number of coca leaves into the air and noting the direction in which they fall. In some localities the magician first asks for the names of the suspected persons. He is paid in coca leaves, alcohol or small sums of money.

It should be noted that Indians who work on the large plantations, or *haciendas*, in factories or in towns gradually abandon the beliefs and practices we have mentioned; but this does not prevent them from chewing coca leaf as a result of factors (1) and (2) mentioned above and of the general belief that coca leaf dispels hunger, thirst and fatigue.

Miners

The foregoing remarks apply to Indians permanently employed in the mines. An Indian who is employed only temporarily and returns to his village after a few months remains much more firmly attached to his traditional beliefs. Generally speaking, a miner's life does not provide the opportunity for practising many of the

²¹ Simultaneous praying and coca-leaf chewing are also practised on certain occasions by the rural Indian.

customs and usages of rural life. Nevertheless, the miner's life gives rise to new forms of superstition in which coca leaf plays an important part, since most miners, particularly those working underground, are not only coca-leaf chewers, but also in most cases ill-educated *mestizos* and Indians.

The most important superstitions connected with coca leaf are the following:

(1) The belief that coca-leaf chewing dispels hunger, thirst, fatigue and sleepiness, or gives strength, courage or energy.

(2) The belief that a plug of coca leaf keeps dust out of the mouth. Physically, there is some justification for this belief, but very possibly it includes some elements of superstition and the explanation given is merely a rationalization.

(3) In some cases "teams" or gangs of miners refuse or fear to work with non-chewers on the ground that they bring bad luck.

(4) There are "good" and "bad" shafts, i.e., lucky and unlucky ones. To counteract any evil influences or determine whether a shaft is good or bad, miners note the position taken by coca leaves after being thrown into the air.

(5) In some shafts there are holy images, before which miners pray while chewing coca leaf to protect themselves against bad luck.²¹

To sum up, there exist a number of religious, superstitious and traditional factors which directly and indirectly encourage the chewing of coca leaf. Such factors, while they are deeply rooted in certain regions and among certain social groups, are not ineradicable, but result from the present living conditions of the great majority of coca-leaf chewers. An improvement in these conditions would lead to the gradual disappearance of these beliefs, and improved medical services and more general education can contribute largely to this result, although they cannot alone produce it. Rural and agricultural education must be given special emphasis. In Peru, such agricultural instruction is being carried out with resources provided by the services of the S.C.I.P.A., which thus, as the Commission had occasion to note on many occasions, performs a practical social function of obvious importance.

Chapter X

SOCIAL AND ECONOMIC ASPECTS OF THE HABIT OF CHEWING COCA LEAF

From the social and economic standpoints the chewing of coca leaf has harmful effects, both individual and collective. The gravity of the problem in the latter respect is increased by the fact that the numbers of coca-leaf chewers in Peru and Bolivia are so large.

DETERMINATION OF THE NUMBER OF COCA-LEAF CHEWERS

It is extremely difficult to determine the number of coca-leaf chewers, since the data available are not accurate enough to permit of reliable conclusions.

It is generally considered that the great majority of the Indian population chew coca leaf. In addition coca leaf is also chewed by some sections of the *mestizo* population, particularly in the mining regions of Peru and Bolivia. It is virtually impossible to determine the numbers of *mestizo* coca-leaf chewers, and despite all its efforts, the Commission was unable to obtain any concrete information on this point.

In Peru, the *mestizo* population was not separated from the white population in the 1940 census. Neither in Peru nor in Bolivia are there any data giving the number of *mestizos* and Indians working in the mining regions. Such data, it must be admitted, are extremely difficult to compute.

It is equally difficult to compute the numbers of Indian coca-leaf chewers, since, as has been explained above, there are no accurate figures available for the Indian population.

The Commission has endeavoured, tentatively and with all the necessary reservations, to make an estimate of the number of coca-leaf chewers of Indian race both in Peru and in Bolivia.

In arriving at this estimate the following factors have been taken into consideration:

(1) On the basis of official and semi-official information and census results referred to in the present report giving minimum figures, the numbers of Quichuas and Aymaras in Peru and in Bolivia should be as follows:²²

TABLE 5

| | Peru | Bolivia |
|----------------|-----------|-----------|
| Quichuas | 2,500,000 | 1,165,040 |
| Aymaras | 315,000 | 862,840 |
| | 2,815,000 | 2,027,880 |

²² Many estimates arrive at higher figures for the Indian population than those shown here or in official statistics.

The figure given for Peru represents 44.9 per cent of the total population. According to the 1940 census, the Indian races, among which those which are not Aymaras or Quichuas represent only a very small percentage, amount to 45.86 per cent of the population of Peru. The figure shown in the table for Bolivia represents 51.7 per cent of the total population. According to the information obtained the male Indian population could amount to 52 to 53 per cent of the total. It would appear from the official and semi-official information obtained that about 90 per cent of Indians chew coca leaf.

(2) The information obtained by the Commission shows that males generally begin chewing between the ages of twelve and fifteen, the figure of fourteen being used for the purposes of the present report. In Peru, according to computation based on the 1940 census, the male population below the age of fourteen represents 21.4 per cent of the total.

(3) Fewer women chew coca leaf than men. The percentage of women chewing coca leaf is difficult to determine, since it varies considerably according to circumstances. A conservative estimate, based on the information obtained, would be that no more than 20 per cent of women chew coca leaf.

(4) The sex distribution of the population of Peru is 49.4 per cent male and 50.6 per cent female. In Bolivia the figures of the last general census, which took place in 1900, are outdated. In view of the similarity between the Quichua and Aymara populations of both countries, the proportion stated above has therefore been used for the purpose of this report. On the basis of the above data we obtain the following table:

TABLE 6

| <i>Numbers of Indians who chew coca leaf (men and women)</i> | |
|--|-------------------------------|
| Peru | 1,268,596 |
| Bolivia | 913,875 |
| | TOTAL 2,182,471 ²³ |

While these figures may appear to be small, it should be borne in mind that they represent only a *minimum* which refers only to Indian coca chewers, and that they represent about 45 per cent and 50 per cent of the respective total Indian populations of Peru and Bolivia and with respect to the total populations 20 per cent and 25 per cent respectively.

²³ The above figures do not include the *mestizos* who also chew coca leaf, particularly in the mines.

Harmful social effects

In the course of its study of the effects of coca-leaf chewing, the Commission noted the existence of two schools of thought, one holding that coca-leaf chewing increases the output of labour, and the other maintaining a diametrically opposed view.

The first theory, advanced in most cases by landowners but also by a few engineers, doctors and lawyers, appears to be based on the fact that under the influence of coca-leaf chewing Indians and miners (both Indian and *mestizo*) doing severe or arduous work are capable of greater effort. Many of those who put forward this view admitted at the same time that both the rural Indian and the miner suffered from a very inadequate diet, and that their living conditions and habits were untenable.

This manner of thinking was typified by the representatives of one mining company of Cerro de Pasco (Peru), who said that "a worker who chewed coca leaf had a higher output, since he could work longer without eating". The same argument, it was replied, might lead to the conclusion that a worker's output would be even higher if he never slept or rested.

From the social point of view, those who directly and indirectly defended the continuance of coca-leaf chewing failed to adduce any evidence to show that the habit had any beneficial effects.

The view that coca-leaf chewing has harmful social consequences had more numerous supporters. It was advanced by a considerable number of engineers (particularly mining engineers), by doctors, educators, some landowners, and without exception by all the workers' representatives who were heard by the Commission. While it is not possible to detail here all the facts and opinions which the Commission noted and heard, the following may be stated:

Coca-leaf chewing makes social intercourse between the Indians and the other sections of the Peruvian and Bolivian people very difficult. Coca-leaf chewers tend to shun society, and generally lack the little initiative required to establish individual or collective contacts. This does not signify that the Indian is innately anti-social, but that he has acquired an asocial attitude by force of circumstances, which is not the same thing. In the course of its investigations the Commission heard that while criminality among the Indian population had some connexion with alcoholism, it appeared to have no special relation to coca-leaf chewing. The fact that the overwhelming majority of the inmates of the prisons in the interior are Indians does not mean that Indians are more anti-social than others, but results from the generally bad conditions in which they live.²⁴

In the course of its contacts with coca-leaf chewers, both peasants and miners, the Commission almost invariably noted an attitude of reserve, due to a number of historical, social and economic causes among which

²⁴ The Commission studied the question of any direct relations which might exist between cocaism and criminality. In Peru as well as in Bolivia the chewing of the coca leaf is not in itself regarded as a factor leading to delinquency. Dr. Susana Solano, however, expressed an opposite view in her report "The Indian and the penal law" presented to the Second

coca leaf appears to play an important part. In support of this view the following facts may be noted:

(1) A cursory comparison between a coca-leaf chewer and a non-chewer shows that the former, unlike the latter, shows little signs of sociability. Indian children and youths who do not chew coca leaf are as lively and sociable as those of any other country.

(2) The Commission was told on repeated occasions that Indians who do not chew coca leaf make more rapid social progress. Important evidence to support this view was obtained at Cuzco, Tingo María, Trujillo and Cajamarca (Peru), and at Batallas, Huarizata, Acha-Cachi and Catavi, Cochabamba (Bolivia).

(3) Commanders and officers of the Peruvian and Bolivian armies agreed that the prohibition of coca-leaf chewing during military service did a great deal to increase the Indians' sociability. In most cases this is lost when, after the completion of military service, the Indian returns to his rural environment and relapses into the habit of coca-leaf chewing.

Harmful economic effects

Despite certain assertions to the contrary, the Indian who chews coca leaf generally works and produces less than the non-chewer. This reduced economic output is examined here under the following three heads:

- (1) General capacity for work.
- (2) Specialization in work.
- (3) Accidents at work.

In studying each of these aspects, the Commission took into consideration not only its own observations, but also the views expressed, in particular, by engineers, workers, doctors and educators in constant contact with the life and work of coca-leaf chewers, both in agriculture and in the mines. The cases quoted here represent merely a selection of those which the Commission was able to collect.

General capacity for work

Both in Peru and in Bolivia there is a legal working day of eight hours.

Among the agricultural workers of both countries this working day is only roughly observed, since the Indian seems from the outset to have refused to work for a continuous stretch of eight hours.

Normally the working day of the rural Indian is made up as follows:

- Begins work: 7 a.m.
- First rest: 9 a.m. to 9.30 or 9.45 a.m.
- Resumes work: 9.45 to 11.30 a.m.
- Second rest: 11.30 to 1 p.m.
- Resumes work: 1 to 3 p.m.
- Third rest: 3 to 3.30 or 3.45 p.m.

Inter-American Indigenist Congress held in 1949. Dr. Justiniano Lopez, at the above-mentioned Congress, established a correlation between criminality and alcoholism, in a report entitled also "The Indian and the penal law". Other aspects of criminality among the Indians were examined, during the course of that Congress, by Professors M. Abasto and F. Ponce de Leon.

Resumes work: 3.45 to 5 p.m.

Finishes work: 5 p.m.²⁵

The repeated rests, owing to the high percentage of coca-leaf chewers, are mostly spent in chewing coca leaf. The selection and preparation of the coca leaves and the initial formation of the plug of coca leaves takes thirty to forty minutes, particularly on account of the deliberation characteristic of the Indian peasant.

To do seven hours' work per day the Indian generally needs a working day of ten hours. The uneconomic nature of this system is accentuated if we accept the opinion sometimes expressed by persons of undoubted experience that no more than four or five hours' actual work is done during the day.

This system warrants the following observations:

- (1) It is uneconomic from the individual standpoint.
- (2) It is also uneconomic from the standpoint of the national economy. According to reliable opinion, it does not help to increase agricultural production, already hampered by the almost constant labour shortage existing in the rural regions.
- (3) It is in keeping with the Indian's backward conditions of life, diet and health, as is confirmed by the fact that Indians are only sporadically, and never permanently, capable of putting forth a great effort.

In support of the foregoing it may be added that a labour inspector declared that "the Indian workers of the Sierra had asked to be allowed fifteen minutes for *armar*, or chewing, for every hour of work, which would mean ten hours at their place of work for every eight hours' work actually done".

The low working capacity of the coca-leaf chewer was also confirmed by the military commanders, officers and doctors of the Peruvian and Bolivian armies consulted by the Commission. These all agreed that during the first two months of their service coca-leaf-chewing conscripts were unable to adapt themselves to the physical exercises and tasks necessitated by military life. The necessary physical powers were only acquired after the habit of coca-leaf chewing had disappeared, thanks to the better diet and healthier life of the army.

In the mines the legal working day is generally enforced, but it was again found that underground miners, about 90 per cent of whom chewed coca leaf, interrupted their work at least twice a day in order to prepare the coca leaves and plug. These interruptions of work are also normal among the surface miners, only about 20 to 25 per cent of whom were estimated to chew coca leaf.

Specialization in work

Specialization is less prevalent in agricultural work than in mining.

With regard to agricultural work, the Commission collected information confirming that while a coca-leaf chewer is capable of hard work, he is often unable to work steadily and uniformly. He also appears to be less skilful than a non-chewer in the use of his working implements. The president of a very important agricultural and stock-breeding company in Peru declared

²⁵ In some localities the working day ends at 5.30 p.m., but work is begun at 7.30 a.m. or a little later.

that non-chewers learn more easily to handle agricultural machinery and maintain it properly than coca-leaf chewers. It was also stated that non-chewing Indians were employed as tractor drivers in preference to coca-leaf chewers.

With regard to mining, the Commission's observations and the statements made to it by company representatives, engineers and workers may be summed up as follows:

Workers who do not chew coca leaf are as far as possible selected for any job requiring some degree of specialization or care. This was confirmed by the Commission during its visits to the plants, workshops and laboratories. Even underground the Commission found that work requiring some technical skill or care was generally done by non-chewing miners. The wages of these workers, for example cage operators and wagon conductors, are not always higher than those of the ordinary miners, most of whom chew coca leaf. Generally speaking, it was found that skilled workers did not chew, or had abandoned the habit of chewing, as many workers confirmed in their own cases.

In this connexion it is interesting to note:

(1) That company representatives and engineers consulted by the Commission at Cerro de Pasco (Peru) said that non-chewing workers were always preferred for employment as foremen and for work of any responsibility.

(2) That at Catavi (Bolivia) it was stated by similar persons that non-chewers of coca leaf were given preference for employment as *alarifes*, or engineers' assistants, since coca-leaf chewers frequently mixed up figures, angles, etc., and thus committed errors. This, the engineers believed, proved that the chewing of coca leaf reduced the workers' mental capacity.

These statements were all made in the presence of workers' representatives, some of whom fully concurred in them.

In conclusion, it should be noted that during its visits to some factories in Cuzco and Cochabamba the Commission was told in reply to its questions that coca-leaf chewing was not permitted inside certain factories, and that the numbers of coca-leaf chewers were small.

Accidents at work

The Commission did its best to obtain all possible data on the relation between coca-leaf chewing and industrial accidents. Unfortunately, there are no statistical data on this point, and the information obtained is therefore based on statements by landowners, representatives of companies, miners, engineers, doctors and workers, particularly those employed in the mining regions.

The Commission was informed that in agriculture, as is generally the case, there were very few accidents at work. This was particularly true in the coca-leaf-producing regions, where the nature of the soil normally precludes the use of agricultural machinery. It was added that since almost all rural workers were coca-leaf chewers it was impossible to reach any conclusion on the comparative numbers of accidents as between chewers and non-chewers.

While there was an equal absence of statistics in the mining regions (at Catavi the Commission was promised that statistics would be introduced) the following information was obtained:

(1) Both at Cerro de Pasco (Peru) and at Catavi (Bolivia) engineers and workers expressed the following views:

(a) That miners who chewed coca leaf appeared to be dull;

(b) That they appeared to work mechanically; and

(c) That they paid no attention to their work.

More specifically, the representative of one of the most important companies at Cerro de Pasco said that a miner who chewed coca leaf, although he might occasionally do more work, did not concentrate on his work or take any necessary precautions, and therefore had to be watched more than a non-chewer.

(2) The majority of accidents occur among coca-leaf chewers. Most accidents occur in the evening after a worker has been chewing during the day, and miners involved in serious accidents almost always arrive in the hospital with a plug of coca leaf in their mouth.²⁶ The Catavi workers who took part in the meeting supported these facts.

While there are again no statistics available to show a correlation between industrial accidents and coca-leaf chewing on the *haciendas* in the north of Peru, where the work is partly agricultural and partly industrial, the view was expressed that very probably such a correlation did exist. Indeed, at Trujillo a doctor told the Commission that many accidents were due to the state of chronic intoxication induced by coca-leaf chewing in the chewer. Coca-leaf chewers lost control of themselves, thus giving rise to accidents. At Cajamarca, too, some witnesses were prepared to admit a relation between these two phenomena. On the basis of his professional experience a lawyer testified that a chronic coca-leaf chewer showed clear signs of lethargy, that this influenced the number of industrial accidents, and that in the factories or workshops of the Sierra, coca-leaf chewers were more liable to accidents than non-chewers.

From the foregoing the following conclusions may legitimately be drawn:

(1) The social and economic effects of coca-leaf chewing on the individual are obviously harmful. Coca-leaf chewing not only prejudices the social and economic life of the chewer, but also renders more difficult his advance and adaptation to higher standards of life. The coca-leaf chewer's apathy or lack of initiative is not a characteristic of Indian psychology, since each people has its own peculiarities, but results from his generally backward conditions of life. No individual can be expected to show initiative and make social and economic progress when he does not enjoy reasonable living conditions. As the Commission was able to observe, coca-leaf chewing is reduced when living conditions are somewhat improved. This occurs in the Adventist settle-

²⁶ One of the engineers present expressed the view that the greater frequency of accidents in the evening might be due to the dynamiting and explosions which took place at that time. It was added that in view of these facts miners who chewed coca leaf needed to take greater care, which they failed to do.

ments and in some individual cases. The Adventist settlements represent a generous endeavour, but their results are limited. With regard to individual efforts to abandon the habit of coca-leaf chewing, the Commission noted many praiseworthy cases, particularly at Catavi, where some miners stated that they had abandoned coca-leaf chewing and thus improved their social and economic situation; but these are isolated cases. Left to his own devices, a coca-leaf chewer will generally remain a coca-leaf chewer. This means that the coca-leaf-chewing individual will fail to develop his innate qualities and aptitudes, which are atrophied as a result of coca-leaf chewing and its concomitant factors.

(2) Since there is an intimate bond between the individual and the community, it is also clear that the effects of coca-leaf chewing must be considered as socially and economically prejudicial to the nation.

Socially, at least a quarter of the population, both in Peru and in Bolivia, either stand apart from the progressive development of their country as a result of coca-leaf chewing and factors related to this habit, or contribute to an extremely limited extent.

From the economic standpoint, it should be noted that both Peru and Bolivia are primarily agricultural countries.

In Peru 52.24 per cent of the working population are engaged in agriculture. Out of the 15 million hectares devoted to food production, 14 million hectares are situated in the Andes, particularly in the southern zone, where coca-leaf chewing is most widely practised. Puno, the second Department in respect of coca-leaf chewing and one of the most deficient in food, alone contains as great a cultivated area as the six Departments of the northern zone of Peru together, and more than the total cultivated area of the Departments constituting the southern zone. Although the Andes region provides most of the food produced in all Peru, agriculture is more intensive in the north. This greater productivity is due to a variety of causes, including the fact that there is less coca-leaf chewing in the north than in the centre and south.

Although this general deficit in food production is, of course, due to a number of factors, one of the most important is the coca-leaf-chewing habit. The Commission heard repeated testimony to this effect, some of it authoritative since it came from the landowners and agricultural engineers in the regions visited. Another important factor is the working day of the agricultural worker, which has already been discussed in this part of the report, and which, far from helping to solve the problem of the shortage of labour in agriculture, still further aggravates this problem.²⁷

Mining production, particularly that of metals, constitutes an important source of Peru's wealth.

According to information obtained by the Commission coca-leaf chewing, which appears to be practised by about 90 per cent of underground miners, must be considered as an unfavourable economic factor.

Similar considerations apply to Bolivia. Approximately 80 per cent of the total population inhabit the

²⁷ The legal provisions governing labour conditions are examined below.

high and the intermediate regions, i.e., the Yungas valleys, where the population is almost entirely agricultural.

Food production in Bolivia lags behind the country's requirements. In 1944, 6,481 million bolivianos were spent by the population on food, while national agricultural and stock-breeding production amounted to no more than 700 millions.²⁸ These figures show that 89 per cent of the food consumed was imported from abroad. Although conditions have improved in recent years, there can be no doubt that a deficit still exists.

The most important agricultural regions are the Yungas, both in La Paz and in Cochabamba, and similar regions. In all of them coca leaf is produced and chewed, the working day described above is observed and there is an obvious shortage of labour.

While the deficit of agricultural production is due in Bolivia, as in Peru, to a variety of causes, it is reasonable to suppose that an important part is played by coca-leaf chewing.

Bolivian mining production is of primary importance to the country's economic life. There are no statistical

²⁸ The author of the technical report submitted to the Government of Bolivia, *Present and Future of the Food Problem in Bolivia* by Professor Pedro Escudero, Buenos Aires, 1947, points out that this figure is in reality too high, since it includes rubber and petroleum. According to figures compiled by the Agricultural Bank of Bolivia (See *Seventh Annual Report, year 1948*, La Paz, 1949, page 52) in 1947 Bolivia imported wheat to a value of 50,186,148 bolivianos, equivalent to a cost of US\$3,340,996.97. The report points out that serious difficulties are experienced in paying for this wheat, and that increased wheat production has been recommended by the Bank on a number of occasions.

data on the number of miners, but it is generally estimated that there are from 50,000 to 60,000, about 70 to 80 per cent of these being employed in the large mining enterprises.²⁹

The Commission was told that miners frequently worked longer than the legal working day of eight hours or redoubled their efforts if they were offered the incentive of extra pay for overtime or for increased output. In view of the dietary conditions of almost all the miners and the prevalent belief that coca leaf prevents fatigue and drowsiness, it may be assumed that such extra work necessarily entails increased chewing of coca leaf. While no statistics are available, it may legitimately be concluded that such conditions:

(1) Lead to more frequent industrial accidents.

(2) Involve a considerable wastage of health, which the miner endeavours to restore by chewing coca leaf.

It would thus appear that from the social standpoint the effects of chewing coca leaf are highly prejudicial both to the individual and to the nation.

To sum up, it may be concluded that, even admitting that other factors which have been partly examined in the present report are also involved, coca-leaf chewing leads to genuinely harmful, closely related economic and social effects in both Peru and Bolivia.

²⁹ While in Bolivia the Commission also visited a mine owned by a private individual classified as a small-scale miner, with a view to comparing conditions of work with those in the large mines. This mine was also situated in the Catavi region and working conditions there were in every way greatly inferior to those noted in the Patifio Company, in the same region. All the workers at this mine were Indians and chewed coca leaf, their wages were lower, and there were no technical safety arrangements or medical services.

Part Four

**POSSIBILITIES OF LIMITING THE PRODUCTION AND CONTROLLING
THE DISTRIBUTION OF COCA LEAF**

Chapter XI

THE PRODUCTION OF COCA LEAF

Generally speaking, all agricultural crops cultivated by man correspond to certain social and economic conditions; but this relation, while it always exists, is not always easily ascertainable. In the present case, however, there is a clear relation between the production and consumption of coca leaf and economic conditions in those regions both of Peru and of Bolivia where the population produces and chews the coca leaf.

There are no statistical data, either in Peru or Bolivia, on the actual production of coca leaf.¹ At present only Peru has begun, pursuant to Decree-Law No. 11046 of 13 June 1949, to make the necessary land survey and compile the registers.² It is impossible to foresee how much time will be needed to complete the survey and institute an efficient system of registration; this will be governed by the nature of the task involved, the complexity and difficulties of which are increased by the nature of the country where the coca-leaf plantations are generally situated, by the remoteness and inaccessibility of many of the plantations, and by the fact that a numerous staff not at present available will be required.

PRODUCTION FIGURES

General considerations

Any estimate of actual production of coca leaf in Peru and Bolivia made at the present time must take into account the following considerations:

(1) The statistical data available apply to coca leaf in circulation, on which tax has been paid. These statistics mainly cover coca leaf transported to coca-leaf-chewing regions where coca leaf is not produced, or is produced in insufficient quantities. Such a distinction is important for the interpretation of the tables given below.

(2) Much of the coca leaf produced in Peru and Bolivia is locally chewed and is not put into circulation. No tax is paid on such coca leaf, and therefore it is not included in the existing statistics. Such coca leaf includes:

(a) Quantities kept by every small producer (even when he sells some or most of his crop) for his own

¹ At the fourth session of the Commission on Narcotic Drugs (16 May-3 June 1949) the representative of Peru said that his Government would prefer to defer its reply to the questionnaire on coca leaf until the Commission of Enquiry had finished its work, since it had not at that time any reliable information on which to base statistics (document E/1361, page 51). The reply of the Bolivian Government to the questionnaire refers primarily to production in the Department of La Paz (document E/CN.7/110, page 7).

and his family's use. The amount retained bears a direct relation to bad living and working conditions, the number of coca-leaf chewers in the family and the degree of illiteracy.

Consumption by the producers themselves and their families has not always been given its full importance in the estimates of the actual production of coca leaf made by some authors. The survey and production-registration system now being inaugurated in Peru may very possibly show that the quantities of coca leaf consumed at present without payment of any tax are greater than is generally believed. Such consumption at the actual place of production is due to the prevailing conditions of life, and particularly to nutrition deficiencies. There is always a tendency to compensate for these deficiencies by means of alcohol and coca,³

(b) The additional amounts of coca leaf also kept by the smallholder or farmers for purposes of:

(i) Exchange in certain transactions for other products or articles; and

(ii) Use in religious, family or agricultural holidays or ceremonials, and payment of certain services, assistance or loans;

(c) Coca leaf kept by large landowners or producers for:

(i) Daily distribution to workers at the beginning of the working day. This practice, while not universal, is very wide-spread;

(ii) Part payment of wages, in certain plantations;

(iii) Distribution on certain occasions or holidays, and use as barter in certain transactions;

(d) Coca leaf which workers are allowed to take during working hours when harvesting the crop, for consumption after the leaf has been dried;

(e) Coca leaf circulated in the illicit traffic in order to avoid tax. It will not be possible to estimate the extent of this traffic until a plantation survey and coca

² This enactment was supplemented by the Supreme Decree of 2 August 1949, the Supreme Resolution of 25 August 1949 and the Supreme Decree of 26 August 1949. The survey and registration system is being conducted by the *Caja de Depósitos y Consignaciones*, the efficient staff of which gave the Commission courteous and competent assistance at all times.

³ See, in support of the above view, Angelica C. Roncal, *Investigación sobre las costumbres alimenticias en las zonas rurales del Perú*, Ministry of Agriculture (S.C.I.P.A.), pages 2, 3, 4, and 5.

production-registration system have been established both in Peru and in Bolivia. The existing control systems set up for taxation purposes in both countries, while they are efficient, provide no guarantee that there is no illicit traffic.⁴

(3) Also to be taken into consideration is the coca leaf consumed in Peru up to the beginning of 1949 for the manufacture of raw cocaine.⁵

It is not possible to compute the amounts of coca leaf corresponding to each of the above categories; but it should be noted that at present the largest quantities involved are those referred to in sub-paragraphs (a) and (c). These quantities are directly proportionate to the numbers of small farmers and large landowners cultivating coca leaf and of rural workers who chew coca leaf; but the figures available for the numbers of coca-leaf cultivators are very general and incomplete.

In Peru, according to statistical data, the number of persons cultivating the coca leaf is 22,400, i.e., no more than 1.7 per cent of the total population engaged in agricultural production.⁶ This figure must be interpreted with due regard to the fact that:

(a) It does not exclude coca-leaf producers who at the same time cultivate other crops, a circumstance which is very common.

(b) The number of persons engaged in coca-leaf production rises appreciably at sowing and harvest times. The number of crops varies between three and six annually, according to the region.

To sum up, the figure 22,400, which in any case appears to refer primarily to the Departments of Cuzco, Huánuco and Ayacucho, should be considered as a minimum which does not cover all the factors mentioned above.

In the case of Bolivia it has not been possible to determine the number of persons engaged in coca-leaf production, in order to compute estimates allowing for items (1) and (2) mentioned on the preceding page. Statistics communicated to the Commission by the Ministry of Agriculture, and referring to the North and South Yungas regions of the Department of La Paz, convey the following impression:

TABLE 7

| | Number of landowners | Communities producing coca leaf |
|--------------------|----------------------|---------------------------------|
| North Yungas | 30 | — |
| South Yungas | 151 | 40 |

Although these figures refer to the most important coca-leaf producing regions in Bolivia, they cannot be

⁴ During its visit to the Coca Leaf Excise Office at Unduavi (Bolivia), the Commission happened to be present during the confiscation of a consignment of coca leaf following an attempt to pass it illegally. The barriers in the way of the illicit traffic are: (a) the vigilance exercised and the strategic situation of the control posts both in Peru and in Bolivia, and (b) the difficulty, in view of the rugged territory, of transporting the coca by any other roads or paths than those normally in use. However, the increase in the numbers of control posts in Peru when the Coca Leaf Monopoly was inaugurated

considered as reliable as regards a possible estimate of the numbers of persons involved in respect of items (1) and (2) above. To the numbers of landowners must be added the frequently numerous tenants on each ranch, who produce coca leaf and consume part of it instead of placing it on the market for sale. Moreover, the figure given for communities producing coca leaf refers only to South Yungas, and it is not known how many coca-leaf producers in each community chew coca leaf and thus come within the scope of items (1) and (2) mentioned on preceding page.

Actual production of coca leaf may be indirectly estimated in approximate figures, by the following methods:

(1) On the basis of the statistics on coca leaf on which tax has been paid.

(2) On the basis of an approximate computation of cultivated area and the yield of coca leaf per hectare.

(3) On the basis of the number of coca-leaf chewers and the average quantity chewed.

The Commission will apply only the first two methods, since statistical information and official estimates, however incomplete, are available in respect of these, whereas no information can be obtained for the third. While the Commission did, subject to the necessary reservations, arrive at an estimate of the number of coca chewers, this is too unreliable to permit any conclusion, however provisional, respecting the actual production of coca leaf.

Peru: production of coca leaf

Data based on existing statistics

(1) According to data given in the *Statistical Yearbook of Peru* (Ministry of Finance and Commerce, 1947), coca-leaf production, estimated on the basis of the figures for coca-leaf consumption, is as follows:

TABLE 8

| Year | Quantity of coca leaf produced (In kilogrammes) | Year | Quantity of coca leaf produced (In kilogrammes) |
|-----------|---|-----------|---|
| 1930..... | 5,201,434 | 1939..... | 5,903,428 |
| 1931..... | 5,264,695 | 1940..... | 6,336,497 |
| 1932..... | 4,615,588 | 1941..... | 6,644,240 |
| 1933..... | 4,484,759 | 1942..... | 6,805,228 |
| 1934..... | 4,667,285 | 1943..... | 6,674,018 |
| 1935..... | 4,645,848 | 1944..... | 6,890,278 |
| 1936..... | 4,921,176 | 1945..... | 7,095,420 |
| 1937..... | 5,292,903 | 1946..... | 7,415,239 |
| 1938..... | 5,845,545 | | |

To the above figures must be added (a) the quantities of coca leaf exported;⁷ (b) amounts of coca leaf

was made primarily in an endeavour to prevent an illicit traffic, the volume of which was not known.

⁵ In order to suppress the illicit manufacture and traffic in cocaine the Peruvian Government promulgated the Decree-Laws of 26 and 28 March 1949 (document E/CN.7/178). With regard to the closing of illicit crude cocaine factories see document E/1361, page 15.

⁶ See *National Population and Employment Census for 1940*, vol. I, and *The Food Situation in Peru*, cited above.

⁷ Export figures are examined in more detail below.

used in the manufacture of crude cocaine. These are difficult to determine, since the amount used depends on the quality of the leaf. According to data obtained by the Commission, 138 kg. of Chinchao (Huánuco) coca leaf and 149 kg. of Tingo María (Huánuco) coca leaf are required to produce 1 kg. of crude cocaine. The average annual production of legally manufactured crude cocaine during the period 1939-1949 was 1,400 kg.

If we assume, as a reasonable average, that 140 kg. of coca leaf are required to produce 1 kg. of crude cocaine, it will be found that the average amount required to produce the 1,400 kg. of crude cocaine produced annually is 196,000 kg.⁸

Using the year 1946 as a basis we obtain the following picture.

TABLE 9

| 1946 | Kilogrammes |
|---|-----------------|
| Coca leaf consumed (on which tax was paid) | 7,415,239 |
| Coca leaf exported | 317,642 |
| Coca leaf used for legal manufacture of crude cocaine | 196,000 |
| | <hr/> 7,928,881 |

This figure does not include (a) the coca leaf produced and chewed without payment of tax; (b) the coca leaf used in the illegal manufacture of crude cocaine.

(2) According to a report submitted to the Commission by the Ministry of Agriculture, production figures are as follows:

TABLE 10

| Year | Kilogrammes |
|----------------|-------------|
| 1945 | 7,095,420 |
| 1946 | 7,415,239 |
| 1947 | 7,407,586 |
| 1948 | 7,604,736 |

The figures for 1945 and 1946 coincide with those given in the *Yearbook* cited above, but they do not include exports or coca leaf used in the legal manufacture of crude cocaine.

In a publication quoted above⁹ the Ministry of Agriculture gives the following table of production during the period 1943-1944 (table 11):

⁸ The above data for legally manufactured crude cocaine are based on information provisionally communicated to the Division of Narcotic Drugs by the representative of Peru in June 1949.

⁹ See *The Food Situation in Peru*, page 178.

TABLE 11

| Peru: Cultivated area, production and consumption | | | | | |
|---|-------------------|----------|----------------------|----------|-----------------------------------|
| Department | Area | | Production | | Consumption, thousand metric tons |
| | Thousand hectares | Per cent | Thousand metric tons | Per cent | |
| Tumbes | - | - | - | - | - |
| Piura | - | - | - | - | - |
| Lambayeque | - | - | - | - | - |
| Cajamarca | 0.8 | 5 | 0.5 | 6 | 0.5 |
| Libertad | 2.0 | 12 | 1.0 | 12 | 0.3 |
| Ancash | - | - | - | - | 0.5 |
| TOTAL | 2.8 | 17 | 1.5 | 18 | 1.3 |
| Lima-Callao | - | - | - | - | - |
| Huánuco | 3.4 | 20 | 1.7 | 20 | - |
| Junín | 0.2 | 1 | 0.1 | 1 | 0.6 |
| Huancavelica | - | - | - | - | 0.5 |
| Ayacucho | 2.0 | 12 | 1.0 | 12 | 0.7 |
| Ica | - | - | - | - | - |
| TOTAL | 5.6 | 33 | 2.8 | 33 | 1.8 |
| Arequipa | - | - | - | - | 0.3 |
| Moquegua | - | - | - | - | - |
| Tacna | - | - | - | - | - |
| Cuzco | 8.0 | 47 | 4.0 | 46 | 2.2 |
| Apurímac | - | - | - | - | 0.5 |
| Puno | 0.4 | 2 | 0.2 | 2 | 1.1 |
| TOTAL | 8.4 | 49 | 4.2 | 48 | 4.1 |
| Amazonas | 0.2 | 1 | 0.1 | 1 | 0.1 |
| San Martín | - | - | - | - | - |
| Loreto | - | - | - | - | - |
| Madre de Dios | - | - | - | - | - |
| TOTAL | 0.2 | 1 | 0.1 | 1 | 0.1 |
| GRAND TOTAL | 17.0 | 100 | 8.6 | 100 | 7.3 |

According to this table production is higher than the figures considered up to this point appeared to indicate. The table does not in any way show whether it refers to actual production or to production on which tax was paid, or whether it includes exports and quantities of coca leaf used in the manufacture of cocaine.

(3) The *Caja de Depósitos y Consignaciones* submitted two statistical tables showing estimated production of coca leaf.

The first table applies to the following years:

TABLE 12

| Year | Kilogrammes |
|----------------|-------------|
| 1943 | 7,290,449 |
| 1944 | 7,170,773 |
| 1945 | 7,721,600 |
| 1946 | 7,732,881 |

According to the *Caja de Depósitos y Consignaciones*, these figures "do not show actual production, since to estimate this it would be essential to make a survey of the areas under cultivation". The report continues, that "the degree of internal consumption can be accepted only as a weighted element, which reflects only the legal incidence of the tax, and provides no reliable basis for

estimating the regional areas or numbers of consumers" (see document prepared by the *Caja de Depósitos y Consignaciones*, Lima Office, page 3).

With the exception of the figure for 1946 which comprises only production plus exports, figures for each year include the quantities of coca leaf produced, exported and used for the legal manufacture of raw cocaine. If we add to the figure for 1946 the average of 196,000 kg. used for the legal manufacture of raw cocaine, we obtain a total of 7,928,881 kg. This figure, like those for other years, does not include:

(a) Coca leaf produced on which tax has not been paid.

(b) Coca leaf used in the illicit manufacture of cocaine.¹⁰

The second table submitted by the *Caja de Depósitos y Consignaciones* is more limited in scope, referring only to coca leaf delivered for consumption, and not to total production. The table was drawn up by the *Caja de Depósitos y Consignaciones* at the same time as that submitted to the Coca Monopoly pursuant to Decree-Law No. 11046, and should be considered merely as an attempt to determine, for the purposes of the new tax system, the movement and circulation of coca leaf destined for consumption. It therefore applies mainly to coca leaf chewed.

TABLE 13

| Peru: Statistics of coca-leaf production delivered for consumption during 1948, by production and tax district (In kilogrammes) | | | | | | |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| District | January | February | March | April | May | June |
| Abancay | 2,438.0 | 1,173.0 | 1,092.5 | 3,105.0 | 3,933.0 | 2,116.0 |
| Arequipa | 23.0 | - | - | - | - | - |
| Ayacucho | 120,033.0 | 66,066.0 | 74,094.0 | 87,711.0 | 97,044.0 | 88,944.0 |
| Cajamarca | 18,936.3 | 13,599.4 | 19,461.4 | 20,649.1 | 23,345.0 | 20,331.6 |
| Caraz | 4,367.0 | 329.1 | 1,730.8 | 1,961.2 | 1,823.1 | 920.3 |
| Cuzco | 787.9 | 281.8 | 362.2 | 586.5 | 724.6 | 615.3 |
| Chachapoyas | 19,390.8 | 931.5 | 561.0 | 753.5 | 2,323.0 | 260.0 |
| Chota | - | - | 46.0 | - | - | - |
| Cerro de Pasco..... | - | - | - | - | - | - |
| Huancayo | - | - | - | - | - | - |
| Huánuco | 212,505.0 | 178,586.8 | 130,105.0 | 164,898.7 | 135,054.0 | 124,600.7 |
| Jauja | 6,961.2 | 1,416.3 | 86.5 | 253.0 | 800.4 | 1,052.5 |
| Pampas | - | - | - | - | - | - |
| Pacasmayo | 103.5 | 161.0 | 529.0 | 253.0 | 80.5 | 1,311.0 |
| Puno | 33,985.4 | 12,945.9 | 18,473.3 | 6,558.9 | 25,942.3 | 15,323.1 |
| Tarma | 2.3 | 828.0 | 369.4 | 214.1 | 422.3 | 391.0 |
| Tumbes | 1,114.0 | - | - | - | - | - |
| Trujillo | 42,114.0 | 23,100.5 | 22,411.5 | 44,082.0 | 40,271.5 | 39,088.5 |
| Quillabamba | 380,397.1 | 241,149.4 | 242,845.7 | 300,178.8 | 349,485.0 | 279,823.8 |
| GRAND TOTAL | 843,158.5 | 540,568.7 | 512,168.3 | 631,204.8 | 681,249.0 | 574,777.8 |

| | July | August | September | October | November | December |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Abancay | 747.5 | 425.5 | 4,232.0 | 1,276.5 | 414.0 | 1,035.0 |
| Arequipa | - | - | - | - | - | - |
| Ayacucho | 54,285.0 | 53,526.0 | 53,910.0 | 32,436.0 | 46,656.0 | 102,768.0 |
| Cajamarca | 18,130.4 | 11,933.9 | 17,176.3 | 21,729.9 | 15,376.7 | 31,558.7 |
| Caraz | 2,076.1 | 1,995.4 | 1,449.3 | 2,095.3 | 1,862.9 | 287.6 |
| Cuzco | 195.5 | 621.0 | 649.8 | 247.3 | 333.6 | 57.5 |
| Chachapoyas | 25,894.0 | 230.0 | 46.0 | 2,564.5 | 1,512.5 | 2,196.5 |
| Chota | - | - | 46.0 | 23.0 | - | - |
| Cerro de Pasco..... | - | - | 28.0 | - | - | - |
| Huancayo | - | - | - | - | - | 66.0 |
| Huánuco | 168,678.5 | 14,838.4 | 159,222.8 | 145,320.7 | 135,779.4 | 192,740.3 |
| Jauja | 797.8 | 854.5 | 789.0 | 1,592.9 | 1,145.4 | 1,131.6 |
| Pampas | - | - | - | - | - | 23.0 |
| Pacasmayo | 793.5 | 529.0 | 80.5 | 391.0 | 552.0 | 345.0 |
| Puno | 1,806.6 | 2,944.0 | 13,508.1 | 5,352.4 | 166.8 | 1,882.4 |
| Tarma | 258.5 | 573.1 | 517.5 | 425.5 | 299.0 | 644.0 |
| Tumbes | - | - | - | - | - | - |
| Trujillo | 48,115.6 | 29,144.0 | 29,379.5 | 27,489.4 | 25,517.5 | 37,123.0 |
| Quillabamba | 273,257.5 | 322,155.4 | 221,449.8 | 196,109.5 | 219,195.6 | 202,957.8 |
| GRAND TOTAL | 595,036.5 | 574,770.2 | 502,484.6 | 437,053.9 | 448,811.4 | 574,816.4 |

¹⁰ The quantity is very difficult to determine.

Table 13 (continued)

| | Total |
|---------------------|-------------|
| Abancay | 21,988.0 |
| Arequipa | 23.0 |
| Ayacucho | 877,473.0 |
| Cajamarca | 232,228.7 |
| Caraz | 20,898.1 |
| Cuzco | 5,463.0 |
| Chachapoyas | 56,663.3 |
| Chota | 115.0 |
| Cerro de Pasco..... | 28.0 |
| Huancayo | 66.0 |
| Huánuco | 1,897,330.6 |
| Jauja | 16,881.1 |
| Pampas | 23.0 |
| Pacasmayo | 5,129.0 |
| Puno | 138,889.2 |
| Tarma | 4,944.7 |
| Tumbes | 1,114.0 |
| Trujillo | 407,837.0 |
| Quillabamba | 3,299,005.4 |
| GRAND TOTAL | 6,916,100.1 |

While this table, by its very nature, does not give a clear idea of coca-leaf consumption in the various Departments (see table 1), it shows that there is an appreciable difference between total production, production delivered for consumption, and consumption.

For example:

(a) Production in the Department of Cuzco is subdivided into the two tax districts of Cuzco and Quillabamba. Quillabamba is a more important production and taxation district than Cuzco City, and is administratively independent of it (both were visited by the Commission).

According to the figures given in the present table, coca leaf delivered for consumption in both districts amounted to 3,234,468 kg. But, according to the data given in table 11, total production in the Department of Cuzco was 4,000,000 kg.

(b) According to the present table, the total amount of coca leaf produced and delivered for consumption in Cerro de Pasco for the whole of 1948 was 28 kg.¹¹ This figure might convey the mistaken impression that coca-leaf chewing is rare, whereas Cerro de Pasco is an important coca-leaf-chewing centre. According to data obtained by the Commission at the Cerro de Pasco Excise Office, 104,924 kg. of coca leaf were imported into the Department in 1948; but this figure applies solely to imported coca leaf on which tax was paid.

(c) According to the table, 1,897,330 kg. of coca leaf were produced and delivered for consumption in Huánuco; whereas table 11 shows total production for this Department as 1,700,000 kg. On the other hand, table 11 shows no consumption for Huánuco.

These are but three of the observations which are suggested by examination of table 13.

¹¹ The list of producer regions given in the above-mentioned document by the *Caja de Depósitos y Consignaciones*, and in Decree-Law No. 11046, mentions no coca-leaf-producing region situated in the Department of Cerro de Pasco, although it would appear from table 13 that such a region does exist.

To sum up, it may be concluded that existing statistical data not only fail to agree among themselves but show that the figures at present available apply, generally speaking, only to amounts of coca leaf placed in circulation either for chewing or for export, and therefore do not show actual production of coca leaf.

Indirect estimate, based on cultivated area

Production may be computed indirectly on the basis of the cultivated area and the average yield of coca leaf per hectare.

Owing to the lack of a land register of coca-leaf plantations, existing data for the number of hectares cultivated are not uniform.

According to table 11, the cultivated area amounts to 17,000 hectares, whereas official information communicated to the Commission by the Ministry of Agriculture gives this area as 14,795 hectares. Other information similarly communicated to the Commission in the Quillabamba (Cuzco) region by officials of the *Caja de Depósitos y Consignaciones* shows the cultivated area there to be about 13,800 hectares. Although this figure is not based on statistics, it must be borne in mind that it is based on the practical knowledge acquired by these officials of their region, which is one of the largest coca-leaf-producing centres. If we assume for purposes of argument that it is correct, this figure would imply that the cultivated area for the remainder of Peru is not more than 3,000 hectares, which appears extremely small in relation to the total coca-leaf production for Peru. This impression is strengthened when it is remembered that in Huánuco alone, which is not a part of the region of Quillabamba, 1,200 hectares were shown to be registered in October 1949, and that this figure applies only to declarations made by landowners up to that date.

Similarly, no concrete data could be obtained regarding the average number of kilogrammes produced annually per hectare. This is due to the fact that no register of production exists, and that production varies appreciably according to region and to the number of crops annually. In the Quillabamba region the Commission was told that the approximate average annual yield is about 1,120 kg. per hectare. According to the "Report of the Cuzco Departmental Agricultural Service on Coca Leaf Cultivation in the Department of Cuzco" submitted to the Commission, the average annual yield is about 1,380 kg. Yield is higher from the fourth year, but declines after the plants have passed the age of eight years. Between the fourth and eighth years, the report states, the average yield is 1,656 kg. per hectare.

Further, according to information furnished by S.C.I.P.A., the average yield of coca leaf per hectare in Peru varies from region to region. In Cuzco it is said to be 920 kg. a year and in Ayacucho, 400 kg. a year, while in Huánuco it varies between 345 and

A close perusal of Decree-Law No. 11046 shows that the Oxapampa coca-leaf-producing region, which the Decree-Law assigns to the Department of Junín, belongs in fact to Cerro de Pasco. This being so, the production figure for Cerro de Pasco given in table 13 would appear to have some basis, although it appears extremely small—which would again go to show that a distinction must be made between production and production delivered for consumption.

690 kg. a year, depending on the number of harvests. In accordance with surveys made by S.C.I.P.A., the average annual yield per hectare of coca leaf in Peru might be estimated at 700 kg.

Assuming that the total area under coca leaf is 15,000 hectares and the average annual yield 1,000 kg. per hectare, actual annual production would be 15 million kg. This figure must be reduced by approximately 25 per cent since, according to information received from many sources by the Commission, pests and diseases, labour shortage and primitive methods of cultivation result in the loss of approximately one-quarter of the leaf produced. The final figure for effective production would in that case be 11,250,000 kg. a year.

If the figure of 700 kg. stated above is accepted, production would be 10,500,000 kg. This figure appears to refer to total effective production, that is, production after allowance has been made for the loss of approximately 25 per cent mentioned above.

The figures given are, in any case, only tentative in view of the discrepancies between the available data.

Bolivia: production of coca leaf

In Bolivia, as in Peru, the most accurate statistical data available apply to the coca leaf on which tax is paid on being placed in circulation. Generally speaking, these data are based on the statistics published by the La Paz and Cochabamba Coca Excise Offices. However, some official and semi-official data are available which attempt to state in approximate figures the actual production of coca leaf. It should be pointed out, however, that there is at present no land register of coca-leaf plantations in Bolivia or effective system of production registers for each plantation. As in Peru, neither the large landowners nor the smallholders normally keep, for their own accounts, any registers which might show their production figures.

Statistical data respecting coca-leaf production

The available sources of information are the following:

(1) The reply of the Bolivian Government to the questionnaire on coca leaf (document E/CN.7/110) furnishes the production data for table 14.

TABLE 14

| Year | Kilogrammes |
|------|-------------|
| 1937 | No data |
| 1938 | 7,125,900 |
| 1939 | No data |
| 1940 | No data |
| 1941 | No data |
| 1942 | 3,177,185 |
| 1943 | 2,000,424 |
| 1944 | 2,972,804 |
| 1945 | 3,215,619 |
| 1946 | 2,976,817 |

The reply states that these figures refer only to the Department of La Paz. In respect of the Cochabamba region, production is given as 209,760 kg. for 1938.

(2) Data on production in the Department of La Paz¹² are as follows:

TABLE 15

| Year | Metric tons | Year | Metric tons |
|------|-------------|------|-------------|
| 1925 | 2,355 | 1936 | 2,677 |
| 1926 | 3,440 | 1937 | No data |
| 1927 | 3,672 | 1938 | No data |
| 1928 | 3,421 | 1939 | No data |
| 1929 | 3,309 | 1940 | No data |
| 1930 | 3,067 | 1941 | No data |
| 1931 | 3,283 | 1942 | 3,839 |
| 1932 | 2,852 | 1943 | 3,643 |
| 1933 | 3,392 | 1944 | 3,727 |
| 1934 | 3,177 | 1945 | 3,455 |
| 1935 | 3,140 | | |

(3) Data on total national production given by the General Board of Statistics are as follows:

The data for the years 1943-1946 differ from those given in table 14.

TABLE 16

| Year | Kilogrammes |
|-----------|-------------|
| 1937-1938 | 7,336,000 |
| 1938-1939 | 7,850,000 |
| 1939-1940 | 5,069,000 |
| 1940-1941 | 4,973,000 |
| 1941-1942 | 5,817,000 |

According to a table communicated to the Commission by the Ministry of Agriculture, the combined production of the Departments of La Paz and Cochabamba was as follows:

TABLE 17

| Year | La Paz (Kilogrammes) | Cochabamba (Kilogrammes) | Total (Kilogrammes) |
|------|----------------------|--------------------------|---------------------|
| 1944 | 3,728,000 | 923,000 | 4,651,000 |
| 1945 | 3,455,000 | 1,029,000 | 4,484,000 |
| 1946 | 4,040,000 | 817,000 | 4,857,000 |
| 1947 | 3,698,000 | 835,000 | 4,533,000 |
| 1948 | 3,468,000 | 831,000 | 4,299,000 |
| | | TOTAL | 22,824,000 |

The data referring to the Department of La Paz differ from those given in table 14. According to the report of the Ministry of Agriculture which accompanied the present tables, the production figures given refer only to quantities passing through the La Paz

¹² Published by the Director-General of Statistics, Dr. Jor Panda Gutiérrez, in his work *Geografía Económica (Bolivia y el Mundo)*—Economic Geography (Bolivia and the World) vol. II, 1947, page 268.

and Cochabamba Excise Offices and are based on information supplied by those Offices. Consequently the figures given apply not to actual production but simply to quantities placed in circulation.

According to this table annual average production is 4,565,000 kg. whereas other information obtained shows the average annual production as follows:¹³

TABLE 18

| Department | Kilogrammes | Per cent |
|------------------|-------------|----------|
| La Paz | 4,900,000 | 89 |
| Cochabamba | 550,000 | 10 |
| Santa Cruz | 50,000 | 1 |
| TOTAL | 5,500,000 | |

(4) According to statistics communicated to the Commission by the La Paz Coca-Leaf Excise Office, the quantities of coca leaf delivered for consumption were as follows:

TABLE 19¹⁴

| Year | Kilogrammes |
|------------|-------------|
| 1942 | 3,633,980 |
| 1943 | 3,447,913 |
| 1944 | 3,527,727 |
| 1945 | 3,270,152 |
| 1946 | 3,823,730 |
| 1947 | 3,499,921 |
| 1948 | 3,281,819 |

These figures again differ from those given in tables 14, 15 and 17, for the years which can be compared.

(5) According to statistics in the possession of the Society of Landowners of Yungas, production in the Department of La Paz was as follows:

TABLE 20

| Year | Kilogrammes |
|------------|--------------|
| 1942 | 3,839,310.38 |
| 1943 | 3,642,719.07 |
| 1944 | 3,727,043.28 |
| 1945 | 3,454,914.87 |
| 1946 | 4,039,769.91 |
| 1947 | 3,697,665.38 |
| 1948 | 2,967,214.49 |

¹³ See work quoted in footnote ¹².

¹⁴ The unit of weight used by the Coca-Leaf Excise Office is the *tambor*, which, according to information obtained by the Commission, is equivalent to 21.77 kg. Another unit of weight used is the *cesto*, which is equal to 2 *tambors*. In addition the pound and the *huarco*, which is equivalent to 4 pounds, are often used. Moreover, there are two types of *cestos*, one the units used in the *haciendas*, equivalent to 6 *huarcos* or 24 pounds, and the other the Indian *cesto*, equivalent to 8 *huarcos* or 32 pounds. This diversity of measure does not facilitate proper computation or uniform control. The official system of Bolivia is the metric system.

¹⁵ The statistics published by the Cochabamba Excise Office are computed in *arrobas* and pounds.

These figures agree to a certain extent with those shown in table 17, (La Paz) and apply to quantities of coca leaf delivered for consumption after payment of tax, and not to actual total production.

(6) According to statistics compiled by the Cochabamba Excise Office and communicated to the Commission, the quantities of coca leaf delivered in this Department for consumption were as follows:

TABLE 21¹⁵

| Year | Kilogrammes |
|------------|-------------|
| 1947 | 834,716 |
| 1948 | 830,875 |

Data submitted by the Society of the Landowners of Yungas¹⁶ show production in Cochabamba as follows:

TABLE 22

| Year | Kilogrammes |
|------------|-------------|
| 1945 | 411,704 |
| 1946 | 326,526 |
| 1947 | 333,889 |

The discrepancy between the production figures for 1947 given in tables 21 and 22 is clear.

Calculation per hectare

There are no concrete data on the number of hectares cultivated in Bolivia. The data obtained on annual yield per hectare vary, owing to the nature of the terrain, epidemics and sicknesses, climatic conditions, hours of work, etc.

(1) In the data submitted by the Ministry of Agriculture the cultivated area is estimated in approximate figures at 6,000 hectares and the mean annual yield per hectare¹⁷ as 800 kg. According to these data the total annual production should be 4,800,000 kg. This figure is lower than the average annual production shown in table 18.

(2) In the report submitted to the Commission by the Society of Landowners of Yungas of La Paz, it is also estimated that the cultivated area of coca leaf is 6,000 hectares (5,500 in La Paz and 500 in Cochabamba) but the average annual yield per hectare is estimated to be only 660 kg.¹⁸

¹⁶ See "Memorandum submitted to the United Nations Commission of Enquiry into the Effect of Chewing the Coca Leaf by the Society of Landowners of Yungas de La Paz", La Paz, 5 November 1949, page 2.

¹⁷ See "Replies to the Questionnaire submitted to the General Boards of Agriculture and Rural Economy by the United Nations Commission of Enquiry into the Effects of Chewing the Coca Leaf", La Paz, 18 November 1949.

The average shown is lower than in Peru, which may be due to differences in the nature of the land, different methods of cultivation, numbers of crops, climatic variations, extent of epidemics and sickness, etc.

¹⁸ See "Memorandum" quoted above.

TABLE 23

| A INFORMATION RECEIVED FROM THE CAJA DE DEPÓSITOS Y CONSIGNACIONES <i>Departments and areas</i> | B INFORMATION RECEIVED FROM THE MINISTRY OF AGRICULTURE <i>Departments</i> | C ACCORDING TO SUPREME DECREE OF 2 AUGUST 1949 <i>Departments and areas</i> |
|--|---|---|
| 1. <i>Ancash</i> : Conchucos (Pallasca Province) and in the Puruhuay valley, in the district of Quchis (Pomabamba Province). | 1. <i>Ancash</i> : Not a producing area. | 1. <i>Ancash</i> : Cabana. |
| 2. <i>Apurimac</i> : Not a producing area. | 2. <i>Apurimac</i> : Not a producing area. | 2. <i>Apurimac</i> : San Jerónimo and Huascatay. |
| 3. <i>Amazonas</i> : District of the Peca (Baghua Province); Balsa and Chuquibamba (Chachapoyas Province) and in the districts of Cocabamba, Ocally, Ocuma and Pisuquia (Luya Province). | 3. <i>Amazonas</i> : | 3. <i>Amazonas</i> : Chachapoyas, Tingo, Tocabamba, Izuquia, Colcamar, Ocumal, Ocay, Cogón, La Ramada, San Rafael and San Lucas. |
| 4. <i>Ayacucho</i> : In the mountains of Acón, Choymacota, Yanabamba, and Pizcatán (known as the Huanta Mountains) Ayna, Pazñate, Sanugari, Sana and Sumariba (La Mar Province). | 4. <i>Ayacucho</i> : | 4. <i>Ayacucho</i> : Ayna, Apulema, Huanta, Sillacocho, Vizcatán, Cabildopampa, Cuchicancha, Chungui, Magdalena, Sachapunco and Sacharacay. |
| 5. <i>Cuzco</i> : Convención valley, and in the Lares, Lacco, Ocobamba, Conispata and Marcapata valleys. | 5. <i>Cuzco</i> : | 5. <i>Cuzco</i> : Carca, Pucartambo, Pumococha, Tinac, Lirihuyoc, Urubamba, Quillabamba, Chaulay, Ocollopani, Machupicchu and Quelleouna. |
| 6. <i>Cajamarca</i> : Along the river Marañón and in adjoining valleys and in the districts of Cachachi and Sitacocha (Cajabamba Province); in the districts of Magdalena and Cospán (Cajamarca Province); districts of Chumuch and Jorge Chavez (Celedín Province); Cascas (Contumazá Province) and in the Pión valleys of the district of Trinidad (Hualgayoc Province). | 6. <i>Cajamarca</i> : | 6. <i>Cajamarca</i> : Bolívar, Cajabamba, Cascos, Celendín and San Marcos. |
| 7. <i>Huánuco</i> : Chinhuagalá, Chinchao, Derrepente, Jaupar and Pilláu mountains; Tingo María valley (Huánuco Province); Chipaquillo valley (Dos de Mayo Province); Corno and Cornillo, Huayrur, Posuso and San José mountains (Pachitea Province); Monzón mountains (Huamalies Province); in the Ají and Coco valleys and in the mountains of Santo Domingo (Marañón Province). | 7. <i>Huánuco</i> : | 7. <i>Huánuco</i> : La Parroquia, el Valle, Acornayo, Huacrachuch, La Esperanza, Santo Domingo, Monzón, Aguellín, Tazo Grande, Tazo Chico, Chipaquillo, Garita Maravillas, Panao and Tingo María. |
| 8. <i>Junín</i> : Pampa Hermosa (Jauja Province); Llaylli valley (district of Andamarca). | 8. <i>Junín</i> : | 8. <i>Junín</i> : Andamarca, Satipo, La Merced, Huancabamba and Oxapampa. |
| 9. <i>La Libertad</i> : Districts of Chococo, Marcabal, Sarin and Satibamba (Huamachuco Province); districts of Charat, Huaranchal, Marmot and Usquil (Otuzco Province); districts of Chillá, Huayo, Huancaparta, Ongón and Pataz (Pataz Province); district of San Pedro (Pacasmayo Province); district of Simbal (Trujillo Province). | 9. <i>La Libertad</i> : | 9. <i>La Libertad</i> : Pedregal, Otuzco, Huamachuco, Tayabamba and Chiclin. |
| 10. <i>Puno</i> : Forests in the provinces of Sandía and Carabaya. | 10. <i>Puno</i> : | 10. <i>Puno</i> : Limbani, Macusani, Amascusani, Patambuco and Sandía. |
| 11. <i>San Martín</i> : Uchiza mountain and along the Grisnejas and Chontayaco rivers (Marsical Cáceres Province). | 11. <i>San Martín</i> : Not a producing area. | 11. <i>San Martín</i> : Uchiza. |

This average appears to have been computed on the basis of the average quantities of coca leaf *delivered for consumption* in the period 1942-1948. While this calculation is arithmetically correct, it is not based on actual production, the figures used corresponding only to the quantities of coca leaf passing through the La Paz Excise Office, on which tax was paid, and not to the actual total production, an appreciable part of which is used without passing through the La Paz Excise Office.

(3) Finally, it should be noted that according to the information submitted in reply to the questionnaire on coca leaf, the cultivated area in the Department of La Paz in 1946 was 7,088 hectares.¹⁹ On the basis of the average given by the Ministry of Agriculture, this would amount to an annual production of 5,670,400 kg. in the Department of La Paz.

It would appear from the statistics and comparative figures given in this part of the report that:

(1) There is a considerable difference between actual production and the quantities delivered for consumption and subject to tax. These, while considerable, represent merely a part of the former.

(2) The statistical data respecting production subject to tax do not always agree.

(3) The data obtained on a purely tentative basis, in order to determine actual production indirectly, also lead to inconsistent results. These figures, and the resulting discrepancies, are based on official data on cultivated area and average annual yield per hectare. Very possibly official estimates for both these figures will be rectified in the course of time.

Finally, the following general conclusions may be drawn:

(1) That at present the actual production of coca leaf in Peru and in Bolivia is unknown.

(2) That any accurate determination of actual production will be impossible unless:

(a) A proper register of coca-leaf plantations is compiled;

(b) A system of registration of actual production is introduced;

(c) An efficient machinery for supervising observance of (a) and (b) is set up.

At the present time only Peru has begun, pursuant to Decree Law No. 11046, to take the first steps towards these objectives.

PRODUCING AREAS

In the absence of a cadastral survey in either Peru or Bolivia, any exact delimitation of coca-leaf-producing areas in the two countries is impossible and only an approximation is possible.

According to information received by the Commission, the coca-leaf-producing areas are as given below.

Peru

Three sources supplied the data on producing areas given in table 23.

It will be seen from an examination of table 23 that:

(1) In no case is there any indication of the area under cultivation.

(2) The producing areas are listed differently in each of the three sources of information. In many cases there are substantial discrepancies which sometimes may be more apparent than real since column C frequently lists only provinces and areas while in column A the districts and the provinces to which they belong are also mentioned.

(3) In column B only the departments in which coca leaf is produced are listed. In the absence of any further indication, this is insufficient to provide adequate information regarding producing areas, since reference to the department must be regarded as too general.

(4) Columns A and C show producing areas in the Departments of Ancash and San Martín which in column B are listed as non-producers.

(5) The Department of Apurímac is given as a non-producer in columns A and B and as a producer in column C.

(6) In table 13 the Department of Arequipa is shown as having some producing areas, as is Cerro de Pasco, but neither Department is mentioned in the data given in the present table.²⁰

(7) The Department of Huancavelica is also omitted, although it is a producing area according to table 13 in which the Pampas area is mentioned. There is a province of that name in the Department of Huancavelica.

The differences and discrepancies between the data given in columns A, B and C of table 23 which we have mentioned (and others might be cited) are largely due to the absence of a cadastral survey of coca plantations. Only a proper cadastral survey could provide exact data regarding the producing areas of Peru, which at present are only approximately known.

The following table shows the producing departments of Peru, grouped by regions:

TABLE 24

| | <i>Per cent of total production</i> |
|--|---|
| Northern region: Ancash, Cajamarca and La Libertad | 17 |
| Central region: Ayacucho, Apurímac, Huánuco and Junín (Cerro de Pasco) | 33 |
| Southern region: Cuzco and Puno | 49 |
| Eastern region: Amazonas and San Martín | 1 |
| TOTAL | 100 |

¹⁹ See document E/CN.7/110, page 7.

²⁰ With regard to Cerro de Pasco, see table 13.

There also seems to be occasional production in the Departments of Tarija and Beni.

As in the case of Peru, the exact determination of producing zones or areas will be possible only when there is a cadastral survey of coca plantations.

Bolivia

According to information received, the most important producing areas are approximately as follows:

²¹ So far as possible, the provinces in each department have been arranged approximately in decreasing order of production. The data given are based on information collected by the Commission in the Coca-Leaf Customs Offices of La Paz and Cochabamba. In the case of Santa Cruz, Tarija and Beni, use has been made of the information contained in *Geografía Económica (Bolivia y el Mundo)*, vol. II, mentioned above, which was kindly furnished to the Commission by the author, Dr. Jorge Gutiérrez, the present Director General of Statistics of Bolivia.

TABLE 25²¹

| <i>Departments</i> | <i>Provinces</i> | <i>Per cent total produc</i> |
|--------------------|---|------------------------------|
| La Paz | Sud Yungas Nor Yungas Inquisivi Caupolicán Murillo Muñecas | 89 |
| Cochabamba | Chaparé Carrasco Araní Quillacollo Cliza | 10 |
| Santa Cruz | Cercado Sara Vallegrande | 1 |

Chapter XII

FLUCTUATION OF PRODUCTION

The Commission constantly endeavoured to assess the fluctuations of coca-leaf production in Peru and Bolivia. These are not easy to establish since the available data relate almost exclusively to coca leaf released for consumption, on which duty has been paid, and not to actual production. Moreover, since the data relating to coca leaf released for consumption are not uniform, it is difficult to draw any conclusion.

Production is, broadly speaking, influenced by the following factors:

(1) Poor harvests are frequently caused by pests and diseases of the coca plant; with some exceptions, methods of pest control are still rudimentary or inadequate.

(2) The absence of fertilizers, in most cases, leads to reduced production. To prevent this, small farmers practise extensive rather than intensive cultivation; the area under cultivation is increased or old land abandoned in the search for new. In practice this policy leads to the depopulation or gradual abandonment of some areas in favour of others and has given rise to grave concern in Peru and Bolivia regarding the agricultural future of some areas.

(3) The chronic shortage of labour in both Peru and Bolivia was found by the Commission to endanger the coca-leaf harvest on occasion. In an attempt to cope with this difficulty, use is made of seasonal agricultural labour.

At present, in the case of Peru, the Government's firm attitude against the illicit manufacture of crude cocaine will necessarily influence the production of coca leaf. This factor has already begun to make itself felt in one of the most important producing areas, the Department of Huánuco, in which most of the factories shut down were situated.²²

Another factor which will probably affect production of coca leaf in Peru is the application of Decree-Law No. 11046 and supplementary provisions, establishing the Coca-Leaf Monopoly. Under the Supreme Decree of 2 August 1949, the number of producing areas is limited to those listed in article 1 of the Decree.²³

²² On 16 September 1949, a meeting of coca-leaf producers and traders was held at Huánuco. The meeting drew attention to the losses caused by the closing of the factories and the fact that there was no market for the second- and third-grade coca leaf used for manufacture. As a solution, they suggested that a cocaine factory should be established either by the

At the time of writing, the fluctuations in the production of coca leaf cannot be regarded as the reflection of a policy aiming at the limitation of such production. In its visits to producing areas, the Commission did not find any clearly-defined trend towards a policy for the limitation of production on the part of the producers. It is true that in some places in Peru the Commission found that coca leaf had been replaced by tea, rubber and other crops, but it also found places in which the production of coca leaf had been intensified. Similar remarks apply in the case of Bolivia; the reduction of production at certain times is the result of fluctuations due to the factors mentioned in (1), (2) and (3) above rather than of a definite policy for the limitation of the production of coca leaf.

PERU

In the case of Peru, an examination of tables 8, 9, 10 and 12 shows that, in spite of some fluctuations, the production of coca leaf has continually increased.

BOLIVIA

Examination of tables 14, 15, 16, 17, 19 and 20 shows that, although there have been substantial fluctuations due to a variety of causes, production cannot be regarded as showing any clear trend towards a policy of limitation. In the case of Cochabamba, there was a clear increase of production between 1938 and 1948.

Granted that there is a correlation between actual production and the volume of coca leaf paying duty and released for consumption, it must be concluded that the actual production has also continued to increase. This would imply that in spite of the constant adverse effect of the factors discussed in (1), (2) and (3) above, the number of coca-leaf chewers in Peru and Bolivia has increased, from which it may legitimately be concluded that the improvement in the economic and social status of the social groups to which chewers belong has been neither sufficiently general nor sufficiently rapid to prevent an increase in coca-leaf production and chewing and consequently in the harmful effects of consumption.

Government or by local coca-leaf traders under proper control. See *Boletín de la Cámara de Comercio de Huánuco*, No. 7, September 1949.

²³ A study of these provisions is given below in chapter XV, Control.

Chapter XIII

THE CULTIVATION OF COCA LEAF

Both in Peru and Bolivia, coca leaf is cultivated in accordance with traditional methods and customs in which modern knowledge regarding the planting, preparation and fertilizing of land and techniques of pest and disease control play little part.

Generally speaking, coca leaf is cultivated on very similar lines in Peru and Bolivia. The most important differences will be noted below. The data given refer to the normal conditions of coca cultivation.

CLIMATE

The requirements are: an average temperature between 18° and 25° C, humidity between 80 and 90 per cent, and altitude between 500 and 2,000 metres.

SOIL

The soil must be clayey, sandy and ferruginous and contain humus. According to the characteristic which predominates, soil is classed as rich in organic matter, clayey or sandy. It appears that the best soils, at least in the Yungas of La Paz, are clayey; these soils give a better yield as the leaves do not drop from the bush so easily when they have ripened.

Very often in Bolivia and less frequently in Peru, the plantations are terraced (see annex V) a process which requires a good deal of time. This prevents erosion and also facilitates irrigation and harvesting. In the Tingo María area in Peru, terraces are little utilized, with the result that in some places land has become unusable, because of constant erosion, and other land has to be found.

Before the coca-leaf seedlings are planted, the soil is dressed, in some localities, by the addition of: 33 per cent pulverized earth, 33 per cent powdered charcoal, 33 per cent fine sand.

If the soil is too sour, it is dressed with lime.

SOWING

The ground is planted with seedlings which are set at a depth of approximately three centimetres. The plants are usually fifty to sixty centimetres apart and the distance between rows is approximately one metre.

CROPS

The plantation begins to produce between two and three years after planting. The period of greatest production is between four and eight years, after which a decline sets in. The decline can be avoided to some extent by improved tilling.

The number of crops varies from region to region because of climate, soil, irrigation, etc.

In Peru the number of crops is usually three and in some cases four. Harvests usually take place in March, June and November. In Tingo María, there are usually five and sometimes even six harvests. The cocaine content of the Tingo María leaf seems to be less than that of leaf from Huánuco, Cuzco, Trujillo and other parts of the country. The greater humidity is said to be the determining factor. It is likely that other factors also have an influence on the reduced cocaine content.

In Bolivia the normal number of crops is three and more rarely four. The harvests take place in the same months as in Peru.

In large coca-leaf plantations, cultivation and harvesting are carried on practically without interruption because of the large number of plots under cultivation.

Fertilizers are little used. They seem to be employed only by a few large landlords.

The average life of a coca-leaf plant is fifteen to twenty years. There are some plantations of twenty-five years and over.

Coca leaf is harvested by hand, women pickers being preferred. Each leaf has to be picked individually with great care, using the index finger and the thumb in order to avoid damaging it. Coca leaves which fall to the ground are collected later and are regarded as of inferior quality.

Coca-leaf plantations require careful tilling. The soil must be weeded regularly. The Commission was able to observe the great difference which exists between well- and badly-tilled coca-leaf plantations. In the latter, the plants are overgrown, the branches increase in thickness and the size of the leaves is reduced. The plant then has the appearance of a wild plant. In Peru, leaves from the less well-cultivated plantations are used in some cases for the manufacture of crude cocaine and not for chewing. In Bolivia, coca-leaf plantations are generally well cultivated since, as crude cocaine is not manufactured in that country, leaves, including those exported, are generally intended for chewing.

Wild coca-leaf bushes play no part in production. All coca leaf produced is cultivated.

After collection, the leaves have to be dried. Two methods are used:

(1) The leaves are spread out in special places to be dried by the sun for two or three hours.

(2) The leaves are placed in hot air chambers.

Method (1) is used in Peru and Bolivia. The Commission found that method (2) was used in some plantations in Peru, especially in the Tingo María area.

After being partly dried, the leaves are stored in cool place in order to keep them in good condition.

The piles of leaves are usually not more than fifteen to twenty centimetres in height and have to be turned over once or twice a day in order to keep the leaves properly aired and to avoid damage through dampness.

The form and weight of packages of coca leaf for distribution vary with the locality and area. As a rule, dry banana leaves or a material made of ordinary cotton are used to pack them. Wool is said to damage coca leaf.

The average yield of a coca-leaf plant is difficult to establish. It is said that 1,000 six-year-old plants produce 46 kg. of coca leaf in a year. The yield depends, however, on a large number of factors.

PESTS AND DISEASES

Both are very numerous and not infrequently cause great damage in plantations.

The most important pests are:

- (1) The *Ulo* or coca-leaf butterfly (*Eloria sp.*).
- (2) The *Tujo* or butcher ant (*Atta sp.*).

(3) The *Chacka* or small butcher ant (*Acromyrmex sp.*).

(4) The coca-leaf louse (*Aphis sp.*).

(5) A *halticido* or chewing insect which is not so common as the foregoing (*Haltica sp.*).

The most important disease, especially among old coca-leaf bushes, is *estalla*. The cause of this disease has not yet been exactly established. It now seems possible to state with some probability that *estalla* in the Yungas of La Paz and Cochabamba is not a fungus disease but is caused by a virus. The transmitting agent seems to be the black aphid.²⁴

Methods of pest and disease control are usually traditional. On some large plantations, preparations of lead or calcium arsenate are sometimes employed against some of the pests mentioned. Their use is regarded as somewhat dangerous since traces of poison may remain on leaves intended for chewing. The use of arsenates is therefore stopped six weeks before the harvest.

²⁴ See in particular "La estalla de la coca" by Prof. Martín Cárdenas in *Revista de Agricultura*, No. 4, 1948, pages 8-17.

Chapter XIV

THE LEGAL REGULATION OF LABOUR

The Commission does not claim to offer here a legal study but rather a summary account of the conditions of employment of coca-leaf growers.

For a fuller understanding of this part of the report, it should be borne in mind that:

(1) The legal status of coca-leaf growers is in broad terms the same as that of the growers of any other crop. As a rule all growers of coca leaf also cultivate other crops although coca leaf is usually the most important.

(2) For the purpose of the present report the contract governing employment conditions will be described as a "lease". The Commission is aware that, because of the peculiarities of this type of legal organization, it is also described as share-cropping or *yanaconaje* and compared with other forms of tenancy such as emphyteusis, usufruct, etc. As used in this report, the term "lease" is to be understood in a conventional and flexible sense as covering the conditions of employment of *arrendires*, *mejoreros*, *yanaconas*, etc. in Peru. In the case of Bolivia the term "lease" refers in general to the *sayaña*, a form of contract adopted chiefly in the Yungas areas of La Paz, the principal centres of coca-leaf production.²⁵

(3) Labour conditions are determined by local and regional custom and usage rather than by statute law. Consequently labour conditions are not uniform.

(4) The lease is frequently concluded verbally. The landlord usually enters the surname and given names of the tenant and the boundaries of the land he receives in a book. Both the boundaries and area are in many cases established in a very rudimentary fashion.²⁶

The areas leased vary greatly. The Commission was able to observe that in many cases they were really large as the estates are sometimes of considerable size.

There is at the present time an increasing tendency to conclude "written" contracts. This means, especially in Peru, a contract—generally printed or typewritten—which the landlord or manager of the estates gives to the tenant to sign. Being unable to write, the tenant frequently does no more than make his thumbprint. The Commission was able to examine some of these

²⁵ In Peru, Act No. 10885 of 28 February 1947, known as the *Yanacónaje* Act, largely regulates the organization of labour discussed in this report; in Cuzco and elsewhere the system is known as *arrendamiento* (lease). The Act, which was supplemented by the provisions of 22 June and 20 August 1947 and 10 July 1948, is now being reviewed by a special commission set up by the Supreme Decree of 9 April 1949. A commission entrusted with the task of preparing a draft rural code was created by a Supreme Resolution of 8 February 1950.

In Bolivia, a distinction must be made between the organization of agricultural labour in *haciendas* or *fincas* and in the

contracts and even to obtain some of the printed forms containing them. It also interrogated various tenants on the conditions under which they worked.

In Bolivia the Commission found that on one important estate in Chulumani contracts were concluded in a legal document executed before a notary.

PERU

The principal categories of agricultural labour may be summarized as (1) tenants; (2) sub-tenants, (3) labourers or peons.

Tenants

Under the tenancy system, the tenant (*arrendire*, *mejorero*, or *yanacóna*, etc.) receives a certain amount of land on the following terms:

(1) The land, the area of which varies, may be already cultivated or completely virgin. In the latter case, the tenant undertakes to clear it, at least in the portion required for cultivation.

(2) The period of tenancy also varies. A five-year tenancy is fairly general. Renewals are possible. In the event of death, the tenant's heirs may continue the tenancy.

(3) The tenant usually pays an annual rent which in most cases takes the form of labour. The tenant is then required to work for eight to twelve days a month for the landlord, at the rate of two or three days a week. Each day is generally reckoned at 5 soles of which 4 or 4.50 are earmarked for payment of the rent. The difference, 50 centavos or 1 peso, is paid by the landlord to the tenant. If the tenant is unable to work, he has to send someone else in his place and on his behalf. The substitute is usually an *allegado*.

In other cases the amount to be paid for rent is not stipulated but the number of days, also varying from eight to twelve, which the tenant is required to work for the owner, is prescribed. The landlord pays approximately 50 centavos for each day worked. This type of tenancy is merely a slight variant of that described above.

(4) The tenant is required to improve the piece of land he receives, i.e., to cultivate it in the manner laid

sayañas. The former are of large area and the owners are usually whites or *mestizos* although there is no legal barrier to their being Indians; the *sayañas* are of small area and are leased by Indians. An agrarian law is now being studied in Bolivia.

²⁶ The imprecision regarding area and boundaries is a result of the imprecision regarding the areas and boundaries of the great estates. On those visited by the Commission, it was never possible to obtain exact information regarding the estate itself or the pieces of land leased to tenants.

down. The amount the tenant will receive on termination of the tenancy as compensation for improvements or cultivation is generally stipulated in advance in the contract. If the improvements exceed the amount prescribed — generally 3,000 soles — the excess accrues to the landlord, without any compensation to the tenant.

(5) Frequently, the tenant is required, on pain of termination of his lease, to supply the landowner with as many labourers as the latter requires for agricultural work on his estate. This obligation is specific in the case of the *palladoras*, the women who pick the coca leaves at harvest time. Their wages are paid by the landlord.

(6) The tenant cannot sublet part of the land he receives without the landowner's consent.

(7) He is not allowed to sell material or fuel obtained from his land.

(8) Any disagreement between tenants, or between them and their *allegados*, is settled by the landlord or his representative.

(9) In the printed contracts which the Commission was able to examine, tenants also undertake, on penalty of termination of their leases, to lead a peaceful life and not to participate in the formation of trade unions, or associations.

The landlord's obligations are:

(a) To supply the land and seeds to begin planting. He also usually supplies some building materials to enable the tenant to build a dwelling, if none is available;

(b) To pay the daily wages and compensation for improvements stipulated in the lease;

(c) To authorize sub-tenancies except when there is good reason to refuse to do so. This obligation is more or less at the landlord's discretion.

Sub-tenants

Frequently the tenant sublets part of his land to persons generally known as *allegados*.

The *allegado* assumes a number of obligations towards the tenant in respect of the portion of land he receives; these are mostly similar to those assumed by the tenant towards the landlord. The most important personal obligation is that of taking over the tenant's obligation to work eight to twelve days a month for the landlord.

The number of *allegados* varies. If the tenant has a large piece of land, he may have a substantial number of *allegados*. This is unusual, however, since few *arrendires* are in such a position.

Labourers or peons

The peons are recruited seasonally and are paid by the day at a rate varying between 3 and 5 soles. If food is supplied, the wage is reduced to 0.50 or 1 sol a day. If the labourer or peon brings his own tools, he is usually paid a few centavos more a day.

Both tenants and *allegados* may work as labourers on the landlord's estate; they then receive the same wages as any other peon or labourer.

Women are generally paid half of the wages paid to men.

The Commission found that, although in theory the *enganche* is illegal, it is still practised by some owners of coca-leaf plantations. Under this system, the landlord or manager applies to an agent and asks him to provide a stated number of agricultural labourers. The agent recruits them and pays each recruit an advance on the wages he will receive. The advance, which varies in each case, is generally not more than 200 soles. The *enganchado* or labourer thus recruited has to repay the advance by working. The agent receives a fee from the landlord for each worker "recruited". If for any reason the labourer recruited does not remain on the estate for which he was engaged, which is not unusual, his position generally becomes difficult.

BOLIVIA

As in Peru, the relations between tenants and landlords are regulated by a series of traditional usages and customs.

In the Yungas of La Paz, most lands are worked under the tenancy system. The general characteristics of this system are:

(1) The tenant or *arrendero* receives a piece of land, known as a *sayaña*, from the landlord. The land may or may not be already planted. If it is not, the landlord provides seed and materials to begin cultivation.

(2) The tenant and his wife work three days a week for the landlord, without pay. The work may be agricultural labour on behalf of the landlord or personal services.

(3) The tenant has to pay an annual sum for the *sayaña*, the amount varying according to circumstances.

(4) The tenant may work as a labourer or peon on the landlord's estate in return for the usual wage.

(5) The tenant may transfer the tenancy subject to the landlord's consent.

(6) The landlord undertakes to pay for improvements effected by the tenant when the latter leaves the *sayaña*.

* * *

In the light of the conditions of employment existing in Peru and Bolivia, the following observations may be made:

(1) In no case does the tenant possess sufficient legal stability to take a real interest in the growing of crops, capable of increasing the prosperity of himself and his family. Generally, and with some exceptions, he produces only what is required to cover his bare needs and contractual obligations, since he is afraid of being evicted from the land he occupies.

Some landlords, both in Peru and Bolivia, stated that many tenants earn large profits. While the Commission does not deny that this may happen in some cases, one of which it observed itself, as a general rule the economic and social status of the tenant is as described in the present report.

(2) In these circumstances, the tenant prefers to engage in the cultivation of coca leaf. In both Peru and Bolivia, most of the coca leaf is produced by small farmers. The reason is that of all agricultural products coca leaf has the most certain market, since the economic and social conditions of large sections of the Indian and mining population are such as to ensure that it will be bought; moreover, the tenant has also to produce coca leaf for himself and his family since it is popularly believed that coca, rather than any other crop, makes up for the absence of deficiency of proper food.

²⁷ See footnote ²⁵.

(3) The present legal regulation of agricultural labour is out of date and complicated. Representatives of the workers and a number of landlords spoke of the necessity of reform.²⁷

The system of *allegados* which exists in Peru, far from encouraging agriculture, actually makes it more difficult. In any case, the *allegado* who has to work for the *arrendire* and for the landlord generally prefers to grow coca leaf since it is the only crop capable of providing him with a limited but certain income. As in the case of the tenant, the *allegado* believes that by diminishing his sensations of hunger and fatigue, coca leaf can take the place of proper food.

Chapter XV

CONTROL

At present only coca leaf delivered for consumption is subject to control in Peru and Bolivia. The purpose of the control is to collect the tax on the coca leaf in circulation in each of these countries.

It should be mentioned that the new legislation enacted in Peru marks an important step towards (1) the control of actual production, and (2) some degree of limitation of production.

These two points are examined in this part of the report, together with those provisions of the international conventions on narcotic drugs which concern the coca leaf and Peru and Bolivia as parties to some of these international conventions.

LEGISLATION

Although both in Peru and Bolivia coca-leaf legislation is concerned especially with taxation, there are important differences between the two, particularly as a result of the new Peruvian legislation, and they will therefore be considered separately.

Peru

Historical observations

Prior to the present legislation on the coca leaf, the laws on this subject in Peru were numerous and very diversely applied in different parts of the territory. More than thirty laws or provisions on coca leaf were enacted between 1891 and 1944. Generally speaking, they were all designed to institute new taxes on coca leaf. A large part of the taxes thus obtained was to be used for the building or maintenance of roads, hospitals, schools, municipal rates, the paving of streets, municipal office buildings, etc. In general, the provisions creating or increasing the taxes on the coca leaf at the same time raised those on the production and circulation of alcoholic beverages, the proceeds of which were likewise to be used for the same purposes.

Some of the tax laws on the coca leaf refer to the harmful effects of chewing. For instance, Regional Act No. 239 of 18 August 1920 for the province of Huaylas states: "Whereas a moderate tax on articles which are non-essential and tend to contribute to the degeneration of the race, would enable health or public improvement plans to be carried out". Regional Act No. 446 for the province of Huaras states: "Whereas it is necessary to tax certain articles (including the coca leaf) which have ill effects on the health and life of the neighbourhood". On the other hand, the Supreme Decree of 11 November 1932 increases the taxes on coca leaf in the Department of Huánuco in order to build a road "the opening of which would stimulate the valuable production of coca leaf, cocaine, coffee, fruit, timber and other

important commodities, thus increasing domestic and foreign trade, and requiring preferential State protection". In contrast with this latter provision, the Decree of 14 March 1936 set up a technical commission for the purpose of studying among other questions concerning the coca leaf, means of combating coca addiction.²⁸

The legislation referred to applied in some cases to the whole country, in some to a province and often merely to a municipality. This multiplicity of provisions and taxes does not appear to have facilitated supervision of the production of coca leaf placed in circulation.

With a few exceptions, the main characteristics of the legislation in question were:

(1) An explicit or implicit acknowledgement, in certain cases, of the harmful effects of coca-leaf chewing.

(2) The assumption that a fiscal policy of increased taxation on the coca leaf would result in a decrease either in production or in chewing.

(3) The utilization of all or part of the taxes obtained therefrom for the building or maintenance of public works or premises for educational or social purposes.

In the course of its visits to certain districts, the Commission heard it stated on two or three occasions that an increase in the taxes on and price of coca leaf would lead to a decrease in production and chewing.

Nevertheless, the experience gained from application of the legislation in question and the observations of the Commission itself lead to the conclusion that:

(1) In itself the fiscal policy of constantly increasing the tax on coca and consequently its price has not, over a period of more than fifty years, led to a decrease either in production or chewing.

(2) On the contrary, in view of his living conditions and diet and in spite of a continual rise in wages, the coca chewer increasingly deprives himself of the essential articles of diet as the price of coca leaf rises.

Legislation in force

The new legislation in force in Peru has radically changed the previous situation. It consists of the following enactments:

(1) Decree-Law No. 11046 of 13 June 1949 establishing the Coca-Leaf Monopoly.

(2) Supreme Decree of 2 August 1949 containing regulations for the application of Law No. 11046.

²⁸ Further details concerning this Decree are given in annex I.

(3) Supreme Resolution of 2 August 1949 allocating the funds obtained from the coca-leaf tax.

(4) Decree of 25 August 1949 rendering the export of coca leaf subject to international control in accordance with the conventions on narcotic drugs.²⁹

The new legislation is based on the following:³⁰

(1) The terms of the international conventions limiting the use of narcotic drugs.

(2) The imperative need to enact national laws for the application of those international conventions.

(3) The need immediately to limit and ultimately to eradicate coca-leaf chewing on higher grounds of human and national welfare.

(4) The duty of the State to protect the national heritage, represented in this case by investments in the cultivation of the coca leaf, the use of which, for scientific purposes, is of great benefit to humanity.

With these principles as its basis, the legislation in question comprises the following provisions:

(1) Establishment of a Coca-Leaf Monopoly through the territory of the Republic. This Monopoly is to control:

- (a) Cultivation;
- (b) Harvesting;
- (c) Distribution; and
- (d) Export of the coca leaf.

The coca leaf is to be exported through and with the authorization of the Department of Narcotics (Ministry of Public Health and Social Welfare), in accordance with the relevant provisions of the international conventions on narcotic drugs.

(2) The above-named Ministry is to be responsible for industrialization of the coca leaf for medical purposes.

(3) The Coca-Leaf Monopoly is to be a dependency of the *Caja de Depósitos y Consignaciones* (Ministry of Finance).

(4) The areas in which coca leaf may be produced are specified (see list in column C of table 23). The Ministry of Finance is responsible for granting authorization to establish new production areas.

(5) In pursuance of the new provisions:

(a) A cadastral survey is to be made of the coca-leaf plantations;

(b) Producers are to keep registers of coca-leaf production and sale;

(c) Every person engaged in the coca-leaf trade must be entered in the registers of the Monopoly. Persons not registered may not engage in the trade;

(d) Coca leaf may not be circulated unless accompanied by the required authorization issued by an official of the Monopoly;

(e) The Monopoly is to control all the operations mentioned above.

²⁹ The legislation here referred to is given in annex V.

³⁰ See preamble to Decree-Law No. 11046.

(6) A single tax on the coca leaf is established as follows:

(a) Forty centavos per kilogramme;

(b) Sixty centavos per kilogramme on coca leaf produced in the Department of Cuzco.

These taxes replace the previous taxes and are to be distributed as follows: 47 per cent to the State and 53 per cent to those bodies which up to now have received funds from the tax on coca leaf.³¹

(7) The following penalties are provided:

(a) Confiscation of crops;

(b) Confiscation of coca leaf produced or in circulation; and

(c) Fines of 100 to 5,000 soles inflicted on persons infringing the provisions concerning the Coca-Leaf Monopoly.

(8) Lastly, the Coca-Leaf Monopoly is authorized to issue such provisions for control as it may deem necessary.

General remarks

The new Peruvian legislation on the coca leaf clearly represents an improvement over previous laws. It constitutes a step towards the limitation of production and the gradual abolition of chewing. In that connexion the Commission expresses here, as it has already done at Lima, its gratification concerning the Peruvian Government's new legislation.

The new legislation was only beginning to be put into practice when the Commission left Peru. Completion of the cadastral survey, already begun in some districts visited by the Commission, will take some time in view of the practical difficulties involved. The Commission found frequent evidence of the willingness and zeal of the officials of the *Caja de Depósitos y Consignaciones* in carrying out all the new and not always easy tasks imposed upon them by the new legislation.

It nevertheless had the impression that, owing to the small number of officials assigned to the Coca-Leaf Monopoly, application of the new laws would take longer than was desirable, especially in view of the Peruvian Government's praiseworthy desire to solve the coca-leaf problem.

The former system of control has been appreciably simplified. It should be pointed out, however, that certain difficulties may arise in putting some of the new provisions into practice. This is true of the stipulation in article 3 of the Decree of 2 August 1949 that Indians engaged in coca-leaf growing must keep registers showing details of their sowings, crops, harvest and sale of coca leaf.

In view of their standard of education, these Indians will have some difficulty in keeping the records required under the new law. Furthermore, they themselves are expected to purchase at cost price these registers:

³¹ In reality, the tax of 10 centavos per kilogramme of coca leaf allocated to national defence in accordance with Act No. 4936 of 30 January 1924, still remains in force. In practice every kilogramme of coca leaf is now subject to 50 and 7 centavos tax, respectively, but the tax collected in pursuance of Act No. 4936 constitutes revenue independent of that obtained in pursuance of Act 11046 and supplementary provision

which they will at first have difficulty in understanding and using.

One of the opinions and suggestions received by the Commission on this point was that the owner or administrator of the ranch should be responsible for keeping the books of the tenants who work on his property. This solution encountered criticism on the part of some owners and administrators, who maintained that the owner of a ranch with a large number of tenants would be obliged to employ, at his own expense, one or more persons to keep these records. It was also pointed out that if he took over this task the owner or administrator would be assuming a new responsibility under the law, as penalties were imposed for failure to keep the records properly.

The Commission is confident that a solution for these difficulties can be found. Whatever the solution, the system introduced by the law, of keeping a register of production, should be maintained. In interviews with small landowners, sometimes through a Quichua interpreter, the Commission ascertained that there had already been some cases of non-compliance with the provision established in article 2 of the Decree of 2 August 1949.³² Some owners and administrators had helped their own tenants to fill in the printed forms distributed by the Monopoly, but others had refused to do so. This refusal compelled the small tenant, usually unable to read or write, to pay a third party to complete his registration form within the prescribed time-limit. Although the fees for this service are small, they always represent a big expense for the Indian tenant, in view of his poor economic situation.

The foregoing observations should on no account be taken as criticisms of the new legislation, which represents a praiseworthy step forward, but merely as a statement of the practical difficulties which the application of any new legislation necessarily involves, especially at first. Such difficulties can only be solved with the co-operation of all concerned. A possible solution might be that when a tenant cannot read or write, the registers should be kept for him by the administrator or owner of the ranch. Furthermore, officials of the Monopoly should as far as they can (for they do not live on the coca-leaf plantations) give smallholders the information and help they need to comply with the new laws.

One of the most important provisions of the new legislation is article 1 of the Decree of 2 August 1949 which is complementary to article 1 of the Decree-Law of 13 June of the same year. It states that in principle only the areas enumerated in that article (see column C of table 23) are coca-leaf production areas. However, the final paragraph of the article authorizes the Ministry of Finance to establish new cultivation areas. This seems contrary to the principle of the limitation of production and ultimate eradication of chewing proclaimed by the Peruvian Government in the preamble to the Decree-Law of 13 June 1949.

³² This article states: "Entities or persons engaged in the cultivation of or trade in coca must enter their names in the registers of the Monopoly, and must comply with the formalities prescribed by it; if they fail to do so they are not legally entitled to continue their activities. The time-limit for registration shall be sixty days from the date of the present Decree".

Export

Under article 13 of the Decree of 2 August 1949, only the Monopoly, acting in conformity with the provisions of the international conventions (Supreme Decree of 26 August 1949), is entitled to export coca leaf. Export contracts concluded by private persons up to 31 May 1949 will be recognized and authorized by the Monopoly provided that the parties concerned submit documents establishing the legality of their contracts within the prescribed time-limit.

From the above-mentioned provision it may be assumed that in future, once the contracts referred to have lapsed, the Coca-Leaf Monopoly will alone be entitled to export. This will undoubtedly facilitate stricter control over exports.

Distribution

The control system is as follows:³³

(1) Coca leaf may only be transported from production to consumption or distribution centres during the day time and by public thoroughfares.

(2) A system of control posts now exists, and the number of posts has been increased and their location improved.

(3) Coca-leaf growers are divided into three classes: first class, producers of more than 500 *arrobos*; second class, producers of 100 to 500 *arrobos*; third class, producers of 5 to 100 *arrobos*. (1 *arroba* = 11.5 kg.)

Every grower must keep a register of production, and thirty days before the harvest must state the approximate quantity of coca leaf which he hopes to obtain. After harvesting he must declare the actual amount of the crop. Officials of the Monopoly will check these statements against output.

(4) No producer may dispose of the crop without authorization from the Monopoly.

(5) The coca leaf must be made up into packages and the origin, weight, quality and destination marked on each package. No coca leaf may leave the plantation without a transfer sheet. At the first control post the tax must be paid and the transfer sheet exchanged for a circulation sheet. The coca leaf together with this latter sheet must be deposited at the buyer's warehouse.

(6) The coca leaf may be despatched from the warehouse to other points if accompanied by a free transit sheet.

(7) There are two categories of coca-leaf traders: wholesalers and retailers. The former deal in wholesale quantities and may not sell less than one *arroba* in any one transaction. They are required to keep records of their purchases and sales.

Retailers deal in retail quantities. Both categories of traders must be registered in order to engage in their respective branches of the trade.

(8) The sheets or permits referred to under (5) and (6) are printed and issued by officials of the *Caja de Depósitos y Consignaciones*.

³³ In drafting this part of the report use was made not only of the Commission's notes and observations but also of the administrative circulars issued by the headquarters of the *Caja de Depósitos y Consignaciones* at Lima.

So far this system of control has only been partially applied. The present position is as follows:

- (1) Work has begun on the cadastral survey.
- (2) Introduction of the system of registering coca-leaf production is awaiting completion of the survey.
- (3) The system of registration of coca-leaf producers and traders was in application when the Commission was in Peru.
- (4) Application of the system of controlling coca-leaf distribution has begun. It applies only to coca leaf despatched for consumption, as the cadastral survey has not yet been completed.

It is not yet possible to form an opinion on the results of the application of the new provisions on the coca leaf. It should be noted that limitation and control of production according to the new legislation will only be possible:

- (1) If the number of coca-leaf growing areas is limited.
- (2) If the cadastral survey of the coca-leaf plantations is completed and the system of production registers is put into effect.

At present a much simplified and improved system of control over coca-leaf distribution is in force. It represents progress but not a real limitation of production nor, consequently, a progressive reduction of chewing.

BOLIVIA

The legislation relating to the coca leaf is concerned exclusively with taxation. Under this legislation coca-leaf production is free and only coca leaf delivered for consumption is subject to tax. So far no cadastral survey of the coca-leaf plantations exists, and there is no information as to their number or area.

The authorities responsible for collecting the taxes are the Coca Excise Offices of La Paz and Cochabamba (Decree-Law of 12 December 1941). They are also responsible for distributing the tax among the beneficiaries in accordance with a series of laws. The La Paz and Cochabamba Coca Excise Offices also collect taxes on a series of other products: coffee, cocoa, fruit, ground nuts, cinchona, green vegetables, rice, timber, tobacco, etc. The largest revenue is derived from the coca leaf.

The main characteristics of the system of control over coca leaf delivered for consumption are:

- (1) A system of control posts is responsible for collecting the tax on coca leaf in circulation.
- (2) For purposes of control there are two categories of coca leaf: the *hacienda* and the *rescate*. This distinction does not relate to the quality but only to the manner in which the leaf is put into circulation and the tax levied upon it. The *hacienda* type is that produced by the large landowners. When harvested it is sent to the wholesalers accompanied by a consignment sheet issued by the producer. Sometimes the consignee is the producer himself.

The tax is often paid not by the producer but by the consignee. In that case he deducts the amount of the tax from the price paid to the producer. To facilitate his operations, the consignee frequently keeps a kind of open account of the Coca Excise Office out of which

he can pay the tax on the coca he receives direct to the Central Coca Excise Office at La Paz and not at the transit control post.

The *rescate* coca is that produced by the small landowner, who sells it direct to the *rescatistas*, i.e., those who buy it at the plantation. The tax on this type of coca is usually paid when it passes through the control post. Thenceforward it is accompanied by a tax-payment certificate which allows it to circulate freely.

In 1948 production of *hacienda* coca leaf in the Department of La Paz represented only 17 per cent of the Department's total production.

(3) Attempts to evade the tax are penalized by doubling the tax. If the double tax is not paid, the coca leaf is confiscated and sold by public auction to the highest bidder, who must pay the taxes due.

(4) The revenue from double taxes is divided equally every month between the services of the control office (Unduavi Excise Office).

(5) The La Paz Coca Excise Office keeps for tax purposes a list of wholesalers or consignees to whom coca leaf is despatched for sale.

As far as the levying of tax is concerned, the Commission found that the existing control system operates efficiently. It does not, however, serve as a means of determining the true amount of coca-leaf production, as it applies only to leaf placed in circulation. Nor does it represent any attempt to limit production or chewing.

INTERNATIONAL CONVENTIONS

1925 Convention

Chapter II. Under article 3, the parties agree to limit the number of towns, ports or other localities through which the export or import of coca leaves shall be permitted.

Peru is not a party to the 1925 Convention. The ports of Callao (Lima), Salaverry, Mollendo and Puno are used for the export of coca leaf. Bolivia has been a party to this Convention since 15 April 1932.³⁴

Chapter V. The system of import and export authorization applies to the coca leaf.

Peru applies the provisions of this chapter, although it is not a party to the Convention.

Chapter VI. In article 21 the parties agree to send in annually to the Permanent Central Board estimates of the quantity of coca leaf to be imported for internal consumption for medical, scientific and other purposes.

Under article 22 the parties undertake to send to the Central Board as complete and accurate statistics as possible on the production, stocks and consumption of coca leaf and the amounts confiscated on account of illicit traffic. The parties are also required to supply

³⁴With the following reservation:

"1. Bolivia does not undertake to restrict the home cultivation or production of coca or to prohibit the use of coca leaves by the native population.

"2. The exportation of coca leaves shall be subject to control by the Bolivian Government by means of export certificates.

"3. The Bolivian Government designates the following as places from which coca may be exported: Villazon, Yacuiba, Antofagasta, Arica and Mollendo."

every four months statistics of their imports and exports of coca leaf.

1931 Convention for limiting the manufacture and regulating the distribution of narcotic drugs

Under article 1 of the Convention the term "the drugs" denotes both drugs which are partly manufactured and those which are completely refined. Thus

crude cocaine is a drug subject to the provisions of the 1931 Convention and of those of the 1925 Convention which may be regarded as supplementary to it. All the provisions of the 1931 Convention applicable to the drugs included in group 1, sub-group (a) of this article are applicable to crude cocaine.

Peru and not Bolivia is a party to the 1931 Convention.

Chapter XVI

THE ECONOMIC VALUE OF COCA-LEAF PRODUCTION

The economic value of coca-leaf production may be considered as a source of Government revenue and as an economic asset in circulation.

COCA LEAF AS A SOURCE OF GOVERNMENT REVENUE

Peru

The legislation in force establishes a state or national tax on coca leaf. Formerly the tax was in part departmental, provincial or even municipal. Now there is a single system of taxation. The Commission obtained from the Peruvian Ministry of Finance information on the yield of the tax for 1950, which shows the total receipts expected from coca-leaf taxation for that year, based on the Ministry's own estimates which it kindly made available to the Commission.³⁵

TABLE 26

| Total tax receipts | Draft budget for 1950 Revenue from coca leaf | Section |
|---------------------|---|--|
| 1,644,500,000 soles | 65,400 soles | <i>Chapter II.</i> Indirect taxes. Export duties. |
| | 2,943,000 soles | <i>Chapter III.</i> Monopolies. |
| | 750,000 soles | <i>Special accounts.</i> National defence. Act 4936 and Supreme Resolution of 2 August 1949. |
| | <u>3,758,400 soles</u> | |

The total receipts expected from coca leaf in 1950 under the present legislation represent 0.23 per cent of the estimated national revenue.

Bolivia

The tax on coca leaf in Bolivia is not a state or national tax as in Peru, but a departmental tax. Hence the receipts from this tax do not benefit the whole nation but mainly two Departments, La Paz and Cochabamba, in which the two Coca Excise Offices are situated.³⁶ Moreover, the taxes collected by these Offices

³⁵ Prior to the present legislation it was practically impossible to ascertain the total receipts from the coca-leaf taxes, national, departmental, provincial or municipal.

³⁶ It is quite possible that the coca leaf produced in Santa Cruz is subject to a tax for the benefit of the Department of Santa Cruz but in view of the small coca-leaf production in that Department, it may be assumed that the tax receipts are not very large. As regards Beni and Tarija, the coca-leaf production appears to be sporadic and the yield of the tax must consequently be very small. For references see footnote 5 (chapter VIII, part III) and table 25.

do not represent the total of the taxes raised in the various departments but only those obtained from coca, coffee, cocoa, fruit, groundnuts, honey, hides, timber, etc., produced in certain districts or provinces of those Departments. In short, the tax on these products is a regional one.³⁷

The following table shows, in almost round figures, the taxes obtained by the Coca Excise Office of the Department of La Paz according to the data supplied by this office:

TABLE 27

| Years | Total tax collected | Total collected on coca leaf | Per cent |
|-----------|---------------------|------------------------------|----------|
| | <i>Bolivianos</i> | <i>Bolivianos</i> | |
| 1942..... | 20,068,000 | 16,854,000 | 84 |
| 1943..... | 21,399,000 | 17,490,000 | 81.7 |
| 1944..... | 28,832,000 | 22,768,000 | 79 |
| 1945..... | 29,037,000 | 23,970,000 | 83 |
| 1946..... | 31,890,000 | 28,580,000 | 90 |
| 1947..... | 29,653,000 | 25,936,000 | 87.5 |
| 1948..... | 32,484,000 | 28,763,000 | 89 |

Concerning the distribution of the revenue from taxes on products in the provinces of North and South Yungas and Inquisivi (Department of La Paz) article 12 of the Act of 17 April 1941³⁸ states:

"Article 12. Revenue from the taxes established by the present Act on products from the provinces of North and South Yungas and Inquisivi shall be assigned as follows:

Per cent

"(a) To the La Paz-Beni Road Board, for amortization of the loans on road construction in Yungas, including the road to Yanacachi and the extension of the roads from Puente Mururata to Suapi and Quiloquilo, Coroico to Coripata, Irupana to Lambate and connexion with the trunk roads 30

"(b) To the Yungas Landowners' Society for the maintenance, widening and improvement of the roads to Yungas..... 14

³⁷ In 1948 the national income was 1,496,911,040 bolivianos and the income from the coca leaf (La Paz, Cochabamba) 31,696,000 bolivianos or less than 2.5 per cent of the above-mentioned national income.

³⁸ The following provisions are also connected with this Act: Act of 20 October 1938; Act of 31 January 1941; Decree-Law of 12 December 1941; Decree of 2 February 1942; Decree of 11 November 1943; Supreme Decree of 25 October 1946; Decree of 7 February 1947; Act of 4 December 1947 and Act of 21 December 1948.

| | |
|---|----|
| "(c) To the La Paz Prefecture as a contribution towards general expenses..... | 4 |
| "(d) To the District Boards of Coroico, Coripata, Chulumani and Irupana for drainage works, hospitals, electric light, drinking water, road-paving, sewers, rural, urban and veterinary health measures, other municipal works and services—5 per cent each | 20 |
| "(e) To the cantonal agencies of Suapi, Paccallo, Mururata, Caranavi, Arapata, Upper and Lower Milliguayu, Yanacachi, Oco-baya, Villa Aspiazu, Puente de la Villa, Chisca, Huancané, Tajna, Chicaloma, Laza and Lambate, in equal parts..... | 4 |
| "(f) To the Municipality of La Paz in place of the tax on transactions..... | 1 |
| "(g) To the Province of Inquisivi for the service of the loans for road construction and the development of the production areas of Suri, Cajuata, Circuata and Miguilla | 7 |
| "(h) For the construction of school buildings and the promotion of agricultural training in the Provinces of Yungas..... | 5 |
| "(i) Contribution to the University of La Paz under the Act of 3 November 1938.. | 15 |

"TOTAL 100"

According to information given by the Ministry of Agriculture the relationship between taxes and prices per kg. of coca leaves is the following:

TABLE 28

| Year | Price per kilo | Tax per kilo | Per cent |
|-----------|----------------|--------------|----------|
| 1944..... | 38.29 | 5.28 | 13.8 |
| 1945..... | 45.60 | 5.91 | 12.5 |
| 1946..... | 47.23 | 6.25 | 12.2 |
| 1947..... | 50.65 | 6.37 | 12.4 |
| 1948..... | 65.22 | 7.37 | 12.0 |

According to the same source of information, the economic value of the production of coca leaf in the Department of La Paz is 20 per cent, approximately, of the whole Department.

The following table shows the taxes collected by the Cochabamba Excise Office according to the data supplied by this office (table 19):

TABLE 29

| Years | Total tax receipts | Receipts from coca leaf | Per cent |
|-----------|--------------------|-------------------------|----------|
| 1947-1948 | 3,889,000 | 2,977,000 | 77.0 |
| 1948-1949 | 3,903,000 | 2,933,000 | 75.1 |

In accordance with the Acts of 17 April and 25 November 1941, the taxes collected must be distributed in varying proportions to public works, for the payment of certain charges, and to the University of San Simón (Cochabamba) and the Chaparé Landowners' Association.

VALUE OF COCA LEAF IN CIRCULATION

*Coca leaf in circulation*³⁹

From the statistics examined in the present report it is not easy to determine the exact volume of coca leaf placed in circulation in Peru and Bolivia. Taking minimum figures in order to avoid any possible criticism, the following conclusions may be drawn.

(1) *Peru*

Minimum annual amount in circulation: 6,500,000 kg.

The price of coca leaf varies in each district and according to each grade of leaf. In Huánuco, the first-grade leaf is the one preferred for chewing, the price being 320 soles per quintal (46 kg.); the price of the second grade is 220 soles. These are wholesale prices; the retail prices are slightly higher.

Taking 270 soles per quintal as an average price, this works out at approximately 5.50 soles per kg. The value of 6,500,000 kg. would thus be 357,500,000 soles per annum in circulation.

(2) *Bolivia*

Minimum annual amount in circulation: 4 million kg.

The value of coca leaf varies from year to year. In 1948 the selling price per *tambor* was 1,260 bolivianos, or approximately 55 bolivianos per kg. Hence the volume of money in circulation for the 4 million kg. would be approximately 220 million bolivianos.

Coca leaf exported

Peru

TABLE 30⁴⁰

| Years | Kilogrammes |
|------------|-------------|
| 1937 | 173,140 |
| 1938 | 249,528 |
| 1939 | 382,717 |
| 1940 | 346,838 |
| 1941 | 453,499 |
| 1942 | 362,455 |
| 1943 | 443,892 |
| 1944 | 324,510 |
| 1945 | 482,030 |
| 1946 | 253,609 |
| 1947 | 316,245 |
| 1948 | 301,269 |

Taking 270 soles per quintal (46 kg.) as the price, the average annual value in circulation would be approximately 1,875,000 soles.

³⁹ This does not include coca leaf not placed in circulation but used for chewing.

⁴⁰ This provisional information was submitted by the representative of Peru on the Commission on Narcotic Drugs.

According to the *Statistical Yearbook of Peru* (Ministry of Finance, Lima 1946, 1947) and *External Trade Yearbook* (*idem* 1945, 1946 and 1947), the exports were the following:

TABLE 31

| Year | Kilogrammes | Value Soles |
|--|-------------|-------------|
| 1943..... | 458,600 | 347,268 |
| 1944..... | 261,154 | 206,891 |
| 1945..... | 426,620 | 578,235 |
| 1946..... | 317,642 | 468,222 |
| 1947..... | 311,123 | 418,798 |
| Export: yearly average, 355,027 kilogrammes. | | |
| Value: yearly average, 403,882 soles. | | |

Value of total Peruvian exports for 1947: 1,002,943,010 soles. Among the forty-seven main products exported coca leaf is not mentioned. The value of coca leaf exported in 1947 is 0.004 per cent of the total value of exports for that year. The coca leaf exported is mainly from the Department of La Libertad and also from the Departments of Cuzco and Huánuco. Among the importing countries the most important is the United States of America. Others are France, the United Kingdom, Switzerland, Netherlands, Argentina, Bolivia and Chile.

According to the Report of the Permanent Central Opium Board (1949), the exports were the following:

TABLE 32

| Year | Kilogrammes |
|-----------|-------------|
| 1946..... | 247,417 |
| 1947..... | 371,937 |
| 1948..... | 300,847 |

Bolivia

TABLE 33⁴¹

| Years | Kilogrammes | Official value | Foreign currency equivalent |
|-----------|-------------|----------------|-----------------------------|
| 1945..... | 388,267 | 1,294,480.43 | Arg. Peso 776,280.27 |
| 1946..... | 416,091 | 1,700,001.61 | " 1,153,769.36 |
| 1947..... | 403,504 | 1,648,780.52 | " 909,551.45 |
| " | | 470.34 | U.S. \$ 282.20 |
| 1948..... | 246,892 | 1,257,247.72 | Arg. Peso 1,095,485.63 |
| 1949..... | 233,231 | 1,625,610.00 | " 1,625,610.00 |
| | 1,687,985 | 7,526,120.28 | Arg. Peso 5,560,696.71 |
| | | 470.34 | U.S. \$ 282.20 |

According to the Report of the Permanent Central Opium Board (1949) the following table of exports can be established:

TABLE 34

| Year | Kilogrammes |
|-----------|-------------|
| 1946..... | 408,865 |
| 1947..... | 382,498 |
| 1948..... | 209,283 |

⁴¹ This information was given to the Commission by the Ministry of Finance at La Paz.

According to the reply by the Bolivian Government to the questionnaire on coca leaf (document E/CN.7 110) the exports of coca leaf were the following:

TABLE 35

| Years | Kilogrammes | Value in Boliviano |
|-----------|-------------|--------------------|
| 1937..... | 393,708 | 13,169,486 |
| 1938..... | 396,737 | 12,857,775 |
| 1939..... | 406,314 | 10,184,699 |
| 1940..... | 402,672 | 10,347,031 |
| 1941..... | 347,250 | 9,056,730 |
| 1942..... | 339,190 | 9,728,195 |
| 1943..... | 380,473 | 9,121,239 |
| 1944..... | 444,064 | 12,411,438 |
| 1945..... | 417,178 | 15,359,015 |
| 1946..... | 418,122 | 19,074,830 |

At present the export of coca leaf to Argentina is governed by the coca-leaf contract signed on 6 March 1948 between the Bolivian Coca Producers' Corporation and the Argentine Institute for Trade Development.⁴² The main clauses of the contract are:

(1) Coca leaf for export to Argentina will be of the so-called *hacienda* type.

(2) The price of the leaf will be fixed by common agreement between the seller and the buyer.⁴³

(3) The seller undertakes to sell and deliver to the buyer 500,000 kg. of coca leaf annually for a period of five years ending on 31 December 1952. Deliveries are to be made each month and each delivery is to be not less than 40,000 kg.

This contract had not yet been put into application when the Commission was in Bolivia. The reason appeared to be that the contract fixing the sale price of Bolivian coca leaf has not yet been signed between the buyer and the seller. Consequently, coca-leaf exports to Argentina were being continued as before, i.e., direct to Argentine buyers at La Quiaca (Argentina).

On 14 November 1949 a bill was submitted to the Bolivian Senate requesting the organization of a coca-leaf export monopoly to be operated by the Bolivian Agricultural Bank. Under this bill the Coca Excise Offices of La Paz and Cochabamba would cease to exist and their functions, installations, services, etc., would pass into the hands of the Bolivian Agricultural Bank. The latter would also assume responsibility for the collection of taxes at present collected by those

⁴² The Bolivian Coca Producers' Corporation is a limited company composed of a group of persons concerned in coca-leaf production and has an authorized capital of 4 million bolivianos. It is governed by articles of association approved at the General Meeting of 21 April 1947. Its purpose is to protect and defend the Bolivian coca-leaf industry, and to trade in and process the coca leaf. It undertakes to buy coca leaves from members of the company, and fixes the prices (article 2). The Corporation was approved by Supreme Resolution of 10 July 1947.

The above-mentioned contract is based in particular on chapter I, article 2, of the Protocol on Commodity Exchanges annexed to the Treaty of Economic, Financial and Cultural Co-operation concluded between the Governments of Bolivia and the Argentine Republic on 26 March 1947. The contract was approved by both Governments.

⁴³ The seller is the Bolivian Coca Producers' Corporation (Cocalivia) and the buyer the Argentine Institute for Trade Development (I.A.P.I.).

Offices. The Executive Power decided that the project was not practicable owing to the Agricultural Bank's lack of financial resources.

According to the *External Trade Yearbook (1946)* published by the Ministry of Finance, La Paz, 1948, the value of total exports for 1946 was 262,326,573 Bolivianos. Therefore, the official value of coca-leaf exports for 1946 represents 0.6 per cent of the total economic value of Bolivian exports for this year.

According to information given by the Ministry of Agriculture, the following two tables can be established:

TABLE 36

| <i>Relationship between production and export of coca leaf</i> | | | |
|--|-----------------------------------|--------------------------------|-----------------|
| <i>Year</i> | <i>Production Kilogrammes</i> | <i>Exports Kilogrammes</i> | <i>Per cent</i> |
| 1944..... | 4,651,000 | 444,064 | 9.5 |
| 1945..... | 4,434,000 | 417,178 | 9.4 |
| 1946..... | 4,857,000 | 418,122 | 8.6 |
| 1947..... | 4,533,000 | 385,714 | 8.5 |
| 1948..... | 4,299,000 | 361,358 | 8.4 |
| | Average | 405,287 | 8.88 |

TABLE 37

Economic relationship between total agricultural-stockraising exports and coca-leaf exports (Ministry of Agriculture)

| <i>Year</i> | <i>Total exports Bolivianos</i> | <i>Coca-leaf exports Bolivianos</i> | <i>Per cent</i> |
|-------------|-------------------------------------|---|-----------------|
| 1944..... | 188,463,245 | 12,450,368 | 6.61 |
| 1945..... | 227,468,790 | 15,407,190 | 6.77 |
| 1946..... | 243,011,269 | 19,134,662 | 7.87 |
| 1947..... | 103,981,564 | 15,367,184 | 14.78 |
| 1948..... | 57,782,560 | 13,983,969 | 24.20 |

Rate of exchange for the five years: 170.85 bolivianos per £1
i.e. 1 boliviano = 1.8d.

It is difficult, both in Peru and in Bolivia, to determine how far the small coca-leaf producer benefits from the volume of business created by coca-leaf production.

On the basis of its own observations, the Commission considered that the statements to the effect that the

small producer obtained appreciable benefits from the production of or trade in coca leaf were exaggerated. The social and economic conditions in which the vast majority of these small producers live seems to prove the contrary. Generally speaking, 90 per cent of the small producers harvest only a small amount of coca leaf. Moreover, the crop represents the work of a whole family and is its most important source of income, varying according to the number of crops during the year.

As regards export, the Commission found that the greater part of the coca leaf exported from Peru came from plantations operated either directly or indirectly by the exporters themselves. As regards Bolivia, one of the objects of the Bolivian Coca Producers' Corporation is to export the coca leaf produced by the members of the Corporation, which is composed mainly of large landowners. Under the terms of article 2 of its statutes, the Corporation agrees to purchase coca leaf from the small producer when the members of the Corporation cannot supply all the coca leaf required for export. Similarly it should be mentioned that clause 3 of the contract between the Corporation and the Argentine Institute for Trade Development refers only to *hacienda* coca leaf, which is almost exclusively produced by large plantation owners. In practice it is this type of coca leaf alone which has so far been exported to Argentina.

According to tables 9, 19, 21 and 33 the following general table can tentatively be established:

TABLE 38

| <i>Peru (1946)</i> | | <i>Items</i> | <i>Bolivia (1948)</i> | |
|--------------------|-----------------|---|-----------------------|-----------------|
| <i>Kilogrammes</i> | <i>Per cent</i> | | <i>Kilogrammes</i> | <i>Per cent</i> |
| <i>(app.)</i> | | | <i>(app.)</i> | |
| 7,415,239 | 93.5 | Consumption | 3,865,802 | 94.0 |
| 317,642 | 4.0 | Exports | 246,892 | 6.0 |
| 196,000 | 2.5 | Legal manufacture of crude cocaine | — | — |
| 7,928,881 | 100 | Total of coca leaf on which tax was paid. | 4,132,694 | 100 |

Chapter XVII

SUBSTITUTION OF ANOTHER CROP FOR THE COCA LEAF

During its tour of investigation, the Commission came to realize that the problem of substituting other crops for the coca leaf cannot be resolved in a general and uniform way in all the coca-leaf-producing areas of Peru and Bolivia.

After visiting certain producing areas, hearing the opinion of those concerned with the problem and studying various written reports from agricultural engineers in the areas concerned, the Commission came to the conclusion that, generally speaking, substitution is possible and therefore to be recommended.

Such substitution would involve consideration of the following points by the Governments concerned and by the landlords, particularly the large landlords.

In the large producing areas, coca leaf is now practically a monoculture, based essentially on:

(1) The unsatisfactory social and economic conditions of large sections of the population. It is these conditions, more than anything else, that maintain the production of this crop. The quantities of coca leaf exported by Peru and Bolivia for various purposes would never justify the present production.

(2) The immediate economic profit derived from the sale of the coca leaf. This profit benefits the small producer to only a very limited extent.

The following have been pointed out as disadvantages of the cultivation of the coca leaf as a monoculture:

(1) An excessively good or bad coca-leaf harvest seriously endangers the whole economy of the producing area by over- or under-production. These disadvantages have been repeatedly manifested in Peru and Bolivia. In the latter country, where the cultivation of the coca leaf is more concentrated than in Peru, this danger has been pointed out among others by the *Banco Agrícola de Bolivia* in the following terms: "The low price of coca leaf, which is the main product of the Yungas, places the growers in a very difficult situation as the result of their having based the whole economy of their estates on this single crop" (Report for 1946, page 51). In the *General Statistics of Agricultural Production* for the year 1948, the Coca Customs Office of the Department of La Paz says: ". . . it is necessary to emphasize the increase in fruit-growing which is having a tonic effect on the economy of the Yungas provinces, changing its monocultural nature and proving to the landlords that coca leaf is not the only profitable product of the Yungas".

(2) Such a monoculture makes it more difficult to increase the output of non-noxious food products necessary to the human organism.

Both Peru and Bolivia are countries in which there is under-production of food products and consequently undernourishment. The result of both these, as well as of other factors, is the practice of chewing the coca leaf, and in its turn the production of coca leaf is in certain areas one of the causes which, in conjunction with others, maintains the existing agricultural under-production. Thus, a vicious circle is created in which the production of coca leaf, apparently an economic factor of some importance, is in reality an uneconomic factor of major importance.

The economic value of the production of the coca leaf really benefits only a very limited section of society. Nevertheless, the social, economic and agricultural situation in the producing areas is such that any policy adopted with regard to the coca leaf is bound to have a considerable repercussion in those areas.

In the areas of Peru and Bolivia visited by the Commission, the conclusion was reached that an adequate agricultural policy would permit the substitution of other crops for coca leaf, provided that the following factors were taken into account:

(1) The different geographical peculiarities of each of the coca-leaf-producing areas and the crops other than coca which each could produce. In Peru, for example, there are essential differences between the Quillabamba and Tingo Maria areas and the surroundings of the town of Huánuco. Coca leaf is produced in all those areas, but that does not mean that the same products could be substituted for coca leaf in all of them. In Bolivia, the areas in which coca leaf is cultivated also display differences which must be taken into account. It seems possible that cotton might more easily replace coca-leaf production at Inquisivi than in other areas of the Yungas.

(2) Generally speaking, the products which it is proposed to substitute for coca leaf, in both Peru and Bolivia, are the following: coffee, tea, fruits in general and more particularly the orange, lime, grapefruit, apple, peach, grape, etc. Rice, sugar-cane and yucca have also been mentioned by agricultural experts.

It is not the Commission's task to specify which of the above-mentioned products might be substituted for coca leaf in each of the coca-leaf-producing areas, but only to point out that substitution is possible and that it is one of the most effective means of eradicating the practice of chewing the leaf.

In Bolivia, and particularly in the Yungas, the main coca-leaf-producing centres, it has been pointed out by some producers that the gradual substitution of other crops for the coca leaf is possible. Still more specifically, it has been said that coca leaf "should be re-

placed by another, more honest crop, the components of which do not cheat the body but nourish it and supply nutritious substances to repair the expenditure of physical energy in work". A little further on, the same author says that "the orange is one of the trees best suited to the conditions of the area (the Yungas)".⁴⁴ Moreover, in his conclusions, another author says: "Commercially, the cultivation of the orange can and should be substituted for the cultivation of coca."⁴⁵ Lastly, in the report submitted to the Commission by the Bolivian Central Departments of Economics and Agriculture it is stated that:

(a) It is possible to substitute the cultivation of products such as coffee, tea and fruit for the cultivation of coca leaf;

(b) The economic value of the production of coca leaf as compared with nineteen other food products is only about 5 per cent;

⁴⁴ See Abel Solis: "Coca, can its consumption be eradicated? Plan to regulate production. Economic consequences." *Rotario Boliviano* (Sucre), April 1941, No. 3, pages 8-23.

⁴⁵ See Augusto Valdivia Altamirano (engineer in the Technical Department of the *Banco Agrícola de Bolivia*). *The cultivation of the orange in the Yungas of La Paz—Bolivia*, 1942, pages 12 and 154.

(c) The economic value of the production of coca leaf in the Department of La Paz is approximately 20 per cent of total revenue.

(3) The economic importance of the coca leaf as an agricultural product appears to have been exaggerated. Thus, in Peru, coca is not included in a classification of twenty agricultural and animal products from the three criteria of area, volume and value.⁴⁶ With regard to Bolivia, its importance as an agricultural product is confined to the Departments of La Paz and Cochabamba.

(4) The substitution of other crops for the coca leaf should be carried out within the period of time which is considered necessary for the gradual eradication of the practice of chewing. Such a substitution would respect existing economic interests. The substitution should be accompanied by adequate propaganda and technical education and a policy of agricultural improvement. Lastly, in arranging for the substitution of other crops, the sole purposes for which the cultivation of coca leaf remains legitimate should also be borne in mind.⁴⁷

⁴⁶ Luis Rose Ugarte, *The food situation in Peru*, Ministry of Agriculture (S.C.I.P.A.), 1945.

⁴⁷ See chapter XVIII and part V.

Chapter XVIII

PRINCIPLES ON WHICH THE LIMITATION OF COCA-LEAF PRODUCTION AND THE CONTROL OF COCA-LEAF DISTRIBUTION MIGHT BE BASED

In the course of its tour of investigation, the Commission was able to ascertain that in both Peru and Bolivia it is legally and practically possible to limit the production of coca leaf and to control its distribution. Such limitation and control would, moreover, be justified in virtue of the principles and requirements of the international control not only of narcotic drugs, but also of the raw materials used for their manufacture.

In Peru, recent legislation has shown that limitation of the production and control of the distribution of coca leaf are possible. To a certain extent both have been put into practice by the Government of that country. Although the legislation in question represents no more than a first step, it justifies the hope that in the near future a more decisive limitation in the production and chewing of coca leaf will take place.

In Bolivia there is at present no restriction of production, but the idea of such restriction is now accepted by large sections of public opinion and by numerous professional men in the spheres of both medicine and agriculture. It is worth emphasizing that the advisability of restricting the production of the coca leaf and gradually reducing chewing was discussed not only by important political personages at meetings with the Commission, but also by some of the largest coca-leaf producers. According to one of them, a plan to regulate, limit and control the production of the coca leaf might be based on the following considerations:⁴⁸

(1) The production of the coca leaf has increased. Since the Chaco War, a rising curve in the consumption of coca leaf has been observed.

(2) The consumption of the coca leaf is chiefly a problem of nutrition.

(3) It is impossible to allow free and unrestricted production of coca leaf.

(4) A period of fifteen years divided into three five-year phases would be required to secure the reduction of coca-leaf cultivation to medical and scientific requirements.

(5) A council should be set up to regulate the production, sale, export, industrial utilization and consumption of coca leaf. Such a council would carry out a programme for the gradual eradication of coca-leaf chewing. The cultivation of coca leaf may be replaced by that of other products.

The Commission is of the opinion that a limitation of the production and consumption of coca leaf and also control of distribution might be based upon the following principles:

⁴⁸ See the work cited in footnote 4.

First: The establishment in Peru and in Bolivia of a parallel policy for the limitation of the production and consumption of coca leaf, together with an appropriate system of control. Peru has already initiated such a policy. The maintenance of free production in Bolivia would give rise, among other consequences, to the possibility of illicit traffic in coca leaf between the two countries.

Second: The general features of the respective legislative provisions should as far as possible be similar. Such similarity would not preclude each nation's legislation from taking into account the special circumstances attending the application of a policy of limitation in each of the two countries concerned. The countries might hold whatever consultation with one another they considered necessary for this purpose.

Third: The initiation, as early and in as complete a form as possible, of a policy to limit the production and consumption of coca leaf is a necessary consequence of:

(a) The harmful effects of chewing coca leaf, both from the medical and from the social and economic points of view; and

(b) The fact that since coca leaf is a raw material for the manufacture of narcotics, it should be subject to national and international control.

Fourth: In designing policy and legislation to secure limitation of the production of coca leaf, it should be borne in mind that coca leaf may be intended to serve the following purposes:

(a) The satisfaction of world medical and scientific requirements in accordance with international estimates drawn up for the manufacture of narcotic drugs such as crude cocaine, pure cocaine, etc.; and other requirements in accordance with the existing international conventions on narcotics;

(b) Chewing. Any policy for the gradual reduction of this habit presupposes limitation of the production of coca leaf.

These two aspects have been taken into account in the preparatory work now being done at the United Nations for the purpose of simplifying the narcotic drugs conventions now in force.

Fifth: Existence of a national organ of an official nature or under official supervision responsible for carrying out the policy of limitation and possessing the necessary powers of control.

Sixth: The policy of limiting production and eradicating chewing should be carried out gradually.

CONCLUSIONS AND RECOMMENDATIONS

Under the resolution of the Economic and Social Council (159 (VII) IV, 10 August 1948, document E/968) the terms of reference of the Commission of Enquiry into the effects of chewing the coca leaf include the following two points:

- (1) Investigation of the effects of chewing the coca leaf in Peru and Bolivia, and
- (2) Investigation of the possibilities of limiting the

production and controlling the distribution of the coca leaf in the said countries.

Both questions have been dealt with in this report. On the basis of the investigation conducted in Peru and Bolivia, the Commission unanimously decided to submit the following conclusions and recommendations, Mr. H. B. Fonda dissenting only on the recommendation concerning "Gradual limitation" (recommendation B, 1, (c)).

Chapter XIX

CONCLUSIONS

A. COMPLEXITY OF THE PROBLEM OF COCA-LEAF CHEWING

The chewing of coca leaf must be considered not as an isolated phenomenon but as a consequence of the social and economic conditions under which large sections of the population of Peru and Bolivia are living. These conditions affect principally but not exclusively the indigenous agricultural and mining populations of the two countries. The great majority of chewers is to be found in those two population groups. Although the chewer is predominantly Indian, there are also chewers amongst the *mestizos*. It is not always easy to draw a sharp distinction between the two, for the living conditions of certain sectors of the *mestizo* population are very similar to those of the population regarded as Indian.

B. DANGER OF CHEWING

The leaves of the coca plant contain cocaine. In the present state of knowledge the indications are that the effects produced by chewing coca leaf are to be explained by the action of cocaine.

C. NATURE OF CHEWING

It does not at present appear that the chewing of the coca leaf can be regarded as a drug addiction in the medical sense.

The Expert Committee on Drugs Liable to Produce Addiction gave the following definition of addiction at its meeting of 9-14 January 1950 (World Health Organization, Technical Report, Series No. 21, 1950):

"6.1 Definition of drug addiction.

"Having considered the request of the Commission on Narcotic Drugs, the committee drafted the following definition of 'drug addiction':

"Drug addiction is a state of periodic or chronic intoxication detrimental to the individual and to society, produced by the repeated consumption of a drug (natural or synthetic). Its characteristics include:

(1) An overpowering desire or need (compulsion) to continue taking the drug and to obtain it by any means;

(2) A tendency to increase the dose;

(3) A psychic (psychological) and sometimes a physical dependence on the effects of the drug."

Compared with this, the observations of the Commission show that coca-leaf chewing is not an addiction (toxicomania) but a habit. It may, however, in some individuals, become an addiction, but generally it can be given up like other habits.

D. HARMFUL EFFECTS OF CHEWING

Briefly the harmful effects of chewing coca leaf, from the point of view of the individual and of the nation, are the following:

(1) It inhibits the sensation of hunger and thus maintains, by a vicious circle, a constant state of malnutrition.

(2) It induces in the individual undesirable changes of an intellectual and moral character. This is especially clear in exceptional cases, and it is much discussed how far this is general. It certainly hinders the chewer's chances of obtaining a higher social standard.

(3) It reduces the economic yield of productive work, and therefore maintains a low economic standard of life.

E. NUTRITIVE VALUE OF COCA LEAVES

Coca leaves contain, as do other green leaves, vegetables and fruits, most of the known vitamins, especially

B₁, B₂ and C in significant quantities. In spite of this fact it would by no means be advisable to supply these vitamins in the form of coca-leaf chewing, i.e., together with the toxic substance, cocaine. In no way can the chewing of coca leaves therefore be regarded as a substitute for an adequate diet.

F. ACCLIMATIZATION OF THE ANDEAN MAN

The Andean man is highly acclimatized to living at great altitudes. All our knowledge up to the present time supports the conviction that it is unnecessary to regard the Andean Indian as a race for which special physiological laws must be assumed. We have no right to suppose that cocaine acts differently on him. No advantage of coca chewing for acclimatization and for continuous life at high altitudes has been shown scientifically, and persons of non-Andean origin have become acclimatized in large numbers to life in the high altitudes of the Andes without chewing coca leaf.

G. SOLUTION OF THE PROBLEM

Since chewing coca leaf is not an isolated phenomenon, but the consequence of a number of unfavourable social and economic factors, the solution of the

problem involves two fundamental and parallel aspects: first, the need for improving the living conditions of the population amongst which chewing is a general habit, and secondly, the need for initiating simultaneously a governmental policy to limit the production of coca leaf, to control its distribution and eradicate the practice of chewing it.

H. GRADUAL SUPPRESSION OF CHEWING

The chewing of coca leaf is a habit which can be eradicated if the conditions under which it originated are suitably modified.

In view of the social and economic nature of the factors determining coca-leaf chewing, an immediate and radical suppression of the habit is not possible. Instead of solving the problem, such a suppression would only aggravate the existing situation. Consequently the Commission envisages only a gradual suppression of the habit, that is, a process which while taking into account the complexity of the problem should not be so long as to permit the harmful continuation of the habit nor so short as to damage the economic interests involved.

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Chapter XX

RECOMMENDATIONS

On the basis of the above conclusions, two groups of recommendations are formulated. The first comprises recommendations relating generally to the existing social and economic factors which give rise to coca-leaf chewing. By their very nature these recommendations are here formulated in a general way.

The second group of recommendations is related to the possibility of limiting the production of coca leaf, of controlling its distribution and finally of gradually eradicating the practice of chewing. In accordance with the terms of reference as defined by the Economic and Social Council, these recommendations are given in detail.

A. RECOMMENDATIONS CONCERNING THE FACTORS CHIEFLY RESPONSIBLE FOR THE CHEWING OF COCA LEAF

Before formulating these recommendations, the Commission desires to point out that the Governments of Peru and Bolivia have made and are at present making certain efforts to improve the living conditions of the respective populations amongst which the bulk of the chewers are to be found. But the vastness of the problem and the great complexity and cost of the measures necessary to solve it have not permitted these Governments to obtain the results which they would doubtless desire to achieve.¹ Consequently the Commission formulates the following recommendations:

1. Nutrition

The primary need is to improve the nutritional status of that part of the population which is affected by the chewing of coca leaf. One of the basic observations of this Commission was that where the food is good and sufficient, chewing stops. This observation is in agreement with many medical and military opinions in these countries. Of all the factors concerned, better nutrition abolishes most quickly the habit of chewing. Specific and detailed reference has been made in this respect to the malnutrition existing in the coca-leaf producing and chewing areas. Reference has also been made to the studies carried out both by national and international commissions and organizations.

The betterment of nutrition as recommended above implies the application of a co-ordinated plan which would take a certain amount of time and effort on the part of the Governments of Peru and Bolivia. The tech-

¹ Reference has repeatedly been made in the present report to the efforts which the above-mentioned Governments, acting either on their own account or in collaboration with some other Government, have made to improve certain aspects of the living conditions of the population in general by the establishment of special bodies.

nical assistance of the United Nations seems possible, especially of its specialized agencies whose own objectives bring them into contact with these problems.

Among these agencies special mention should be made of the United Nations Food and Agriculture Organization which had already made a report in 1949 on the agriculture of the Altiplano, and which has referred to the food situation of these countries at its Montevideo Conference of July 1948. The World Health Organization is equally interested in nutrition as a basis of good health which results in greater productivity and higher social standards. The International Labour Office called attention in 1943 and 1946 to under-nutrition. From an educational point of view, the United Nations Educational, Scientific and Cultural Organization is interested also. All these organizations have dealt in some measure in their own sphere with the problem and under-nutrition in these populations.

In any case the studies already made provide a more than sufficient basis for the adoption of a policy designed to produce an immediate improvement in the nutrition of the population affected by the habit of coca chewing. This population comprises not only the chewers but their families and all those who live in the coca-leaf producing and chewing areas.

The Commission is of the opinion that the *keynote of the whole action* against chewing coca leaf can and must be the bettering of nutrition.

2. Other recommendations

(a) Hygiene

Sanitary and hygienic conditions should be improved in the regions affected.

(b) Housing

The improvement of housing conditions both in rural areas and in the mining districts is also essential. Here education in what housing is and means should form an integral part of the policy to be adopted.

(c) Education

This should be understood in a general sense and also in a special sense. The first involves an improvement in general education and the speediest possible elimination of illiteracy. Between the latter and coca-leaf chewing, there is a clear connexion. The Commission has been able to observe that where education increases, there is a parallel decrease in chewing.

The second aspect relates to education in agricultural, hygiene and health matters already mentioned in the preceding recommendations. An improved agricultural education is essential in order to secure:

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(i) A general improvement in the peasant's living conditions,

(ii) An improvement in production and thus in the diet of the people.

(d) *Labour*

The existing labour conditions, particularly in the rural districts, should be improved. An essential condition of such an improvement is the institution of a legal system of land tenure (*arrendamiento*) which would gradually replace the existing system, since the latter cannot be regarded as suited to present agricultural requirements.

The new system should also institute more equitable relations between landlord and tenant. The latter should be given greater legal security than he now has.

The form of sub-tenancy, particularly those of the so-called *allegados* in Peru, should be carefully studied with a view to finding if possible a contractual form more in harmony with modern legal, social and economic requirements.

As has been said, Act No. 10,885 in Peru is now being revised, and there is a plan of agrarian reform in Bolivia. It is to be hoped that both plans will result in an improvement in the legal conditions of labour considered in this report.

(e) *Extension of agricultural credit*

This is to some extent now being practised in both Peru and Bolivia, mainly through the activities of the respective Agricultural Banks.

The present system is generally based on individual loans secured by a specific guarantee. Though recognizing the importance of the work done by the above-mentioned Banks, the Commission is of the opinion that greater attention should be paid to the problem of establishing and maintaining producers' and consumers' co-operatives. The individual loan, though useful, is always of limited economic and social effect, particularly in view of the conditions in which the small farmer now lives. In such conditions, he cannot always offer the guarantees necessary to obtain a loan.

The problem of establishment and maintenance of co-operatives presents evident difficulties, but they are not insuperable. An adequate policy would enable a start to be made with them in the immediate future. The spirit of co-operation existing in the present Indian communities could be enlisted to assist in the organization of these co-operatives.

(f) *Transport*

The carrying out of the preceding recommendations would be greatly facilitated by a general improvement and further development of transport, mainly roads and railroads.

The implementation of the above recommendations implies the application of a vast and co-ordinated plan which would take a certain amount of time and effort on the part of the Governments of Peru and Bolivia with the technical assistance of the United Nations and of its specialized agencies whose own objectives bring them into contact with the problems here described.

B. RECOMMENDATIONS RELATING TO THE POSSIBILITY OF LIMITING THE PRODUCTION OF THE COCA LEAF AND CONTROLLING ITS DISTRIBUTION AND THE GRADUAL SUPPRESSION OF CHEWING

In formulating these recommendations, the principles previously laid down have been borne in mind.

Although the limitation of the production of coca leaf and the control of its distribution necessarily entail limitation of consumption, it has been considered advisable to arrange the following recommendations in two groups. Such a distinction should be understood not as a division but as an arrangement of two closely complementary groups of recommendations.

1. *Recommendations relating to the limitation of production and the control of distribution*

(a) *Simultaneous limitation of production in Peru and Bolivia*

A policy for the limitation of the production of coca leaf and the control of its distribution should be adopted simultaneously by Peru and Bolivia. The respective legislative provisions should be based on the same principles and pursue identical purposes. In implementing a policy of limitation, these legislative measures should take into account the national characteristics which the coca-leaf problem presents in each of the two countries concerned.

(b) *Purposes of the limitation*

In applying measures for limiting the production of the coca leaf, account should be taken of the purposes for which the leaf is used, namely:

(i) The satisfaction of world medical and scientific requirements and of other requirements in accordance with the existing international Conventions on narcotics;

(ii) Chewing.

The purposes mentioned necessitate a limitation of production governed by both national and international provisions. The production of the quantities necessary to satisfy (i) and (ii) should be subject to the estimates established internationally by the competent organ.²

(c) *Gradual limitation*

Limitation of the production of coca leaf for chewing should be effected gradually until complete suppression is achieved within a period of fifteen years or any shorter period which the Governments concerned may consider practicable.

For that purpose the Governments concerned should take the necessary steps to secure an annual reduction by one-fifteenth of the production of coca leaf at present used for chewing or by such larger proportion of the said production as the Governments concerned may consider practicable.

The Governments concerned shall forward to the Secretary-General of the United Nations an annual report on the progress of the gradual suppression of the production of coca leaf and its chewing.

As a minority opinion, Mr. H. B. Fonda considers that the gradual suppression should take place within

² See document E/CN.7/AC.3/3.

a period of five years. The reasons are that with the implementation by the Governments concerned of the other conclusions and recommendations on which he concurs the above period of five years is a practicable one. Therefore, a complete suppression of the habit of chewing can be achieved in the maximum of five years.

(d) *System of control*

To ensure the success of the limitation of production in accordance with purposes (i) and (ii) (see recommendation (b)), it is necessary:

(i) That a cadastral survey of the cultivation of the coca leaf should be carried out as soon as possible in Peru and Bolivia;³

(ii) That taking into account the above-mentioned economic and regional characteristics and the quality of the coca leaf, etc., the respective Governments should decide which coca-leaf producing areas will satisfy within the period during which gradual suppression is to be effected, the requirements indicated in recommendation (b).

Any other cultivation of the coca leaf, outside the scope of the purposes and limitations referred to, should be considered illicit and subject to the appropriate legal penalties.

(iii) That the respective Governments should establish a system for the registration of:

(a) Existing producers, and

(b) Existing dealers (wholesale and retail) in coca leaf.³

Once the registration of the above is complete, no other person should be authorized to produce coca leaf or trade in it in any way.

Authorizations to trade in coca leaf should be understood as granted on a personal basis and should lapse as soon as the person authorized ceases for any reason to deal in coca leaf.

(iv) That a system to control the actual production and distribution of coca leaf should be established.³

(v) That an official organ or an organ under official supervision should be set up and entrusted with the task of applying the control measures to all operations affecting the coca leaf. Such an organ should also be the only one authorized to export coca leaf, for whatever purpose it is intended.³

(vi) No authorization should be granted for any other coca-leaf plantation beyond those already in existence.

(e) *Crop substitution*

The substitution of other crops for the cultivation of the coca leaf should be encouraged as far as possible by the Governments concerned. Among other measures, a preferential system might be established for providing agricultural, economic and technical aid to any grower of coca leaf who wishes to replace it by some other crop.

³ The Government of Peru has already begun to implement this recommendation.

As a complement of such a policy, it would be advisable to establish that in principle no agricultural loan will be granted for the production of coca leaf. As a consequence of a practice established by the respective Agricultural Banks, no loans for the cultivation of coca leaf are at present granted by those banks either in Peru or in Bolivia. The object of the present recommendation is to convert this practice, which is still not altogether universal, into a legal provision.

It would be desirable that in making agricultural loans preference should be given to those growers who do not produce coca leaf and who undertake not to grow it.³

Consideration might also profitably be given to the possibility of providing that the rate of interest on any loan granted to a farmer who also grows coca leaf, be higher than that on loans granted to farmers who do not grow coca leaf.

(f) *Sanctions*

Legal provisions establishing adequate administrative and penal sanctions against those who violate the provisions relating to the limitation of production and the control of distribution of the coca leaf, should be promulgated and applied.

2. *Recommendations relating to the gradual suppression of the practice of chewing coca leaf*

(a) *Legal prohibition of chewing in the army*

The practice now adopted by the armies of Peru and Bolivia of not permitting the chewing of the coca leaf during military service should be elevated to the status of a legal prohibition.

(b) *Educational propaganda*

Appropriate legislation should render compulsory the provision in every centre of education or place of work of adequate information regarding the harmful effects of chewing coca leaf.

Such legislation should be supplemented by such other propaganda measures as the Governments of Peru and Bolivia may consider it advisable to introduce, particularly amongst the Indian agricultural and mining population.

(c) *Legal prohibitions*

It should be legally prohibited on pain of appropriate penalties:

(i) To pay for work or any kind of loan or service directly or indirectly, wholly or partly, with coca leaf;

(ii) To infringe the provisions regarding the gradual reduction in the daily supply of coca leaf to the workers;

(iii) To infringe any of the legal provisions intended to secure the gradual suppression of the practice of chewing coca leaf.

(d) *Regulation of prices*

The price of coca leaf intended for chewing should be officially regulated during the period of gradual suppression in order to avoid excessive prices which might endanger the adequate satisfaction of requirements relating to food, housing, clothing, hygiene and health.

(e) *Appeal to the Government of Argentina*

In view of the existence in the north of the Argentine Republic of a large group of chewers who, though largely not of Argentine nationality, consume annually a considerable quantity of coca leaf, it would be desirable that the Government of that country should be invited to collaborate to the extent it may deem necessary in the gradual suppression of the coca leaf in that area.

(f) *International co-ordination of policies*

The complete success in one country of a policy of the gradual suppression of the habit of chewing coca leaves, of the corresponding limitation of the production of these leaves and the control of their distribution, will depend in a very large measure on identical policies being pursued and carried out in other countries where this habit exists.

To further the adoption of such policies by all countries concerned and to facilitate the co-ordination of

the measures resulting therefrom, it might be advisable to convene, under the auspices of the United Nations, a meeting of these countries with a view to reaching an agreement on the questions referred to above, pending the adoption of the new single convention on narcotic drugs.

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In submitting these recommendations and thus concluding the present report, the Commission is aware that they represent no more than the basic steps to be taken to secure limitation of the production of the coca leaf, control of its distribution and the gradual reduction of chewing.

The implementation of the recommendations with all the complementary aspects which that implies is a task which falls exclusively within the competence of the Governments concerned.



ANNEXES

At its ninth session, the Economic and Social Council adopted resolution 246 H (IX) of 26 July 1949 in which:

(a) It recorded its satisfaction at the declarations made to the Commission on Narcotic Drugs by the representatives of Bolivia and Peru of the willingness of the Governments of these two States to grant to the Commission of Enquiry all assistance and facilities for the successful performance of its mission;

(b) Requested the members of the Commission of Enquiry to start work in Peru not later than during the second week in September 1949;

(c) Endorsed the opinion of the Commission on Narcotic Drugs that the means should be given to the Commission of Enquiry to extend its investigations to Bolivia;

(d) Requested the General Assembly to appropriate before 30 September 1949 the additional funds necessary to enable the Commission of Enquiry, with the terms of reference given in resolution 159 (VII) IV, to spend at least three months in Bolivia and Peru and to prepare a report on its work after the conclusion of its investigations in the field.

Sources: United Nations document E/CN.7/67, E/575 and E/575/Add.1 and 2; E/777; E/1605; E/CN.7/164, Add.1 and 2; E/1361 and E/1553.

II. Terms of reference of the Commission of Enquiry

The terms of reference, as settled by the aforementioned resolutions of the Economic and Social Council, are:

(a) To investigate the effects of chewing the coca leaf in Peru and Bolivia, and

(b) To investigate the possibilities of limiting its production and controlling its distribution.

Limitation of the production of the coca leaf and of opium, both of which are treated as raw materials for the manufacture of narcotic drugs, was discussed during the International Opium Conference held at Geneva from 17 November 1924 to 19 February 1925, though no conclusion concerning limitation was reached.³ The point of view expressed at that time by the Bolivian Government may be summed up as follows:³

(a) Bolivia produces some 5 million kilogrammes of coca leaves annually. The amount of coca consumed by the Indians is fairly small and cannot be considered harmful;

(b) Bolivia does not manufacture cocaine;

(c) Almost all its export of coca leaves goes to countries which neither manufacture cocaine nor re-export the leaves (mainly Argentina and Chile). The amount exported in 1923 was 342,606 kilogrammes;

(d) The coca leaves from Bolivia are used to a large extent in the manufacture of cocaine.

Whilst not expressing any opinion on the nature of the effects of chewing the coca leaf, the Conference considered that it was impossible for the time being to limit the production of the coca leaf or of opium.

In 1931, in the course of general discussion at the Conference for Limiting the Manufacture of Narcotic Drugs, the question of limiting raw materials for the manufacture of the said drugs, and consequently the limitation of the coca leaf, again arose. It was decided that limitation could not be discussed since it was outside the scope of the Conference.⁴

The League of Nations Assembly, recognizing the need to achieve limitation of the raw materials used in the manufacture of narcotic drugs, at its twelfth session (September 1931) re-

³The outcome of that Conference was the Geneva Convention, signed on 19 February 1925. The Convention entered into force on 28 September 1928.

⁴The Government of Peru did not take part in the Conference.

quested the Advisory Committee on the Traffic in Opium and Other Dangerous Drugs to collect all possible material with a view to sending a questionnaire on the limitation of raw materials to Governments.

The Advisory Committee approved the dispatch of two questionnaires, one to the opium-producing countries and the other to countries producing the coca leaf; these questionnaires were sent to the respective Governments in December 1933. As a result of the Advisory Committee's study of the material received, the Council decided that limitation of the production of opium and of the coca leaf should be studied separately. It was also decided to postpone to a later date the question of the limitation and control of production of the coca leaf, although investigations into the problem were to continue (May-June 1936).

The Commission on Narcotic Drugs of the United Nations Economic and Social Council, at its first session (27 November-13 December 1946), requested the Secretariat to prepare a questionnaire on the coca leaf as a preparatory step towards limitation and control of production. At its second session (24 July-8 August 1947), the Commission on Narcotic Drugs approved the questionnaire drafted by the Secretariat, which was sent to the Governments concerned. At its third session (3-22 May 1948) the Commission considered the replies from Governments and the Government of Colombia's policy to abolish the growing of the coca leaf. Of the three Latin-American Governments mainly affected by the problem of coca-leaf chewing—Bolivia, Colombia and Peru—only the first two have submitted replies to the questionnaire on the coca leaf.⁵

The Commission on Narcotic Drugs, when considering the Bolivian Government's reply to the questionnaire on the coca leaf, noted the Government's claim that the Bolivian coca leaf did not contain any narcotic substance, and consequently instructed the Secretariat to ask the Bolivian Government to clarify that statement. The Secretary-General, on 21 September 1948 and 30 March 1949, sent *notes verbales* to the Bolivian Minister for Foreign Affairs. A communication from the Bolivian Ministry of Foreign Affairs dated 9 December 1948 stated that the Secretary-General's request had been referred to the Bolivian Ministry of Hygiene and Public Health.

Sources: (1) "Comments by the Government of Bolivia on the proposal to limit the cultivation of the coca leaf." Annex 12 of document 397.M.146, 1924, XI, Records of the Sixth Session of the Advisory Committee on the Traffic in Opium and Other Dangerous Drugs.

(2) "Records of the Second Opium Conference," 760.M.260, 1924, XI.

(3) "Records of the Conference on Limiting the Manufacture of Narcotic Drugs," document C.509.M.214, 1931, XI.

(4) Documents C.640.M.302, 1933, XI; C.641.M.303, 1933, XI and C.278.M.168, XI.

(5) Documents E/CN.7/105; E/CN.7/110 and Addenda; E/CN.7/W.23; E/799; E/1361; and E/CN.7/W.51.

III. General information on Peru and Bolivia

A. PERU

1. Land and people

Peru covers an area of 1,249,049 square kilometres, with a population of 8,061,000.

The country is divided into four regions:

(a) The Littoral, a narrow coastal belt of mainly desert country between the Pacific and Cordillera Occidental. The belt is crossed here and there by relatively large watercourses which maintain the vegetation in their vicinity. This region produces most of Peru's sugar and cotton.

⁵The result of the Conference was the 1931 Convention for limiting the manufacture of narcotic drugs, which entered into force on 1 January 1934.

⁶The reply from the Government of Bolivia is contained in document E/CN.7/110, that of Colombia in E/CN.7/110/Add.5.

(b) The Andean region, formed by the mountain range and tablelands or mesetas of the Andes. The meseta, also called *puna* or plateau, varies in altitude from 1,200 to 6,000 metres. A large part of it is inhospitable and practically uninhabited. The population of this 300- to 400-km. wide region is concentrated in the valleys, some of which are wide and often have steep sides. The vegetation in these valleys is in marked contrast to the bleak *puna* which surrounds them. The most important rivers in this region are the Marañon (a tributary of the Amazon) and the Huallaga, which rises north of Cerro de Pasco and flows down the Huallaga valley. The coca leaf is produced and consumed in this valley.

(c) The mountain forest (montana) or sierra region, which comprises the eastern slopes of the Andes region. The altitude here varies from 200 to about 3,000 metres. The vegetation is much more abundant, the water supply adequate, and in many places the soil is rich and suitable for agriculture. The climate is intermediate between the humidity of the forest region and the severe cold of the meseta.

(d) The Amazon region, not much above sea level, with an abundant rainfall and luxuriant vegetation.

The Indian population⁸ is estimated to represent approximately 50 per cent of the total. Poblete Troncoso, in an official report sent to the Geneva International Bureau of Education by the Peruvian authorities in 1934, said that out of a total of 6,800,000 inhabitants, 4 million were considered "pure" Indians. Most of the Indians inhabit the uplands and the valleys and plateaus of the Andean region. The Indian population may be divided into two main groups, Aymara and Quichua. They have common characteristics but differ in some respects. In general the Aymara is essentially introvert whilst the Quichua is more expansive. A large nucleus of Aymara Indians live near Lake Titicaca; this region is drained by the River Desaguadero which marks the frontier between Peru and Bolivia.

The present system of land tenure among the native Indian population is something between the agrarian collectivism of the Incas and the individualist system. The collectivist system is at the origin of the indigenous communities which still survive in Peru and Bolivia after passing through many historical vicissitudes.⁷

The coca leaf is usually cultivated under the individualist property system. Communal cultivation of the coca leaf is not unknown, however.

A strong pro-indigenous movement has existed in Peru for some time, its historical origin dating back to colonial times. There is a great deal of legislation concerning the indigenous population of Peru but there are no provisions prohibiting or restricting the chewing of the coca leaf. There is a Directorate-General for Indigenous Affairs which will probably be incorporated in the recently established Ministry of Labour. The Second Inter-American Indian Congress⁹ was held in Cuzco from 24 June to 4 July 1949.

2. Economy

The total value of Peru's national income in 1942 has been estimated at 2,043 million soles. The most important items: 666 millions from agriculture; 284 millions from mining and 280 millions from industry. According to Ferrero, in 1942 the national income amounted to 2,130 million soles, 745 millions coming from agriculture and livestock, 375 millions from mining and 300 mil-

⁷ The terms "Indian" (*indio*) and *mestizo* (Spanish-American Indian half-caste) are used fairly frequently in this document, especially the first. Both should be taken in a general sense and not as purely biological descriptions. Cultural and social factors must be taken into account in distinguishing between whites, *mestizos* and Indians.

⁸ The indigenous community was officially recognized in 1581, abolished in 1824 and 1825 and subsequently re-established in part. Bolivia officially abolished the indigenous community in 1866. Today the indigenous communities in Peru and Bolivia are legally recognized. The communal property system now subsisting in various differing forms should not, of course, be regarded as a communist property system.

lions from industry.⁹ Again according to Ferrero, in 1940 40 per cent of the population was gainfully occupied, this percentage being distributed over the states occupations in the following proportions: agriculture, 52.24 per cent; livestock, 10.22 per cent; mining, 1.81 per cent; industry, 15.36 per cent.

According to Ferrero, mineral products form 60 per cent of Peru's foreign trade and agricultural and livestock products 40 per cent. Cotton and sugar account for 90 per cent of the latter figure.

The Peruvian Ministry of Finance and Commerce has a National Foreign Trade Council which is responsible for controlling the movement of Peru's foreign trade and granting export permits. The Peruvian customs may not authorize any export without the required export license or permit (D.D. 21 January 1947).

B. BOLIVIA

1. Land and people

Area: 1,075,794 square km.; population: 3,922,000.

On the west is the Cordillera or mountain range of the Andes, with passes often above 3,000 metres. On the east is the Cordillera Real with peaks over 6,000 metres high (Illimani near La Paz, Mururata and Illampu). The Cordillera Central and the Cordillera Oriental, branching out from the Cordillera Real, contain many fertile valleys.

The plateaus lack water and agriculture is difficult, but that is not the case in the valleys and the Yungas, the latter being the coca-leaf production centre. To the east and north of the Cordillera Oriental are the low-lying tropical regions which occupy a large part of Bolivia and where the rains are abundant and heavy. It is the most sparsely populated part of the country.

The exact number of Indians in Bolivia is not known. According to some estimates they form approximately 50 per cent of the total population. The number of whites is given as 500,000, the rest being *mestizos*. According to approximate figures, 80 per cent of the total population lives in the highlands, the valleys and Yungas being the most densely populated. Except in the eastern districts (Santa Cruz, Beni, etc.) the Indian population consists mainly of Aymaras and Quichuas.

2. Economy

It is calculated that the gainfully occupied population represents 35 to 40 per cent of the total. If that is so, the gainfully occupied or productive population might be put at about 1,500,000.

Data which are only approximate indicate that 85 per cent of the gainfully occupied population is engaged in agriculture and grazing. Again approximately, Bolivia is estimated to have 12,000 industrial workers, 17,000 public officials, 7,000 railway workers and 38,000 to 40,000 miners. A probable figure for the number engaged in trade and other activities is 50,000.¹⁰

The total income from gainful occupations was estimated at 4,400 million bolivianos in 1940, 3,500 million coming from agriculture. Assuming that that total represents 60 per cent of the national income, the latter may be taken as 7,350 million bolivianos.¹¹ Bolivia has an organization called the Bolivian Development Corporation (*Corporación Boliviana de Fomento*), one of whose purposes is to increase and improve Bolivia's agriculture. This body, which has already done and is doing important work,

⁹ The Congress approved a recommendation on the coca leaf which is given in the bibliography for this section of the document.

¹⁰ According to the United Nations Statistical Office one sol at the official rate is equivalent to US\$0.15 and at the free rate to US\$0.05.

¹¹ The figures refer to 1940 when Bolivia's total population was estimated at not more than 3,100,000.

¹² According to information from the United Nations Statistical Office in May 1949 a boliviano was equivalent to just over US\$0.02.

receives a government grant (Supreme Resolution of 14 September 1942) and the Government has also entered into an agreement with it (see Law of 3 December 1942; the agreement is dated 29 December 1942). The capital of this institution or company was 1,250 million bolivianos. Its Agricultural Department carried out large-scale works in various parts of the country (Santa Cruz, Beni, Acharachi (Lake Titicaca), etc.).

Sources: (1) *Population and Vital Statistics Reports*, June 1949 (Statistical Office of the United Nations).

(2) Fred A. Carlson, *Geography of Latin America*, New York, 1946.

(3) Louis Baudin, *L'Empire socialiste des Inka*, Paris, University of Paris, Institute of Ethnology, 1928.

(4) Moisés Poblete Troncoso, *Cómo vive y trabaja el indio peruano* (How the Peruvian Indian lives and works), *Boletín del Museo Social Argentino*, year XXXIV, September 1946, Buenos Aires.

(5) *The Aymara Indians of the Lake Titicaca Plateau, Bolivia*, Memoir no. 6, American Anthropology Association, January 1948.

(6) H. Tschopij, Jr., *Highland Communities of Central Peru*, Washington, Smithsonian Institution, 1947.

(7) E. B. Doran, Jr., *Report on Geography of the Rio Huallaga Valley, Peru*, UNESCO (NS/IIHA/15A) Paris, 7 January 1949.

(8) Rómulo A. Ferrero, *La Política Fiscal y la Economía Nacional*, Lima, 1946. The author is Dean of the Faculty of Economic Science of the Catholic University of Peru.

(9) *Control de Cambios*, Lima, Banco Central de Reserva del Perú, 1947.

(10) *Studies in Income and Wealth*, Vol. 10. Conference on Income and Wealth. New York, National Bureau of Economic Research (Bolivia, pages 179-180; Peru, pages 217-218).

(11) *Memoria del Año 1944*, La Paz, Bolivia, Ministerio de Economía Nacional, 1945.

(12) *Memoria, 1946/1947*, La Paz, Corporación Boliviana de Fomento.

IV. The habit of chewing the coca leaf

A. HISTORICAL BACKGROUND

From existing information it may be assumed that the habit of chewing the coca leaf existed in certain regions of America before the Inca Empire.

In the pre-Inca era the habit of coca-leaf chewing covered a larger geographical area than now.

It seems then to have included certain regions of Central America (Nicaragua), part of Venezuela, various Amazon regions and extensive parts of what are now Colombia, Ecuador, Peru, Bolivia and, to some extent, North Argentina. The extent of the coca-chewing areas in these regions varied considerably. The habit seems never to have been widespread in Ecuador as in the other regions. Nowadays coca-leaf chewing is unknown in Nicaragua, but it appears to subsist in certain parts of Brazil and other smaller areas of Venezuela.

It is very generally believed that during the Inca Empire coca-leaf chewing was reserved to the upper social classes. It is believed that all the Peruvian coca plantations belonged to the Inca.¹² This would suggest that addiction was slight at that time, although the size of the Empire would indicate that in a way the habit was widespread.¹³

¹² The beginning and duration of the Inca Empire cannot be exactly determined. It is thought that the Empire began in the thirteenth century and was in full power by the fourteenth. The fifteenth century is considered the period of its greatest development and splendour, its decline beginning in the sixteenth. In 1525, although still in existence, the Empire was greatly weakened by serious internal strife, which led to a kind of civil war. Strictly speaking, the Empire lasted about two centuries, but in a wider sense, about four centuries. The Spaniards (Pizarro, 1532) arrived not long after Atahualpa, after killing his brother Huascar and his family, had seized power as Inca or sovereign of the Empire.

The end of the Inca Empire produced a political, economic and social crisis which encouraged the habit of coca-leaf chewing. During the conquest and colonial period, the Spaniards repeatedly drew attention to the danger of the coca-leaf chewing habit to the Indians and in 1560 and 1609 restrictions against chewing were issued. In spite of these efforts, coca-leaf production increased and with it the chewing habit.

After the Independence, the habit of chewing the cocoa leaf, although geographically somewhat reduced, increased numerically to a considerable extent. In Peru and Bolivia nothing was done to restrict or prohibit it. At that time what is now known as addiction and similar states was, of course, unknown. Cocaine was isolated in 1860 and its anaesthetic effects proved in 1884.

This state of affairs partly explains Mantegazza's enthusiasm (1859) for the coca leaf and its properties. Mantegazza is considered by some as one of the main indirect contributors to the dissemination of cocaine and cocaism. Before him one must also mention Pöppig, who as far back as 1832 revealed some of the harmful effects of coca-leaf chewing.

During the remainder of the nineteenth century interesting studies on the coca leaf were made, and two schools of thought, one in favour of and one against coca-leaf chewing appeared.

At the present time coca-leaf chewing is not prohibited or restricted in Peru and Bolivia.

The first research in Peru on the coca leaf and its effects was begun in 1937 by the Pharmacology Department of the Faculty of Lima. The research workers at present engaged in studying the effects of chewing the coca leaf include Gutiérrez Noriega, Zapata Ortiz, Ciuffardi, Carlos Monge and Cabieses Molina. Both of the two above-mentioned theories or opinions as to the harmful or harmless effects of coca-leaf chewing are represented among these research workers.¹⁴

B. COUNTRIES IN WHICH THE HABIT OF CHEWING THE COCA LEAF EXISTS TO A GREATER OR LESSER EXTENT

According to the information available, coca-leaf chewing is practised in various parts of the following countries, as well as in Peru and Bolivia: Argentina, Brazil, Colombia, Chile, Ecuador and Venezuela. The problem varies in magnitude in each of these countries.

1. Argentina

Chewing is practised in certain northern areas of the country in the provinces of Salta and Tucumán and possibly in Jujuy. It seems that the main group of addicts is a considerable number of chiefly agricultural Bolivian workers resident there.

2. Chile

The problem seems to be confined to the Bolivian workers, mostly employed in the mines near Chile's frontier with Bolivia. The most important point on the frontier is the Chilean station of Ollagüe. Within the high land inside the triangle Arica (Chile)-Charan (Bolivia)-Cordillera Occidental, which marks the frontier between the two countries at this point, there are probably small groups of Indians who chew the coca leaf.

3. Brazil

Coca-leaf chewing appears to be practised mainly in certain Amazon regions (rivers Purus and Amazon). These or other Amazon regions are thought by some to be the point where the custom of chewing the coca leaf originated.

On 13 January 1949 the Secretary-General sent a communication to the Ministry of Foreign Affairs of Brazil, stating that certain bibliographical references suggested that in parts of Brazil, coca leaf was chewed or powdered coca leaf (*ipadú*)

¹³ According to other opinions the habit was practised more freely than is suggested in the text.

¹⁴ For information on these and other opinions and on the research work, see the annotated bibliography on the effects of coca-leaf chewing.

consumed. Consequently two copies of the questionnaire on the coca leaf were forwarded with a request for particulars. So far no reply to that communication has been received.

4. Venezuela

The only information is that in certain mountainous regions relatively near Colombia a number of more or less isolated groups chew coca leaf.

5. Ecuador

Coca-leaf chewing began not long ago in certain parts of Ecuador.

In 1941 the officially known coca-leaf production was 16 kilogrammes. According to certain reports, chewing is practised on a small scale in the province of Azuay; according to others it does not exist in Ecuadorian territory.¹⁶ The Government of Ecuador's reply to the questionnaire on the coca leaf says the custom of chewing the leaf does not exist in the country.

The conclusion seems to be that the problem of coca-leaf chewing is practically non-existent in Ecuador. So far no satisfactory explanation for the disappearance of the habit is known.

It appears from the foregoing that in South America the three countries mainly affected by the problem are Colombia, Bolivia and Peru. Although for the present the Commission of Enquiry is to confine itself to the last two countries, it seems fitting to add a few notes on the position of coca-leaf chewing in Colombia.

6. Colombia

The Government of Colombia, in its annual reports and in its reply to the questionnaire on the coca leaf, has supplied copious information on the coca-leaf problem and the Government's policy to abolish chewing.

The Government has reported the amount of coca leaves for chewing as 210,000 kilogrammes in 1946, whereas in 1942 it had been 380,000 kilogrammes, which would indicate that chewing has diminished.

The same official source states that agricultural workers suffer serious ailments as the result of coca-leaf chewing. The Government has issued a series of provisions designed to abolish cultivation and to make it unlawful to pay wages largely in coca leaf.

The following conclusions may be drawn from the above information:

(a) That the Colombian Government considers coca-leaf chewing to be harmful;

(b) That there is a close relationship between nutrition and coca-leaf chewing although it is not the only factor: at the present time chewing is causing extreme diet deficiency;

(c) That total abolition of the cultivation of the coca leaf is an economic struggle in view of the fact that farmers pay a large part of their workers' wages in coca leaves;

(d) That investigations made in the Departments of Huila and Cauca suggest that:

(i) The coca leaf is not a food;

(ii) It is harmful and reduces the organic reserves;

(iii) The value of its cultivation and production is only relative.

It is not exported, being consumed in the country;

(e) That the natives of certain parts of the province of Cauca have expressed to the Government their approval of the

¹⁶ See items 79 and 111 of the annotated bibliography on the coca leaf.

policy of abolition and proposed that coca-leaf cultivation be replaced by that of bananas, maize, yucca, sugar cane, rice, cacao, etc.

Application of article 4 of Decree 896 of 1947 prohibiting the cultivation and ordering the destruction of the coca plantations was temporarily deferred. By Decree 1472 of the same year a census of coca plantations was ordered. Decree 3822 of 1948 made it unlawful to sell coca leaf in public markets, only registered pharmacies and drug stores being allowed to sell it. Infringement of these provisions is punishable by confiscation and fine. At the request of the Commission on Narcotic Drugs (document E/CN.7/186, pages 9 and 68), the annual report of the Government of Colombia has been distributed to the members of the Commission of Enquiry on the Coca Leaf in order that they should be acquainted with the situation as regards the coca-leaf problem in that country.

C. SPECIAL NOTE ON PERU AND BOLIVIA

1. General remarks

Generally speaking, the habit of coca-leaf chewing is a complex problem which cannot be considered by itself but must be studied in close connexion with other factors and aspects of life in the regions where it is practised.

It has existed for many centuries and its exact origin has not yet been ascertained. It may be the result of a chronic deficiency in living conditions, especially diet, and also an illusory means of obtaining the physical energy required to struggle against a hostile natural environment. The hostility of the environment still persists today in large measure in the areas in which chewing is habitually practised. This explanation is fairly widely accepted but it is also true that from earliest times the habit of chewing the coca leaf may also have had sacred and religious significance, and still exercises an influence.

The economic system of the Incas prevented any shortage of food. The relative abundance of food at that time was only possible because of the planned collective nature of agricultural production—the Inca Empire being essentially agricultural. This abundance might explain why the coca leaf was not used to assuage hunger. Coca-leaf chewing by the upper classes cannot be explained on dietetic grounds. Even if chewing is assumed to have been a class privilege, the reason for this is still not clear. A religious explanation seems inadequate, as the right to chew the leaf was later granted fairly freely by the Inca for deeds and to persons in no way religious. The only remaining hypothesis is that the Incas appreciated the pleasurable and stimulating properties of the leaf. These advantages or pleasures were considered exceptional and only to be enjoyed as a privilege by those belonging to the ruling groups or others who had earned the privilege. It is quite possible that the privilege was not granted very frequently in the early days, but it is likely that, as in any period of decadence, privileges were granted much more frequently during the decadence of the Empire. This was probably facilitated by the dislocation of the hierarchical system inevitable in any civil war.

The fact is that from that time onwards coca-leaf chewing began to spread and later, under the colonial empire, increased still more, until it has now become almost general in certain areas of South America.

In the study of the effects of coca-leaf chewing, the following considerations should be taken into account:

(a) The geographical distribution of the areas in which chewing occurs;

(b) The social status of the groups. The term "social" must be interpreted widely;

(c) The relationship between chewing and altitude and between chewing and diet;

(d) Whether chewing can be abolished either entirely or partially.

These considerations refer to the factors which may to some extent be considered as causative of coca-leaf chewing. The present document merely indicates and explains them objectively. To determine the extent to which they should be considered as causative factors and what the effects of chewing are, is the task of the Commission of Enquiry according to its terms of reference. Each of the topics mentioned is considered separately.

2. Peru

(a) Geographical distribution of coca-leaf chewing

The areas of Peru in which coca-leaf chewing occurs are not precisely defined. This is due to the fact that:

(i) Even in the areas in which chewing may be regarded as generalized there are certain places where it is not practised; and

(ii) Inversely, in those areas or towns where chewing cannot be regarded as generalized, it is practised either constantly or temporarily by more or less isolated groups.

It should be added that in Peru, more than in Bolivia, the chewing areas and the producing areas tend to coincide.

Generally speaking, coca-leaf chewing takes place in the high plateau and forest regions but also in much lower regions. In the south, the Departments of Cuzco and Puno are the most important consumption centres; in the centre, Huancayo and Huancavelica; in the north, Chicama. Coca-leaf chewing occurs in the cities of Lima, Callao, Trujillo, Arequipa, etc., although the instances are more or less isolated.

The Secretariat has received no information from the Government of Peru on the annual consumption of coca leaves in that country. However, the following official list gives the annual figures for domestic consumption over a sixteen-year period.¹⁶

| Year | Kilogrammes | Year | Kilogrammes |
|-----------|-------------|-----------|-------------|
| 1930..... | 5,201,434 | 1939..... | 5,903,428 |
| 1931..... | 5,264,695 | 1940..... | 6,336,497 |
| 1932..... | 4,615,588 | 1941..... | 6,444,240 |
| 1933..... | 4,484,759 | 1942..... | 6,805,228 |
| 1934..... | 4,667,285 | 1943..... | 6,674,018 |
| 1935..... | 4,645,848 | 1944..... | 6,890,278 |
| 1936..... | 4,921,176 | 1945..... | 7,095,420 |
| 1937..... | 5,292,903 | 1946..... | 7,415,239 |
| 1938..... | 5,845,545 | | |

These figures show a steady rise in consumption up to and including 1946, with the exception of the period 1932-1936.¹⁷

The following table shows the figures for coca-leaf consumption and the regions in which it is consumed:¹⁸

The difference between the total figures shown by this table and the total in the preceding table may be explained by the methods of computation used for the year in question.

Lastly, according to Gutiérrez Noriega, the consumption of coca (for chewing only) has, according to official figures, continually increased until it has reached the figure of 8.5 million kilogrammes per annum, more than 5 million kilogrammes of this being consumed in the southern departments, 2.5 million

¹⁶ *Anuario Estadístico del Perú* (1946) Lima, Ministry of Finance and Commerce, Directorate-General of Statistics, 1948.

¹⁷ A very small quantity of coca leaf is used in the domestic preparation of infusions or coca tea. This amount, which is not easy to estimate, is probably included in the above figures. However it may be assumed not to exceed 10 per cent of the total consumption. The decrease in consumption in the period 1932-1936 has been explained as follows: The incidence of malaria increased in Peru at that time, decimating the population of the

COCA CONSUMPTION: 1943-1944

| Departments | Total metric tons (thousands) |
|--------------------|-------------------------------|
| <i>North</i> | |
| Tumbes | — |
| Piura | — |
| Lambayeque | — |
| Cajamarca | 0.5 |
| Libertad | 0.3 |
| Ancash | 0.5 |
| | 1.3 |
| <i>Centre</i> | |
| Lima-Callao | — |
| Huánuco | — |
| Junín | 0.6 |
| Huancavelica | 0.5 |
| Ayacucho | 0.7 |
| Ica | — |
| | 1.8 |
| <i>South</i> | |
| Arequipa | 0.3 |
| Moquegua | — |
| Tacna | — |
| Cuzco | 2.2 |
| Apurímac | 0.5 |
| Puno | 1.1 |
| | 4.1 |
| <i>East</i> | |
| Amazonas | 0.1 |
| San Martín | — |
| Loreto | — |
| Madre de Dios..... | — |
| | 0.1 |
| TOTAL | 7.3 |

kilogrammes in the hill departments of the north and the rest (about one million) in the coast and mountain departments. According to the above-mentioned author, the figures are not exact, as they are calculated upon the basis of the revenue from the tax upon coca, and it has been officially demonstrated that part of the coca produced escapes official control and taxation, and it is therefore certain that the real production and consumption of coca is in excess of the quantities mentioned above.

(b) Social condition of the population groups chewing coca leaf

With certain exceptions, chewing is prevalent amongst Indians who for the most part, but not exclusively, live in the Andean and hilly regions. On an occupational basis they may be classified in three main groups: agricultural workers, miners and other occupations.

It is not easy to establish the total number of coca-leaf chewers. Calculations based upon the quantity of coca leaf consumed daily by the chewer and the total number of leaves consumed could only be approximate, since the calculation would not take into consideration the various social, nutritional and other factors which have to be reckoned with. Further, there are certain discrepancies in respect of the quan-

valley of Concepción, the main production centre, and with it labour also decreased. As health conditions improved the production and consumption of the coca leaf increased. See "*Observaciones sobre el cocaísmo en un viaje al sur del Perú*", by Carlos Gutiérrez Noriega, in *Revista de Farmacología y Medicina Experimental* (Lima) No. 2, 1948.

¹⁸ Luis Rose Ugarte, *La situación alimenticia en el Perú* (The food situation in Peru), Lima, Ministry of Agriculture, 1945.

tity of coca leaf consumed daily by the chewer. According to some authorities, the average is 40 grammes, according to others 50 or even 80-90 grammes daily. Others put the average at 100 or between 50 and 150 grammes. Any estimates must distinguish between habitual addicts and occasional consumers. The individual's age, his physiological condition and so on must also be taken into account, together with the amount of alcohol he has absorbed, for the capacity to chew coca leaf apparently increases during the post-alcoholic period.

The foregoing shows the difficulties in the way of estimating the number of coca-leaf chewers. Calculations based on the total number of leaves consumed and those chewed by each person would be open to serious objection. Further, the quantity of leaves chewed also depends on the flavour of the leaves, that is to say, on their alkaloid content; on the chewer's financial circumstances; the price of coca leaf and so on.

For the amount of cocaine absorbed during coca chewing, reference should be made to the "Annotated bibliography on the effects of chewing the coca leaf".

Generally speaking, the Indian starts to chew coca leaf in childhood or adolescence. Women do the same although in smaller numbers and to a lesser degree.

The general living conditions of the native populations in America have been summarized as follows:

"The Indian is primarily an agricultural labourer, working for scanty wages and his productivity is very low. Other Indians work under various systems as independent workers . . . and are bound by various kinds of agreements under which they share the produce of their work with their employers, landlords, etc. . . . In addition to these two main groups, there are large numbers of Indians performing forced labour for little or no compensation . . . In Peru and Bolivia, the usual system is *hussipongo*, under which Indians are granted a piece of land off which they live and in return for which they work on the estates of their landlords. The system by which they are compelled to perform domestic service, particularly widespread in Peru and Bolivia, is called *ponguaeje* . . . These systems have been abolished by law, but are nevertheless still widely in force. Wages and other forms of remuneration are always miserably low . . . But the life of Indians is not only a question of adaptation to their surroundings. It is a life of hardship, struggle and suffering . . . Some 90 per cent of their dwellings are poor, defective and unsanitary . . . It is a well-established fact that the Indian's nutrition is inadequate . . . The Indian may satisfy his hunger but . . . he does not feed himself so as to strengthen his body . . . It is malnutrition that contributes to . . . alcoholism and addiction to drugs . . . The coca that is chewed, etc., in so far as they are used to give the Indians strength to perform their work, have the appalling significance of being heroic drugs taken with absurd but authentic heroism . . . The clothing of the Indians, particularly in Bolivia, Peru and Ecuador, is simple and poor . . . It is impossible to ignore the fact that the Indian peoples are at present at a low level of culture and civilization . . . More adequate nutrition would also contribute to wean the Indians away from fermented liquors . . . And although it is not reasonable to hope that their desire for alcohol, *chicha* and coca will disappear completely within a short space of time, measures should be taken to reduce the consumption of these poisons, which injure their health and aggravate all their problems . . ."

Upon a proposal by the Peruvian representative, the Conference of American States members of the International Labour Organisation (Santiago, Chile, January 1936) caused an inquiry to be made into the living and working conditions of Indians in Peru. Mr. Moisés Poblete Troncoso was entrusted with this study, and the following data are taken from his memorandum on the subject:

"The subject of the inquiry was the Indian . . . who, in principle, enjoys full citizenship rights in Peru . . . In practice, the Indian's total ignorance, his lack of general and civic education, his traditional fear of his employers and of the

authorities most closely in contact with them, almost completely nullify the benefits of the political rights guaranteed by the Constitution to all the inhabitants of the country . . ."

Further, in an examination of the Indian's position in agriculture, the author adds: "The position of the Indian workers on many of the large estates is practically that of slaves . . . The wages are insignificant . . . They are often paid in kind . . . Although under article 55 of the Constitution, *peonaje* (a form of labour undertaken in payment of debts or certain obligations entered into to meet needs in respect of food, accommodation, clothing and similar necessities) is prohibited, in practice *ponguaeje* and other forms of forced labour exist".

The report referred to also deals with working conditions in the mines and generally speaking reaches conclusions similar to those already described. The author criticizes "the lack of safety measures in the mines; the system of hiring or engaging Indian labour and the truck system". In many parts of the memorandum, express reference is made to alcoholism and coca:

"The Indian is not an habitual drunkard . . . He only drinks to excess on certain feast days . . . If drunkenness is widespread in some regions, this is partly due to the need to find artificial energy which the low wages cannot provide . . ."

As regards coca, the following comment is made:

"The inhabitants of the sierra and the miners use large quantities of coca which they say gives them strength and helps them to resist hunger, cold and altitude . . . All the health experts who have studied the use of coca amongst the Indians are in agreement as regards its harmful effects . . . Generally speaking, the Indian chews 100 grammes of coca daily . . . which is equivalent to 3.88 grammes of pure cocaine weekly . . . With this degree of intoxication the indigenous race is inevitably doomed to rapid degeneration . . . One method of protection would be to restrict the consumption of coca as far as possible, prohibiting or gradually reducing trade and sale, which should make it possible in a short time to stamp out the consumption of coca . . ."

When examining the problems peculiar to Peru, the author insists upon the need to prohibit or reduce the consumption of coca, it being "useful to restrict the retail sale of coca in order to protect the indigenous workers".

(c) *Relation between coca-leaf chewing, altitude, nutrition and labour*

The factors mentioned above are not only the ones which have been noted, but they appear to be the most important.

Altitude in itself is not a social factor, it is a geographical or physical factor which conditions other economic and social factors, particularly in the Andean and hilly regions chiefly inhabited by Indians. As regards nutrition, this is to a great extent determined by the physical environment and by the inadequacy of means of communication and transport. To this should be added certain social usages and customs; hygienic conditions; superstitions and beliefs; economic standards, etc.

As regards the nutrition of workers, a distinction has been made between three separate concepts: malnutrition, malnourishment and under-nourishment. The first is largely a medical term, referring to the state of precarious or ill health produced by malnourishment or under-nourishment. The second refers to the nature of the diet consumed, and here the quality and not the quantity is the determining factor. The third describes a condition caused both by the insufficient quantity and poor quality of the food. This condition occurs most frequently among the working classes.²² The problem of nutrition presents both economic and social aspects and is closely connected with problems of education, occupation, wages, agricultural production, food consumption, social legislation, methods for improving diet, etc.

²² The political constitution of Peru lays down a series of principles to be used as a basis for an Indian policy, particularly in part XI. The Peruvian Civil Code (part IV) recognizes the legal existence of the native communities.

²³ *Workers' Nutrition and Social Policy*, Geneva, International Labour Organisation, 1936.

²¹ Victor Gabriel Garces, *Living Conditions of the Indigenous Populations in American Countries*, Montreal, International Labour Office, 1946.

Chewing and altitude. From very early times various authors have established a more or less close connexion between the habit of chewing coca leaf and altitude. It has been stated that dwelling at certain altitudes necessitates the chewing of coca leaf in order to maintain life and ability to work. More recently a theory has been formulated that the peculiar physiological constitution of the Andean Indian justifies or at least explains the above-mentioned habit. It is added that this habit counteracts the fatigue caused by work at great altitudes.

The point of view which denies that the chewing of coca leaf is determined by altitude is based upon the following arguments:²²

(i) In other high populated regions of the world (particularly in Tibet), the altitude is greater, yet coca leaf, which might be cultivated or imported, is not chewed, nor are any other stimulants used;

(ii) In the high regions of the Peruvian sierra, coca-leaf chewing, though widespread, is not practised by all the inhabitants. There are groups which do not engage in chewing. There are also concrete cases where, by means of education, it has been possible to eradicate coca-leaf chewing amongst certain groups of Indians (for example, the Adventists at Puno; the Salcedo Farm of the Salesian Fathers, also at Puno; the "farms" of Yucaj and Quillabamba, etc.). More recently the case of Tupe, a village in the Lima Department at an altitude of 3,000 metres, has been reported, where there is an Indian ethnic group which does not chew coca;

(iii) White people living in the Andean or hill regions rarely chew coca leaf. In the case of half-breeds, the proportion of coca-leaf chewers is much smaller than among the Indian population;

(iv) The habit of coca-leaf chewing also occurs in Peruvian coastal regions, or regions near the coast, where the altitude is low (Checama region). It occurs in more isolated cases at Callao, Lima and other places practically at sea level;

(v) Historically the habit of chewing has existed in regions of low altitude. At present chewing appears to occur in certain regions of the Amazon where this physical factor is not present;

(vi) In the Andean or mountainous regions of Ecuador where coca-leaf chewing was formerly practised, the habit has practically disappeared in our own time;

(vii) The theory of the peculiar physiological constitution of the Andean Indian would not explain why: (a) Indians of the same ethnic group living in the same or similar places do not all chew coca; (b) if such a peculiarity existed, since it would be an adaptation to environment, coca-leaf chewing would be unnecessary;

(viii) Lastly, Indians who leave the high regions do not always give up coca-leaf chewing. Frequently they continue the habit, although living temporarily or permanently in low-lying regions.

It seems that, according to some investigations, altitude is not directly responsible for coca-leaf chewing. What happens is that as the altitude increases, the region becomes increasingly poor, and there is a corresponding decline in economic standards and in the possibilities of adequate nutrition. It is also said that this causes isolation. In this connexion the Urubamba Valley has been quoted as a case in which coca-leaf chewing increases in relation to altitude and in proportion as the level of agricultural wealth, and with it the standard of nutrition, declines. In accordance with these opinions the relationship appears to be: altitude—economic poverty—coca-leaf chewing.

²² Consult the annotated bibliography referred to previously.

²³ Chewing also takes place during work. The Lucre factories near Cuzco, and those of Huascar and Estrella at Cuzco itself,

Chewing and nutrition. Many writers hold that there is a close connexion between malnutrition and coca-leaf chewing. A frequent assertion is that the habit is practised to "kill hunger". According to recent research, certain regions of South America are among the areas where the greatest malnutrition exists. As regards Peru, it is said that the average standard of nutrition is very low. The lowest coefficients of nutrition occur in the sierras of the south and north. On the coast, nutrition, although inadequate, has slightly improved. According to recent publications, the number of calories consumed daily by the Andean Indian does not exceed 2,000. An official publication of the Peruvian Ministry of Agriculture states that the calory deficit *per capita* varies between 500 and 2,000 calories per day. To this should be added the climatic conditions of the Andean region. According to many authors, the calory deficiency explains, at least in part, the use that is made of alcohol and coca. According to Gutiérrez Noriega "coca-leaf chewing is started to appease hunger and an extraordinarily low food consumption is the eventual result of chewing . . . at first coca leaf is chewed because there is not enough to eat, and later the addict does not eat enough because he chews coca leaf" (*op. cit.*).

Chewing and labour. According to some opinions, coca-leaf chewing is necessary to perform certain types of hard work, particularly work such as that done by the Indians in the mines. It has also been stated that under the influence of coca the native works better and produces more.

According to other opinions, however, coca is not necessary for any type of work. Some native miners, though not many, work without chewing coca. As far as greater skill and output are concerned, both have been denied, and according to some opinions the output of coca-leaf chewers is much lower and the number of industrial accidents greater.²³

Can chewing be wholly or partly eradicated? The total or partial eradication of coca-leaf chewing has been considered essential to the protection of the indigenous population since colonial times, when this practice was considered by many as a vice.

Various attempts have been made to attain at least the gradual eradication of coca-leaf chewing, but up to the present no results have been obtained in the form of legislation. The voluminous legislation on the Indians of Peru contains no provisions referring to the prohibition or restriction of coca-leaf chewing. This is considered by the law solely for purposes of taxation, which is levied both by the Central Government and the Departments. Such taxes act chiefly as a deterrent to the trade in coca leaf.

The cases of more or less direct attempts to suppress coca-leaf chewing known to the Secretariat are as follows:

(i) Draft law to restrict the use of coca (29 November 1929).

Its author, Dr. C. A. Ricketts, then a Deputy, basing himself on the habitual use of coca and the fact that this use gave rise to a veritable intoxication which was a formidable obstacle in the way of restoring the indigenous races to their position in the life of the nation, proposed that the State, by creating a coca-leaf monopoly and other measures, should prevent the habitual use of coca.

The draft, although it was debated, never became law.

(ii) In 1934, after referring to the International Convention of 1931, the Health Council unanimously approved a report proposing the nationalization of the manufacture of cocaine and the establishment of the factories producing cocaine at Lima in order to facilitate government supervision.

are quoted as typical examples to show that coca chewing is unnecessary. In the first factory 90 per cent of the workers chew coca; in the latter two factories only 5 to 10 per cent. The result is that the work in the first factory is manifestly inferior to that in the other two.

(iii) Decree of 14 March 1936.

The preamble to this Decree stated that, since Peru was a party to the Convention of 1931 (Limitation of the Manufacture of Narcotic Drugs), and in view of the importance of the Peruvian coca industry and the imminence of a new international conference on the reduction and destruction of coca plantations, it was necessary to study the problems of coca.²⁴ To this end the Ministry of Public Health was entrusted with the study of these matters and a technical committee was established with the following tasks:

- (a) To collect the data requested by the League of Nations;
- (b) To prepare the defence of national interests at the future conference;
- (c) To revise and prepare legislation on coca; and
- (d) To suggest means of combating coca addiction.

The Secretariat has no information on the results of the work of this technical committee.

(iv) In 1939, Mr. Carlos E. Paz Soldán, Director of the Institute of Social Medicine, proposed the establishment of a National Coca Institute to study:

- (a) The agricultural problem in connexion with coca: production quotas and cultivation zones;
- (b) Establishment of a central cocaine factory;
- (c) The effects of coca-leaf chewing; and
- (d) Government intervention in respect of coca-leaf consumption, distribution etc.

(v) In 1947 the Peruvian Government asked the United Nations to send out the Commission of Enquiry for which the present document has been prepared.

(vi) At the same time as this request was made, in the autumn of 1947, Dr. Alberto Hurtado, then Minister of Public Health in Peru, asked for the technical assistance of the Public Health Service of the United States in investigating the effects of coca-leaf chewing. The investigation was to be directed by the Institute of Andean Biology of the Peruvian Faculty of Medicine.

The assistance requested was given as follows: Mr. Specht of the above-mentioned service was sent (February, March 1948) to ascertain the conditions under which the required help might be given. In accordance with Mr. Specht's recommendations, Mr. Barbella, the biochemist and his assistant, Mr. Yates, were sent for a period of eight months to study, in collaboration with the staff of the Institute of Andean Biology, the quantitative distribution of the alkaloids of the coca leaf in the process of chewing.

3. Bolivia

Generally speaking, the social condition of the Bolivian Indian in the Andean regions is similar to that of the Peruvian Indian as already described. Both belong essentially to the two great groups already mentioned: the Quichua and the Aymara. The history of the Bolivian Indian in general has been similar to that of the Peruvian Indian. It is perhaps worth noting that there is more extensive legislation in respect of the indigenous population in Peru than in Bolivia but as regards the chewing of coca leaf the characteristics and elements of the

problem are much the same.²⁵ For this reason the general remarks made in the comments on Peru may be regarded as equally applicable to Bolivia.

(a) Social conditions of the Indian worker

The living and working conditions of the Indians were studied and described by Messrs. Remberto Capriles and Gaston Arduz in 1941.²⁶ According to these authors, the labour conditions in the mines (the miners are almost all Indians), "although they have improved, are still very bad, worse than in the manufacturing industries; . . . as regards agriculture, the diet of the Indian land-worker addicted to coca-leaf chewing . . . is exceedingly poor".

In 1943 a Joint Bolivian-United States Labour Commission studied living and working conditions in Bolivia. According to this report:

" . . . the specific conditions found by the Commission in its visits to mines, *haciendas*, and factories should be judged against the background of the general standards of living prevailing in Bolivia. In terms of purchasing power, low wages are the rule rather than the exception. There is a widespread insufficiency of medical, dental, hospital and nursing care. There is an acute shortage of housing, and workers' homes generally are forlorn, overcrowded, unhygienic, and lacking in elementary sanitary facilities. This is true even in the principal cities".

" . . . the *haciendas* visited clearly established the widespread usage of a farm tenancy little short of feudal serfdom. In return for occupancy of a small section of land, tenants are forced to work for little or no cash wages, and live in small nondescript houses which they must build for themselves (this generalization is made with full recognition that in some progressive *haciendas* better conditions prevail). Medical care is not furnished free of charge and is generally unavailable even at reasonable cost. Educational opportunities are also lacking".

" . . . taking the mining industry as a whole, it may be said that the standard of living compares favourably with that of workers in rubber, agriculture and factories".

In respect of output the following statement is made:

"We reject the argument advanced in some quarters that the low productivity of Bolivian workers accounts fully for the low wages they generally receive and the bare subsistence level on which so many of them have to exist. This is probably a confusion of cause and effect. Granting that there is wide room for improvement in the productivity of Bolivian workers, this condition itself may be the result of a lowered vitality due to malnutrition and neglected bodily ills, and of a fatalistic feeling that their meagre existence is their inescapable lot and that of their children. Given a reasonable hope that effort on their part will better their lot and a reasonable opportunity to develop their innate capabilities, we do not doubt that Bolivian workers will respond to the normal human aspiration for a nice home and decent surroundings and a fair chance for their children".

With regard to coca, the following statement is made:

"A further factor that is claimed to have a bearing on nutritional deficiencies is the habit, so prevalent on the Altiplano, of chewing coca leaves. These leaves contain a small amount of cocaine and their chewing is claimed to deaden sensory nerves, quiet hunger pains, temporarily stimulate energy, increase the power of endurance, but to constitute a degenerating force that markedly reduces efficiency.

"There is much controversy as to whether the coca-chewing habit is the cause or the effect of improper nutrition—whether the worker chews coca to appease his hunger or whether the chewing of coca destroys his appetite. No study has ever been made to determine how deleterious to health this practice is.

²⁴ It is very probable that, in view of the date, the Decree refers to the fact that at that time the Advisory Committee on the Traffic in Opium and Other Dangerous Drugs was dealing with the problem of the limitation of raw materials used in the manufacture of narcotic drugs. In 1936 it was decided to study the limitation of opium and that of coca leaf separately. See chapter II of this document.

²⁵ The Bolivian Constitution protects the indigenous community. The First Indigenous Congress was held under the auspices of the Bolivian Government, from 10-15 May 1945, as a consequence of which a Decree was issued abolishing *pongueage* (personal and domestic work by Indians without remuneration).

²⁶ The first was then a senior official of the Ministry of Labour and the second Director-General of Social Research.

It appears clear to the Commission that this question has many ramifications that require study. It constitutes not only a physiological but a psychological problem. Moreover, the large acreage now devoted to the cultivation of coca makes it an economic problem as well. Until such time as an authoritative study is made of the effects of coca chewing, no recommendation can be made with respect to its control or regulation by taxation or otherwise".

More recently, at the Fourth Conference of the American States members of the International Labour Organisation (1949) it was stated, with reference to agricultural workers, that not less than 60 per cent of the workers in Bolivia received wages insufficient to enable them to obtain articles of prime necessity in the way of food.

The vital statistics expert representing Bolivia on the Pan-American Sanitary Bureau, speaking of the period 1944-1945, said:

"The remoteness of the various centres of population and the lack of means of communication, in addition to the deficient nutrition of the inhabitants and the unfavourable living conditions in general, alcoholism and the immoderate use of coca, etc. . . have created a very delicate situation for the Government as regards public health."

(b) Coca-leaf chewing areas

The geographical distribution of the coca-leaf chewing areas in Bolivia is very wide. Generally speaking, coca leaf is chewed throughout the plateau. The largest centres of consumption are in the departments of La Paz, Oruro and Potosí. In Oruro and Potosí are the large mining centres. Coca leaf is chewed even in the capitals of these departments. The reply of the Bolivian Government to the questionnaire on the coca leaf shows that this is consumed chiefly in the plateau and in the mining areas and that 99 per cent of the coca chewers are Indians. The minimum quantity of leaves used for chewing, in the period 1937-1946, was 1,619,951 kilogrammes in 1943 and 6,733,163 kilogrammes in 1937. As the Secretariat has pointed out, the data contained in the reply referred to quite possibly dealt only with the Department of La Paz, which contains the largest producing area.

Dr. Jorge Pardo Gutiérrez, Director General of Statistics in Bolivia says: "The coca leaf contains various alkaloids, the chief of which is cocaine," and he goes on to add:

"The Indian's physical strength and longevity are attributed to coca, but this is not statistically proved . . . coca stimulates the intelligence, but continual use of it entirely destroys that faculty."

(c) Attempts at restriction

Attempts to restrict the use of coca leaf have not been lacking in Bolivia. The following should be noted:

(i) In 1938 the question was raised whether or not to establish a coca monopoly, also whether it would be practicable to manufacture cocaine. Such a monopoly would (it was said) reduce the consumption of coca leaves by the Indians to 40 per cent, which "would result in the improvement of their health".

(ii) In 1941, the Bolivian Doctor Gregoria Montes Catacora submitted to the First National Medical Congress and the Fourth Pan American Red Cross Conference²⁷ a report stating that nearly 4,500,000 kilogrammes of coca leaves were consumed in Bolivia in 1938. On the assumption that one kilogramme of Bolivian coca contains two and a half grammes of cocaine, the quantity of cocaine consumed would be 11,000 kilogrammes.²⁸ The Doctor denied that coca would be used to take the place of food.

On the occasion of the Latin American Neuropsychiatric Congress, Dr. Emilio Fernandez Miranda, of Bolivia, asked in the name of the mental health of the Bolivian people:

²⁷ December 1940, Santiago de Chile.

²⁸ The quantity of cocaine required to meet world medical and scientific needs was only 2,400 kilogrammes in 1947.

(i) That the State should control the cultivation, production and sale of coca;

(ii) That the coca-growing industry should be confiscated;

(iii) That the consumption of coca leaf should be gradually limited; and

(iv) That the chewing of coca leaf should be declared harmful, since it contributed to the deterioration of the human personality.²⁹

Sources: (1) Annual Report of the Government of Colombia, 1946, 1947 and 1948. (These reports are required under article 21 of the International Convention of 1931.)

(2) *Anuario Estadístico del Perú, 1946*, Ministry of Finance and Commerce, Directorate General of Statistics, Lima, 1948.

(3) Luis Rose Ugarte, *La situación alimenticia en el Perú*, Lima, Ministry of Agriculture, 1948. The author was at that time head of the Economic Studies Division of the *Servicio Cooperativo Interamericano de Producción de Alimentos*.

(4) Carlos Gutiérrez Noriega, *El cocaísmo y la alimentación en el Perú*, publication of the Institute of Pharmacology and Therapeutics, Lima, 1948. (Scientific study of the problem based on official statistics and observations by the author himself.) Dr. Gutiérrez Noriega deals experimentally with the problem of coca addiction in Peru over a period of years, and has published many works on coca-leaf chewing and its effects (see annotated bibliography). He is Director of the Institute of Pharmacology and Therapeutics of the Lima Faculty of Medicine, where he has carried out interesting studies on coca-leaf chewing and its effects.

(5) Moisés Poblete Troncoso, *Condiciones de Vida y de Trabajo de la Población Indígena del Perú*, Geneva, International Labour Office, 1938. This is the result of a survey originating in a resolution approved by the Labour Conference of the American States members of the International Labour Organisation, held in Chile in 1936. At the request of the Peruvian representative, it was decided that a survey should be made and the ILO entrusted the task to Mr. Poblete Troncoso.

(6) Victor Gabriel Garces, *Living Conditions of the Indigenous Populations in American Countries*, Montreal, ILO, 1946. The author is the ILO representative in Ecuador. The pamphlet was published by the ILO in view of the importance of the subject.

(7) Political constitutions of Peru and Bolivia; Peruvian Civil Code.

(8) *Workers' Nutrition and Social Policy*, Geneva, ILO, 1936. A study on the problems of nutrition amongst workers. Contains interesting information on means to improve nutrition.

(9) *Nutrition. Final Report of the Mixed Committee of the League of Nations on the Relation of Nutrition to Health, Agriculture and Economic Policy*, Geneva, 1937. General study on the methods of improving nutrition; relation between agriculture and nutrition, etc.

(10) *World Food Survey 1946*, Washington, FAO, General considerations on the problem of world nutrition with special reference to South America.

(11) FAO, *Food and Agricultural Statistics*, vol. II, no. 3, 1949. Contains agricultural and nutritional statistics. No special reference is made to coca leaf.

(12) *Investigación sobre costumbres alimenticias en las zonas rurales del Perú*, Lima, Ministry of Agriculture, 1945.

(13) *La coca peruana y su futuro régimen político*. Collective report of the Health Council. Published in *La Reforma Médica* (Lima), no. 180, February 1934.

(14) Dr. Carlos E. Paz Soldán, "Luchemos contra la esclavitud del cocaísmo indígena", *La Reforma Médica* (Lima), no. 209, January 1939.

(15) Dr. Carlos A. Ricketts, *La Coca, Problema de Prevención Social*, Arequipa, 1948.

²⁹ Emilio Fernandez Miranda, "La cocamanía en Bolivia", *La Reforma Médica*, Lima, February 1945.

(16) *For a Healthier World*, vol. I, no. 2, April 1949. Published by the Public Health Service of the United States, Washington, D. C. Contains data on the assistance given by the Public Health Service of the United States to the Peruvian Government in investigating the effects of coca-leaf chewing.

(17) *Condiciones de vida y de trabajo de las poblaciones indígenas de América Latina*, Report II, Fourth Conference of the American States members of the International Labour Organisation, Montevideo, 1949, Geneva, ILO, 1949.

(18) *Condiciones de empleo de los trabajadores agrícolas*, *idem*, ILO, 1949.

(19) Emilio Guiffardi, "Dosis de alcaloides que ingieren los habituados a la coca. Nuevas observaciones," *Revista de Farmacología y Medicina Experimental* (Lima), no. 2, 1948.

(20) (Report of the Mission of Experts for the Reorganization of the Narcotics Administration in Peru) Technical Assistance to Governments, United Nations, 1948.

(21) Carlos Gutiérrez Noriega, "Observaciones sobre el cocaísmo obtenidas en un viaje al sur del Perú," *Revista de Farmacología y Medicina Experimental* (Lima), no. 2, 1948.

(22) R. Capriles and G. Arduz, *El problema social en Bolivia. Condiciones de vida y trabajo*, La Paz, 1941. The study refers to a mission of the ILO in 1940. The authors collaborated as Bolivian representatives on this mission.

(23) *Labour Problems in Bolivia* (Report of the Joint Bolivian-United States Labour Commission), Montreal, ILO, 1943. This Commission was established at the request of the Bolivian Government.

(24) S. Hubert E. Navarro, *La Sanidad en Bolivia*. The author, an expert on vital statistics, represented Bolivia on the Pan American Sanitary Bureau. Bulletin of the Pan American Sanitary Bureau (Washington, D. C.), September 1946.

(25) H. Fossati, *Reflexiones sobre la organización del monopolio de la coca* (La Paz), 5 May 1918.

(26) Emilio Fernández Miranda, "La cocamaña en Bolivia", *La Reforma Médica* (Lima), February 1945.

(27) Document E/CN.7/110 and addenda. Replies of Bolivia, Colombia and Chile to the questionnaire on coca leaf.

(28) The Second Inter-American Indian Congress on Indigenous Affairs 1949 recommended to countries where the coca-leaf problem exists, that they should immediately appoint commissions which, together with the United Nations Commission, should form a permanent committee for the complete study of the problem. This committee should be constituted as soon as possible.

As soon as the committee reaches its conclusions, it should hold an extraordinary meeting of the countries affected by this problem and the measures recommended should be taken at once.

The same Congress, through its Biology Section, made the following statement:

"The Biology Section of the Second Inter-American Indian Congress condemns any notion of physical and intellectual degeneration of the indigenous races, and recognizes that they are in possession of their full powers and of normal ability to adopt themselves to modern life".

V. Coca-leaf production

A. PRODUCER COUNTRIES

According to the Secretariat's information, the following countries should be considered as producers of coca leaf: Peru, Bolivia, Colombia and Indonesia. For the latter, information

is available only up to 1940. For practical purposes, Ecuador is not considered as a producer country.

In India, coca-leaf cultivation has been a government monopoly since 1930. Up to December 1948 no cultivation had taken place. Coca-leaf production has been prohibited in China and Japan since 1945. In Chile the Government states that the coca leaf is not cultivated. In Brazil there must be a certain amount of production, in view of the information concerning the practice of chewing in certain areas. In Venezuela production must be very small, if it exists at all. No reply to the questionnaire on the coca leaf sent out in December 1947 has been received from Argentina.

For these reasons, Bolivia, Colombia and Peru must be considered as the main coca-leaf producers.³¹ Each of these countries has different characteristics:

Peru: producer, consumer, exporter of coca leaf, manufacturer of crude cocaine;

Bolivia: producer, consumer, exporter of coca leaf;

Colombia: producer and consumer of coca leaf.

Coca leaf is used for the following purposes:

(1) Chewing;

(2) The manufacture of crude cocaine, cocaine and other alkaloids;

(3) The preparation of certain beverages after extraction of the alkaloids;

(4) Medical preparations;

(5) Domestic use: tea, coca-leaf infusion.

Colombia produced 225,000 kilogrammes in 1946, 210,000 of which were for chewing and 20,000 for other purposes.

Under Decree 1472 of 1947, in view of the serious difficulties involved in the application of article 4 of Decree 896 of that year, all new coca plantations were prohibited under penalty of destruction and a fine convertible into a prison sentence.

In its reply to the questionnaire, the Government of Colombia stated that the coca shrub is not scientifically cultivated in Colombia but grows wild. This statement is difficult to reconcile with the above-mentioned legislation (destruction and prohibition of new plantations) and the protests from growers, as well as other details concerning sowing, harvesting, etc., contained in the Secretariat's working material. Perhaps the term "scientifically" was meant to indicate that coca leaf was not cultivated scientifically. Generally speaking, wild coca shrubs are considered to be the exception and are poor in alkaloids.

B. PERU

1. Coca-leaf production

(a) Quantity

Peru's coca-leaf production is the largest in the world. No definite official data upon it exist as Peru has not furnished the relevant information. In a communication addressed to the Permanent Central Board in 1947 the Peruvian Government stated that it was impossible to calculate, even approximately, the total coca-leaf production.³²

The following table provides data, although incomplete, on coca-leaf production and its value.

³¹ Indonesia produced 141,354 kilogrammes in 1940.

³² See extract from this communication in the 1947 report of the Permanent Central Board, pages 17-18.

³⁰ For a study of the coca leaf from the botanical, chemical and other aspects, see document E/CN.7/W.34.

COCA

Area cultivated, production and value, 1943-1944²⁸
(Figures in thousands)

| Department | Area (Hec- tares) | (Per cent) | Production (Metric tons) | (Per cent) | Value (Soles) |
|-----------------|-------------------------|---------------|--------------------------------|---------------|------------------|
| <i>North</i> | | | | | |
| Tumbes | - | - | - | - | - |
| Piura | - | - | - | - | - |
| Lambayeque ... | - | - | - | - | - |
| Cajamarca | 0.8 | 5 | 0.5 | 6 | 815 |
| Libertad | 2.0 | 12 | 1.0 | 12 | 1,740 |
| TOTAL | 2.8 | 17 | 1.5 | 18 | 2,555 |
| <i>Centre</i> | | | | | |
| Lima-Callao ... | - | - | - | - | - |
| Huánuco | 3.4 | 20 | 1.7 | 20 | 2,720 |
| Junín | 0.2 | 1 | 0.1 | 1 | 160 |
| Huancavelica .. | - | - | - | - | - |
| Ayacucho | 2.0 | 12 | 1.0 | 12 | 1,500 |
| Ica | - | - | - | - | - |
| TOTAL | 5.6 | 33 | 2.8 | 33 | 4,380 |
| <i>South</i> | | | | | |
| Arequipa | - | - | - | - | - |
| Moquegua | - | - | - | - | - |
| Tacna | - | - | - | - | - |
| Cuzco | 8.0 | 47 | 4.0 | 46 | 6,400 |
| Apurímac | - | - | - | - | - |
| Puno | 0.4 | 2 | 8.2 | 2 | 340 |
| TOTAL | 8.4 | 49 | 4.2 | 48 | 6,740 |
| <i>East</i> | | | | | |
| Amazonas | 0.2 | 1 | 0.1 | 1 | 165 |
| San Martín.... | - | - | - | - | - |
| Loreto | - | - | - | - | - |
| Madre de Dios. | - | - | - | - | - |
| TOTAL | 0.2 | 1 | 0.1 | 1 | 165 |
| GRAND TOTAL | 17.0 | 100 | 8.6 | 100 | 13,840 |

In the light of this table, 8,600,000 kilogrammes is a minimum figure. Production must have increased annually since 1944 in view of the steady increase in the consumption of coca leaf (see chapter IV, section C, 2, Peru). Further, it seems impossible to regard the official production figures as complete even in respect of the areas of cultivation to which they relate. The possibility that part of the production is not subject to any form of control must also be taken into account.

The production of coca leaf in 1949 might be estimated approximately on the basis of the following assumptions:

(i) That beginning in 1943, the average annual increase of the consumption of coca leaf can be estimated at 240,000 kilogrammes;

(ii) That the quantities of coca leaf used in 1947, 1948 and 1949 for the manufacture of crude cocaine are not less than those used in 1946; and

(iii) That the figures for the export of coca leaf in the three years mentioned are higher than the 1946 figures.

From these assumptions it can be concluded that in 1949 the total production of coca leaves will be not less than 9,500,000 kilogrammes. In this figure the quantities of coca leaf for which no statistics are available are not taken into account, including such substantial items as:

²⁸ Luis Rose Ugarte: *La situación alimenticia en el Perú*, Lima, Ministry of Agriculture, 1945.

(i) Leaves supplied to Indians, especially Indians working in coca plantations, as part of their wages. This practice continues in spite of legal regulations to the contrary;

(ii) Coca leaf used for illicit manufacture of crude cocaine and cocaine.

(b) *Producing areas*

According to estimates, again approximate, the most important are in the Departments of Cuzco (47 per cent), Huánuco (20 per cent), Libertad (12 per cent), Ayacucho (12 per cent) and Cajamarca (5 per cent). Generally speaking, the coca-chewing areas coincide with the producing areas (see chapter IV). Nevertheless, there are exceptions; one of the most important consuming areas, Puno, accounts for only 2 per cent of the total production of coca leaf. This can be explained by:

(1) The high altitude of the Department of Puno which restricts the cultivation of coca to a few valleys;

(ii) The influence of altitude on the economy of the Department. The percentage of foods of animal origin in Puno is lower than in any of the southern Andean departments.²⁹

(iii) Educational and health factors, etc., in the Department.

In Cuzco, the most important centre of production is the Concepción Valley where more than 3,000 tons are produced annually. Production is considerable in the valleys of Lares and Cotabamba, also in Cuzco.

(c) *Economic importance of revenue from coca leaf*

The foregoing table provides data—albeit incomplete—on the economic value of coca leaf in 1943-1944. On the basis of the table and information furnished by its author, the following comparative table can be drawn up.

| PERU 1943-1944 | |
|---|------------------------|
| Total cultivated area..... | Hectares 1,487,000 |
| Total area under coca..... | 17,000 |
| Total volume of agricultural and stock-raising production | Tons 3,265,000 |
| Coca leaf | 8,600 |
| Value of agricultural and stock-raising production | Soles 1,532,000,000 |
| Value of coca leaf (approximate)..... | 14,000,000 |

On the basis of an official publication of the Ministry of Finance and Commerce of Peru it is also possible to give the following comparison:

| 1944 | |
|---|----------------------|
| Total revenue | Soles 410,118,770 |
| Central revenue from coca leaf (under 0.9 per cent) | 349,141 |

| 1945 | |
|---|-------------|
| Total revenue | 434,816,953 |
| Central revenue from coca leaf (under 0.9 per cent) | 341,671 |

According to information furnished to the United Nations Mission instructed to study the reorganization of the narcotics administration in Peru, the figures for revenue in 1945 and 1946 were:

| 1945 | |
|----------------------|------------------|
| Central taxes | Soles 709,542 |
| Regional taxes | 1,072,000 |

| 1946 | |
|----------------------|-----------|
| Central taxes | 742,000 |
| Regional taxes | 1,129,000 |

More specifically, the value in United States dollars of coca leaf exported to the United States of America in 1946 was \$108,231.³⁰

²⁹ As regards foods of vegetable origin, it is fourth of the six southern departments.

³⁰ Complete information for the period 1937-1946 in *Medicinal Plants*, Pan American Union, Washington, D. C., 1948.

(d) *Legal position of coca leaf*

(i) *Internal:*

In Peru there is no limitation of the production of coca leaves. Their cultivation would seem to be free. As indicated above (chapter IV) the law deals only with the imposition of central or regional taxes on coca leaves.³⁶

(ii) *International: Geneva Convention of 1925:*

Chapter II. Article 3 lays down that the Parties shall limit the number of towns, ports or other localities through which coca leaves are imported or exported.

In Peru the ports of Callao (Lima), Salaverry (in the north) and Mollendo (in the south) are used; Puno (Lake Titicaca) on the Bolivian frontier is also used.³⁷

Chapter V. The system of import and export certificates applies to coca leaf.

Chapter VI. Under article 21 the Parties are required to send annually to the Permanent Central Board estimates of the quantities of coca leaves to be imported for internal consumption for medical, scientific and other purposes.

Under article 22 the Parties are required to send to the Permanent Central Board as complete and accurate statistics as possible, showing the production of coca leaves, stocks of coca leaves, consumption of coca leaves and amounts confiscated in the illicit traffic. Quarterly statistics have also to be supplied on the imports and exports of coca leaves.

Peru is not a party to the 1925 Convention but applies the provisions of chapter V of the Convention which relates to the system of import and export certificates.

2. *Production of crude cocaine and cocaine*

The production of crude cocaine and cocaine is discussed here because of the close connexion between it and the problem of the limitation of the production and the control of coca leaf.

Refined cocaine is also manufactured in Peru in the laboratory of the general supply service of the Ministry of Public Health to satisfy the country's medical and scientific needs. In a letter to the Secretary-General dated 23 October 1947, Peru notified its intention of manufacturing cocaine hydrochloride for export. Hitherto only crude cocaine had been exported.

(a) *Manufacture*

Peru is the largest producer and exporter of crude cocaine in the world.

In 1948 there were eight factories in Peru licensed to manufacture crude cocaine; it would seem that in fact only five of them can be regarded as active. All are primitive and are situated at a considerable distance from Lima.³⁸

According to information supplied to the Permanent Central Board, Peru used 185,663 kilogrammes of coca leaves in 1946 in the manufacture of 1,153 kilogrammes of crude cocaine. It is a point worth noting that some of the crude cocaine factories have their own coca plantations and that the area cultivated and therefore the production of coca leaves can be increased without previous Government authorization (see the reference to Decree Law No. 11005 below).

³⁶ See extract from communication sent by Government of Peru in 1947 to the Permanent Central Board, quoted above.

³⁷ According to the report of the United Nations Mission (page 22), at Salaverry, bales of coca leaf were being embarked without inspection.

³⁸ For fuller information see the report of the United Nations Mission previously referred to.

(b) *Legal position*

(i) *Internal:*

According to the report of the United Nations Mission for the reorganization of the narcotics administration in Peru, there was in practice no effective control of the manufacture of crude cocaine in Peru.

As regards coca leaves, under article 2 (c) of the recent Decree Law No. 11005 of 28 March 1949 the cultivation and production of coca leaves constitute the offence of illicit traffic when the leaves are cultivated or produced by private individuals for the purpose of obtaining narcotic drugs.³⁹ Under this clause, the cultivation and production of coca leaves are punishable only if there is intent to obtain narcotic drugs.

(ii) *International:*

Peru is a party to the 1931 Convention for limiting and controlling the manufacture of narcotic drugs.

Under article 1 of the Convention, the term "drugs" denotes any drugs which are partly or completely manufactured. Crude cocaine is therefore a drug subject to the provisions of the Convention and to those provisions of the 1925 Convention which are to be regarded as complementary.⁴⁰

All the provisions of the 1931 Convention applicable to drugs in Group 1, Sub-Group (a) of the article are applicable to crude cocaine.

For information regarding Peru's fulfilment of her obligations under the international conventions on narcotic drugs, reference should be made to the reports of the Permanent Central Board, and in particular to the reports for 1947 and 1948 annexed to this document. To date, no annual report has been received from Peru under article 21 of the 1931 Convention.

(c) *Illicit traffic*

Since 1947 the world illicit traffic in cocaine has increased considerably. This increase was due to the appearance of Peruvian cocaine on the legal market. During its recent session, the Commission on Narcotic Drugs examined the item on its agenda regarding the illicit traffic in Peru. It was then stated that there were eight licensed and ten unlicensed cocaine factories in Peru, with a total annual production of 5,000 kilogrammes of cocaine, which was more than three times the amount—estimated at approximately 1,500 kilogrammes annually—required for the medical and scientific needs of the whole world. The representative of Peru stated that two illicit factories had been closed and arrests had been made. He added that his Government had recently promulgated two new decrees, the texts of which are annexed to this document, in order to stamp out the illicit traffic in Peru.⁴¹

C. BOLIVIA

Coca-leaf production

(a) *Amount*

In its reply to the questionnaire, the Government of Bolivia reported its production of coca leaves in 1946 as 2,976,817 kilogrammes. This figure relates only to the Department of La Paz which includes the provinces of the North and South Yungas, the main centres of production in Bolivia.

According to the *Yearbook of Agricultural and Stock-raising Statistics* published by the Directorate-General of Statistics, coca production in the Yungas amounted to 7,335,880 kilo-

³⁹ See document E/CN.7/170.

⁴⁰ The 1925 Convention refers to crude cocaine directly in article 1 and article 4 and indirectly in all the articles referring to article 4, notably article 22 under which statistical information is required to be furnished.

⁴¹ See report of the fourth session of the Commission on Narcotic Drugs, document E/1361.

grammes in 1938, the area under coca being estimated at 17,465 hectares. In its reply to the questionnaire, the Government of Bolivia reported 7,125,900 kilogrammes as the figure for the same year. According to the reply, the area under coca in the Yungas has been considerably reduced. It is not known whether this reduction is due to the replacement of coca by other crops.

According to Pardo Gutiérrez, the Director-General of Statistics of Bolivia, the position as regards the total production of coca leaf is as follows:

"It is difficult to establish the amount produced in Bolivia. Whereas the Ministry of Agriculture calculated an average of 2,700 tons for the period 1920-1925, the estimate of the Directorate-General of Statistics was 6,200 tons for the period 1938-1942. The difference is probably due to the fact that the first source took into account only the coca produced in the Department of La Paz and actually marketed, since there was no means of calculating the production of other departments or the amount consumed in centres of production.

"The estimated production in the two periods mentioned were:

| Ministry of Agriculture | | Directorate-General of Statistics | |
|-------------------------|-------|-----------------------------------|-------|
| | Tons | | Tons |
| 1920..... | 2,981 | 1937-38..... | 7,336 |
| 1921..... | 3,033 | 1938-39..... | 7,850 |
| 1922..... | 2,945 | 1939-40..... | 5,069 |
| 1923..... | 2,415 | 1940-41..... | 4,973 |
| 1924..... | 2,429 | 1941-42..... | 5,817 |
| 1925..... | 2,544 | | |

"Hence, and taking into consideration also the figures for sales effected by each of the producing areas through the Coca Customs Offices of La Paz and Cochabamba, we can state that the Bolivian coca production amounted on an average to 5,500 tons a year, distributed as follows:

| | Tons | Per cent |
|----------------|--------------|------------|
| La Paz..... | 4,900 | 89 |
| Cochabamba .. | 550 | 100 |
| Santa Cruz.... | 50 | 1 |
| TOTAL | 5,500 | 100 |

"The only coca with an export market is that produced in the Department of La Paz. The volume of its production can also be judged from the following figures which show the movement of internal trade from the various provinces to the city of La Paz, for both the national and international markets; this trade is controlled by the Coca Customs Office.

| | Tons | | Tons |
|-----------|-------|-----------|--------------------------|
| 1925..... | 2,355 | | |
| 1926..... | 3,440 | 1937..... | no information available |
| 1927..... | 3,672 | 1938..... | no information available |
| 1928..... | 3,421 | 1939..... | no information available |
| 1929..... | 3,309 | 1940..... | no information available |
| 1930..... | 3,067 | 1941..... | no information available |
| 1931..... | 3,283 | 1942..... | 3,839 |
| 1932..... | 2,852 | 1943..... | 3,643 |
| 1933..... | 3,392 | 1944..... | 3,727 |
| 1934..... | 3,177 | 1945..... | 3,455 |
| 1935..... | 3,140 | | |
| 1936..... | 2,677 | | |

⁴³ It should be pointed out that by Supreme Decree of 24 May 1946, a statistical service was established in Bolivia to control agricultural production by means of a general register of agricultural production. The register is kept by the Directorate-

"In spite of the closing of the Chilean markets, it is safe to say that this has had no great effect on Bolivian exports which show a marked upward tendency; the export figures for 1930 and 1944 are the largest in the history of the Bolivian coca trade, as can be seen from the following figures:

| | Tons | | Tons |
|-----------|-------|-----------|-------|
| 1910..... | 196.5 | 1928..... | 398.3 |
| 1911..... | 252.3 | 1929..... | 432.3 |
| 1912..... | 385.8 | 1930..... | 446.7 |
| 1913..... | 352.1 | 1931..... | 406.4 |
| 1914..... | 347.7 | 1932..... | 347.0 |
| 1915..... | 389.9 | 1933..... | 336.1 |
| 1916..... | 331.9 | 1934..... | 305.2 |
| 1917..... | 362.5 | 1935..... | 340.2 |
| 1918..... | 355.2 | 1936..... | 402.1 |
| 1919..... | 413.1 | 1937..... | 393.7 |
| 1920..... | 365.3 | 1938..... | 392.7 |
| 1921..... | 373.4 | 1939..... | 406.3 |
| 1922..... | 315.1 | 1940..... | 402.7 |
| 1923..... | 342.6 | 1941..... | 347.3 |
| 1924..... | 376.0 | 1942..... | 399.2 |
| 1925..... | 388.8 | 1943..... | 380.5 |
| 1926..... | 438.3 | 1944..... | 444.1 |
| 1927..... | 369.5 | 1945..... | 417.2 |

Comparison of the production figures for La Paz furnished by the Government with those supplied by Pardo Gutiérrez will show certain discrepancies between the amounts reported. The differences are considerably less and in fact the figures almost coincide if the two sets of figures for exports are compared. The differences between the production figures can be explained by the fact that it is impossible to obtain exact figures for the area under cultivation and for production of coca leaf. Only approximate figures are available. Exports, by contrast, are always more readily determined, since as a rule all exports require prior authorization. In Bolivia the export of coca leaf is subject to the system of certificates established by the 1925 Convention.

There are also certain differences regarding production, if the figures given by the Government of Bolivia in its reply to the questionnaire on coca leaf are compared with those published by the Coca Customs Office of the Department of La Paz. In 1945, for example, the difference is 160,000 kilogrammes in a single producing district. A difference of this order might be explained by the fact that the Coca Customs Office bases itself on the coca leaves which have passed through its hands and on which the tax is paid, while the figure given by the Government does not mention this fact. It should, however, be pointed out that according to the reply to the questionnaire there is no land register of rural properties in the Yungas and the only source of information on production is therefore the Coca Customs Office.⁴⁴ According to Pardo Otero's estimates, production in the Department of La Paz in 1942 should be put at 4,900,000 kilogrammes. The lack of any land register, despite the decrees mentioned, results in some confusion and discrepancies in the figures for the production of coca leaves.

According to the Agriculture and Conservation Office of the Pan American Union, one hectare of coca produces approximately 500 kilogrammes of dried leaves annually. On the assumption of this yield, the production of coca leaves in the Department of La Paz would, taking the areas under cultivation in 1945 and 1946 to be as reported by the Government of Bolivia, amount to 3,828,000 and 3,544,000 kilogrammes, respectively. The reply to the questionnaire gives the figures as 3,215,619 and 2,976,817 kilogrammes, respectively. The discrepancy might be explained by the fact that the figures furnished by the Government relate to coca leaves which have been harvested and on which tax was paid on passing through the Coca Customs Office. The conclusion would be that the production of coca leaf cannot be accurately ascertained under this system.

General of Rural Economy of the Ministry of Agriculture. Registration is compulsory and must be carried out within a period of six months under penalty of a fine. The Supreme Decree was supplemented by a Decree of 20 December 1946 which extended the registration period to 30 June 1947. See *Annuaire international de législation agricole*, Rome, 1948.

According to the reply to the questionnaire, the coca produced in the Yungas provinces has not been classified botanically, and does not contain cocaine. The publication of the Agriculture and Conservation Office of the Pan American Union, referred to above, states that Yungas coca belongs to the botanical species *Erythoxylon coca* and contains cocaine.

In its reply to the questionnaire on the coca leaf, the Government of Bolivia states:

- (i) That no attempt has been made to replace coca by other crops;⁴³
- (ii) That coca is an indispensable element in the subsistence of the agricultural and mine workers;
- (iii) That coca does not produce degeneration.

More recently, in a letter published in the La Paz Press, the Society of Landowners of the Yungas, to which the leading coca-leaf producers belong,⁴⁴ made public a copy of a letter addressed to the Minister of Foreign Affairs of Bolivia; its contents may be summarized as follows:

- (i) Coca produces beneficial results. Its nutritive effects have been demonstrated by the chemical analysis made by the Food Research Laboratory, Long Island City, at the request of the Bolivian Ambassador in Washington. According to the analysis, Bolivian coca leaf, unlike the coca leaf of other countries, contains satisfactory quantities of vitamins A, B1, B2, H and E. Its cocaine content is very low and therefore the common belief in its prejudicial effects is erroneous;
- (ii) The Government is accordingly requested to take the necessary steps internationally:

- (a) To protect the production of and trade in coca leaves;
- (b) To secure the exclusion of coca from any list of narcotic drugs established by the United Nations.

The letter was published on 3 February 1948. On 6 March 1948, a contract was signed with Argentina under which Bolivia may export 500,000 kilogrammes of coca leaf annually to Argentina (see (c) below).

It is reported that it is intended in Bolivia to send samples of coca leaf to some of Bolivia's diplomatic missions abroad so that further analysis should be carried out in various countries to confirm the ones already done. The purpose would be to exclude the coca leaf from all international drug lists.

The question whether or not the coca leaf contains vitamins has been examined and discussed by certain researchers (see annotated bibliography). In any case, as has been pointed out, the letter published by the Society of Landowners of the Yungas does not contain any reference to vitamin proportions. According to Balcázar (see annotated bibliography) it remains to be proved that the vitamin content annuls or counterbalances the cocaine which according to him does exist in the coca leaf produced in Bolivia.

(b) *Producing areas*

The Government of Bolivia's reply to the questionnaire deals only with the Yungas provinces near La Paz. More particular information can be gathered from the statistics published by the Coca Customs Office of La Paz.⁴⁵ According to these statistics coca is grown in parts of the provinces of (arranged in order of importance): North Yungas, South Yungas, Inquisivi, Caupolicán, and Muñecas.

The most easily accessible provinces are North and South Yungas.

⁴³ For the purposes of limitation and the consequent crop substitution, it would be extremely useful to know why the cultivation of more than 10,000 hectares of coca leaf was discontinued between 1938 and 1946.

⁴⁴ There is also a Bolivian Coca Producers' Corporation at La Paz. Its formation was authorized by the Government. See document E/CN.7/110, page 15.

⁴⁵ There is another Coca Customs Office in Cochabamba.

On the basis of total annual production figures of 5,500 tons for the period 1938-1942,⁴⁶ Pardo Gutiérrez gives the following geographical distribution of production:

| LA PAZ | Tons | COCHABAMBA | Tons |
|------------------|-------------|-------------------|-----------|
| North Yungas.... | 2,500 | Chapare | |
| South Yungas.... | 2,000 | (Todos Santos, | |
| Inquisivi | 200 | Empiritu Santo, | |
| Caupolicán | 150 | Coreni Palmer) .. | 300 |
| Zongo | 25 | Carrasco (Totora, | |
| Muñecas | 25 | San Antonio y | |
| Larecaja | 10 | Pojo) | 150 |
| | | Arani (Vandiola y | |
| | | Tiraque) | 100 |
| | TOTAL 4,900 | | TOTAL 550 |

| SANTA CRUZ | Tons |
|-------------------|----------|
| Cercado | 25 |
| Sara | 15 |
| Vallegrande | 10 |
| | TOTAL 50 |

(c) *Economic importance of revenue from coca leaf*

The value of the taxes collected on coca leaf for the period 1942-1946 (North and South Yungas) can be obtained from the information given by the Government of Bolivia in its reply to the questionnaire on the coca leaf. The amount collected does not differ essentially from the figures published by the Coca Customs Office. The total taxes and the price of coca have gradually increased. The taxes collected amounted to approximately 16 million bolivianos in 1942 and to more than 25 million in 1946. The price rose from 27 bolivianos a kilo in 1942 to more than 50 bolivianos in 1946.

The amount of taxes collected in other departments is unknown to the Secretariat.

Bolivia exports almost exclusively to Argentina.⁴⁷ The value of these exports rose from approximately 13 million bolivianos in 1937 to approximately 19 million in 1946.

On 6 March 1948, a five-year contract (to 31 December 1952) was signed by the Bolivian Coca Producers' Corporation and the Argentine Institute for the Promotion of Trade (an agency of the Argentine Government). Under the contract Bolivia will export to Argentina 500,000 kilogrammes of coca leaf annually at a rate of not more than 40,000 kilogrammes a month. The contract was approved by the Bolivian and Argentine Governments. The contract was concluded under chapter I, article 2, of the Protocol on the Interchange of Products, additional to the Treaty of Economic, Financial and Cultural Co-operation concluded between the two countries on 26 March 1947.

According to the statistics of the Coca Customs Office, the tax on coca accounted for approximately 80 per cent of all taxes collected on agricultural products in the above-mentioned areas of the Department of La Paz.

The Society of Landowners of the Yungas, in its letter to the Ministry of Foreign Affairs, emphasized the economic importance of coca growing. Coca (it is argued) provides foreign currency and the revenue obtained from it is used to improve communications and to maintain the University of La Paz. As regards the last point, it should be mentioned that in the distribution of taxes on coca for 1943, 1944 and 1945, only the figures for 1945 contain an item of 59,244.14 bolivianos for this object.

⁴⁶ This figure coincides with the figure given by the representative of Bolivia during the discussions on coca leaf at the 1925 Conference at Geneva.

⁴⁷ For further information see document E/CN.7/110, page 9.

(d) *Legal position*

(i) *Internal:*

The production of and trade in coca is free. Both are subject only to the taxes already mentioned. There is no system of licences and no registration of coca cultivation.

(ii) *International:*

Bolivia has been a party to the 1925 Convention since 15 April 1932, with the following reservations:

"1. Bolivia does not undertake to restrict the home cultivation or production of coca, or to prohibit the use of coca leaves by the native population;

"2. The exportation of coca leaves shall be subject to control by the Bolivian Government by means of export certificates;

"3. The Government of Bolivia designates the following as places from which coca may be exported: Villazon, Yacuiba, Antofagasta, Arica and Mollendo."

The only report received from Bolivia was for 1943.

(e) *Production of crude cocaine and cocaine*

At the time of writing, neither crude cocaine nor cocaine is manufactured in Bolivia. It has, however, been reported that Bolivia is prepared to ratify the 1931 Convention, possibly this year, which would enable the country to manufacture crude cocaine or cocaine, subject to the international limitations.

D. LIMITATION AND CONTROL OF PRODUCTION AND DISTRIBUTION OF COCA LEAF

The limitation of raw materials used in the manufacture of narcotic drugs is one of the points expressly mentioned in the resolutions of the Commission on Narcotic Drugs and the Economic and Social Council which instruct the Secretariat to undertake the preparatory work for the unification of all the international instruments on narcotic drugs.

At present there is no limitation of the production of coca leaf. The only restrictive provisions, relating not to production but to the maintenance of stocks of leaves, are contained in articles 16 and 17 of the 1931 Convention which prescribe certain limits on the stocks of coca leaves which manufacturers may possess for the manufacture of cocaine.

The title of chapter II of the 1925 Convention refers to the control of coca leaves but the matter is not taken up in article 2 which is concerned solely with opium. The result is that there is no provision in the 1925 Convention requiring parties to the Convention to enact measures to control the production, distribution and export of coca leaves. In the Hague Convention of 1912, to which both Bolivia and Peru are parties, coca leaves do not form the subject of any provision. The only reference to coca leaves is in article 8 (definition of cocaine).

The only limitation established by article 3 of the 1925 Convention is that the parties are required to limit the localities through which the export or import of coca leaves is permitted.

It would seem that in the limitation of the production of coca leaves, account should be taken of the peculiar characteristics of coca, the uses for which it is intended and the effects of coca chewing. As regards the effects of coca chewing, the findings of the Commission of Enquiry are bound to have a decisive bearing on the framing of measures for the limitation of the production of coca leaf.

Whatever the Commission's findings may be, a distinction between the different uses for which coca leaves are intended seems to be desirable. A distinction between leaves used for chewing and those intended for the manufacture of crude cocaine or for export for the manufacture of cocaine would seem in any case to be essential.

The cultivation and distribution of coca leaves for chewing requires the control of their production and distribution; their cultivation and distribution for the manufacture of narcotic drugs requires in addition the limitation of their production in accordance with the principle that world medical and scientific needs only should be satisfied, and subject to the consideration that other countries are also producing coca leaves for those needs. The absence of any distinction between leaves intended for chewing and leaves intended for the manufacture of narcotic drugs is perhaps one of the principal factors in the inordinate increase in the production of coca leaves and in the increase of the illicit traffic in cocaine.

In the study of the possibility of limiting and controlling the production of coca leaves, it would seem advisable also to take into account the facts of the present position of coca production. These may be summarized as follows:

(1) The problem of coca chewing is complex and has social and economic aspects different from those presented by the problem of the limitation of the production of coca leaves as raw material for the manufacture of narcotic drugs.

(2) The production and hence the consumption and export of coca leaves has increased considerably during recent years, especially in Peru. It is not easy to establish whether the increase is due to an increase of population and therefore of the number of chewers, or to the use of more leaves for the licit or illicit manufacture of cocaine. The two explanations are in any case not mutually exclusive.

(3) The production and consumption of coca leaves is not subject to restriction or control of any kind. This explains the fact that for the same period different and in any case incomplete figures for production and consumption are reported by the different services of the same Government. The fact is that at present it is impossible to obtain more or less accurate figures. The only source of information is that furnished by the statistics of coca taxes collected. This information is in itself necessarily incomplete.

(4) The economic value of coca leaves has two different but inter-related aspects—central or departmental revenue obtained from coca taxes, and the financial returns to private traders from the production of and trade in coca.

As regards the first aspect, the available information suggests that from the fiscal point of view coca is more important in Bolivia than in Peru.

In Bolivia the fiscal importance of the coca leaf is confined chiefly to the Department of La Paz, the revenue being derived not from its total production but from the taxes on the agricultural production of the provinces mentioned.

Nor is it easy to establish exact figures for the financial returns accruing to private traders from the production of and trade in coca leaves. In the case of Bolivia, on the basis of information supplied by the Bolivian Government in its reply to the questionnaire, it can be concluded that the total income from coca leaves produced by the Department of La Paz in 1946 was: domestic market, 120 million bolivianos; export, 19 million bolivianos; total 139 million bolivianos.

Various items must be deducted from this income including the cost of production and transport and other expenditures which cannot be estimated. In any case, any estimate of such income must make allowances for:

(a) The low level of wages in Bolivia; and

(b) The fact that wages are paid at least partly in coca leaves.

On the assumption of a total production of 5,500 tons, the financial returns accruing to individuals would be: domestic market, 258,500,000 bolivianos; export, 19,000,000 bolivianos; total 277,500,000 bolivianos.

(5) The possibility of replacing coca by other crops. In this connexion, the Commission on Narcotic Drugs has said, *inter alia*, that the Commission of Enquiry will examine the possibility of crop substitution.⁴⁸

(6) Finally, if the present inquiry proves the harmful effects of chewing, the factors described in the five preceding paragraphs should, it would seem, be considered and evaluated in the light of that conclusion.

As for Peru, the economic value to private individuals of the trade in coca leaves can only be determined approximately owing to the difficulties already mentioned and the difference in price between Huánuco coca (210 soles a quintal of 46 kilos in 1946) and Trujillo coca (150 to 160 soles). On the basis of an intermediate price of 180 soles and the figure for leaves consumed during the year as given by the Government of Peru, the value in the domestic market would be approximately 29 million soles.

Sources:

1. Luis Rose Ugarte, *La situación alimenticia en el Perú*, cited in chapter IV.

2. *Anuario Estadístico del Perú, 1946*. Lima, Ministry of Finance and Trade.

3. *Annual Report of the Government of Colombia, 1947 and 1948*.

4. Document E/CN.7/110 and addenda; E/1361, etc.

5. *Report of the Permanent Central Board, 1947 and 1948*.

6. Report on the reorganization of the narcotics administration in Peru, previously referred to.

7. *Annuaire international de législation agricole, XXXVI*, Rome, Institut International d'Agriculture, 1948.

8. *La industria y comercio de la coca en Bolivia, Boletín Comercial* (La Paz), no. 484, June 1948.

9. Jorge Pardo Gutiérrez, *Bolivia y el Mundo*, cited in chapter IV.

10. Remberto Capriles y Gastón Arduz, *El Problema social en Bolivia, idem*.

11. *Medicinal Plants*, Washington, D. C., Pan American Union, 1948.

12. *Estadística General de la extracción de productos agrícolas y recaudación de impuestos, 1943, 1944 and 1945*, Coca Customs Office, La Paz.

13. *Ultima Hora* (La Paz), 3 February 1948, which published the letter dealt with in this chapter.

14. *La Razón* (La Paz), 6 March 1948, which published the text of the Argentine-Bolivian contract considered in this chapter.

15. Miscellaneous sources.

VI. Suggestions for a possible plan of work

A. GENERAL

Any plan of work will be conditioned by:

(1) The time which the Commission of Enquiry is given to carry out its work; and

(2) The manner in which the mission decides to work.

⁴⁸ In general terms it can be said that in regions where coca leaf is grown coffee, cocoa, copal, various fruits and vegetables, tobacco, etc., are also grown. The coca plant grows at altitudes of 500-2,000 metres where the rainfall is between 100 and 375 centimetres a year and the average temperature varies between 15 and 19 degrees (without great seasonal variations).

As regards (1) there are two possibilities:

(a) To visit Peru and Bolivia or Bolivia and Peru in turn. Two methods of work are possible:

(i) The Commission may carry out its inquiry as a group, or

(ii) The Commission may divide into two sub-groups, one administrative and the other technical, when circumstances so require.

(b) The Commission may work simultaneously in Peru and Bolivia. This implies the division of the Commission into two groups, one medical and the other administrative, which will visit the countries in turn.

B. SPECIAL QUESTIONS

1. Powers of the Commission of Enquiry

(a) The Commission on Narcotic Drugs considered that the Commission of Enquiry should hear, among other evidence, any evidence which might be given by representatives of labour, agriculture and industry. As the terms of reference are quite wide, the Commission of Enquiry is also empowered to hear any persons or institutions it may deem necessary because of their scientific work on the Commission's topic of inquiry. In Peru, such work has been done in the Lima Institute of Pharmacology and Therapeutics by its Director, Dr. Carlos Gutiérrez Noriega and a group of research workers; there is also the Institute of Andean Biology directed by Dr. Carlos Monge.

It is not known whether similar institutions in Bolivia have studied the effects of coca chewing. In connexion with the question of the possible limitation of production, mention should be made of the Society of Landowners of the Yungas and the Coca Producers' Corporation.

(b) In view of the offers of assistance made by the representatives of Peru and Bolivia, the Commission of Enquiry will be able to apply to the Governments concerned for any assistance or co-operation it deems necessary to carry out its mission.

2. Local staff

Within the limits of the funds made available to it by the United Nations and by the Governments concerned the Commission can make use of local staff where required. The need for interpreters for Quichua and Aymara is important in this connexion.

3. Transport

In view of the regions to be visited, transport and accommodation will not always be easy or convenient. In the case of both transport and accommodation the co-operation of central and departmental authorities will be invaluable.

C. ITINERARY

The establishment of the itinerary depends to a great extent on the factors mentioned in A and B, above.

In the fixing of any itinerary, it should be remembered that for the purpose of studying the effects of coca chewing and factors which may contribute to this habit, visits must be made to:

(1) Coca-chewing areas on the plateau and in the uplands;

(2) Non-coca-chewing localities on the plateau and in the uplands;

(3) Coca-chewing localities in the coastal areas or lowlands.

Peru

For the present the following localities are suggested:

(1) *Coca-chewing areas*

In the north: Chicama and Huayas area;

In the centre: Lima, Callao, Tupe, Huancayo and Huanconvelica;

In the south: Puno and Cuzco.

(2) *Producing areas*

In the north: Libertad and Cajamarca;

In the centre: Huánuco and Ayacucho;

In the south: Cuzco.

The coca-chewing and coca-producing regions mentioned coincide or are in any case in close proximity.

Bolivia

(1) *Coca-chewing areas*

(a) *Plateau*: La Paz and the surrounding plateau; Oruro, especially the mining centre of Catavi; Potosí, especially the mining centre surrounding Cerro Rico in Potosí. Quechisla and Pulacayo are important mining centres.

(b) *Mountain*: Cochabamba.

(c) *Lowlands*: Santa Cruz and Vallegrande.

(2) *Coca-producing areas*

The most important are:

Department of La Paz: North and South Yungas, Inquisivi and Caupolicán.

Department of Cochabamba: Todos Santos, Espíritu Santo, Corani, Palmer and San José.

ANNEX II

Annotated Bibliography on the Effects of chewing the Coca Leaf

by

Pablo Oswaldo Wolff, M.D., Ph.D., with the assistance of the Narcotics Division, Department of Social Affairs of the United Nations

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Introduction

The opinions quoted in this bibliography have been divided into two main groups, those which consider the effects of coca-chewing to be harmful and those which do not consider them to be harmful. Each of these groups has, in turn, been divided into two sub-groups, one containing medical opinions and the other non-medical opinions. These sub-divisions, as well as the two main groups indicated above, should be regarded as having a certain elasticity, in view of the difficulties inherent in any work of classification and sub-classification, particularly in the present case.

The general limits of this bibliographical study are indicated by its title: it is a bibliographical compendium of the effects, harmful or otherwise, of the chewing of the coca leaf. The coca leaf, however, is not used for chewing only; it is put to other and different purposes which have had to be taken into account, within certain limits, as being related to the main problem of coca chewing. These other matters are dealt with in an appendix which should be regarded as a supplement to the two main parts on the effects of chewing the coca leaf.

This document is probably the first attempt ever made to present a general annotated bibliography on the effects of coca-leaf chewing. Apart from its inherent difficulties the task was further complicated by the fact that the copious bibliography on the subject is frequently scattered among publications of very varied character which it has not always been easy to consult. Our aim has been to submit as complete a bibliography as possible on the matter under investigation, without attempting to make it an exhaustive one.

The opinions are reproduced verbatim between quotation marks. In many cases these opinions are supplemented by summaries of other considerations advanced by the authors in connexion with the problem. This method has also been used in cases where it was not felt that the opinion need actually be quoted. Similarly, in many cases, a brief note on the author or publication consulted has been added. Dr. P. O. Wolff's notes are essentially explanatory and are always given in square brackets, with his initials.

As an aid to the understanding of certain local terms used by coca chewers, a glossary of those most frequently employed is given below. Certain of these terms, while not referring directly to acts, usages or things connected with the habit of chewing coca leaf, are nevertheless closely related to the habit.

Note. The Commission of Enquiry on the Coca Leaf was engaged on its mission in Peru and Bolivia from 3 September to 3 December 1949. In conformity with its terms of reference, it is to submit its report to the Commission on Narcotic Drugs of the Economic and Social Council.

Vocabulary

Acullico: Quantity of coca leaves, previously stripped of stalks and leaf skeleton. The small handful of leaves is placed in the mouth, where after prolonged mastication it takes the form of a small ball.

Cal: Oxide of lime, obtained from calcined limestone, shells, etc., introduced into the *acullico* when it is in the mouth.

Chacchar: To masticate the *acullico*.

Coca: Generic term used to designate coca leaf intended for mastication. Also used to denote the plant itself.

Cocada: Period during which the coca is masticated. (See *acullico*.)

Cocalero: Owner of *cocales* (coca plantations).

Cocales: Coca plantations.

Coquear: To chew coca leaf, generally mixed with the *cal* or some similar product.

Coqueo: Coca-leaf chewing.

Coquero: A person who chews coca leaf.

Jacchu: Residue of the coca leaf, discarded at the end of each *cocada*.

Llicta, llipta, llujta, llukta: Some of the various terms employed for the alkaline ashes of varying origin which are mixed with the *acullico*.

Mambe: Same as above (Colombia).

Mambeada: Equivalent of *cocada* (Colombia).

Mambear: See *coquear* (Colombia).

Picchar: See *coquear*.

Piccho: The ball of leaves formed in the mouth.

Puna: Generic term designating the whole or certain parts of the high plateau. Since the altitude often brings a certain discomfort and even disorders to persons unaccustomed to it, the term *apunado* is used to indicate such states.

Soroche: Sickness caused by the altitude.

Tocra: See *Ilipta*.

Yungas: Narrow valleys full of vegetation, with a humid climate and often difficult of access or survey, found in the Andean region, particularly in Bolivia, round La Paz and Cochabamba. Their altitude varies between 1,000 and 2,500 metres, and the crops cultivated include, among other products, coca leaf.

PART ONE

Publications stressing the harmful effects of chewing the coca leaf

I. MEDICAL OPINIONS

(1) ALIAGA SUÁREZ, HÉCTOR

"*El Problema de la Alimentación en Bolivia*" (The problem of Nutrition in Bolivia). *Revista de Ciencias Médicas* (Cochabamba), 2, 1941, to 5, 1943.

In this long work the author, at that time chief of the National Department of Nutrition (Ministry of Health and Hygiene) at La Paz (Bolivia) makes a survey of nutrition in Bolivia, including the nutrition of the Indians inhabiting the *puna* (Bolivian plateau or meseta). The author says this region covers one-fifth of the total area of the country. It is more than 3,600 metres above sea level. There is also the so-called *puna brava*, more than 4,780 metres above sea level, where the mining areas are situated. The climate of the *puna* is very trying; the mean annual temperatures range from 12° to 6° C. Winds blow all day, changing their direction at night. On warm days the wind creates dust columns. The humidity fluctuates according to the more or less abundant rainfall (hail or snow). These indications show how difficult living conditions are in these regions.

In his thorough analysis of the diet of the Indians, the author says: "after coca, which the Indians consume regularly, the most striking factor to us is that essentially their food is cold". In the tables showing the "distribution of food according to the time of day", coca appears on the same terms as food items. In the author's opinion, coca "does not constitute a food as is believed or speciously argued by persons interested in the trade in these 'miraculous leaves'" (in capital letters in the original).

The author goes on to explain that "the Indians use coca at their daily meals in order to avoid intestinal colic, meteorism, acidity and the various gastro-intestinal disturbances from which they suffer owing to their mainly carbohydrate and completely cold diet, but they do so quite unwittingly and guided only by the instinct of self-preservation".

"The *llujia* which they prepare from ashes obtained from pigweed stalks and roots" contains 46 per cent ash and 39 per cent organic substances and thus possibly has some nutritional value [but of very minor importance quantitatively.—P.O.W.] The malnutrition of the Indians is also shown by the fact that "the cereals, especially barley and pigweed, together with coca, cause constipation among the Indians, producing a high incidence of Andean native megacolon, amounting to as much as 80 per cent. The death-rate from intestinal occlusion is also high".

"Coca and alcohol, both stimulants, are two signs clearly showing the defective dietary of our Indians."

"I deduce that coca is a necessity in the Indians' diet, simply in order to avoid the various ailments produced by their stale and cold food providing an abundance of carbohydrates."

The coca-leaf chewing habit of the miners is discussed in another chapter. The author stresses the fact that "in spite of the existence of laws protecting them, the miners are the most neglected of all the workers covered by social legislation.

Their life is one constant effort with no opportunity for happiness". "While they are down in the mine tunnels *they chew nothing but coca*" (that statement is capitalized in the original) but also when they are outside the mines "the stipulations concerning adequate diet corresponding to the intensity of their work . . . are nothing but a myth". "Accordingly, the mine-worker is forced to compensate for those nutritional deficiencies by the soothing action of the coca leaf (which makes him the greatest ruminant in the Andes and necessarily an alcoholic)." The life-span of the miner is "limited by the biological law of nitrogenous metabolism and the cheating of his organism by coca-leaf chewing, which in the end shortens his existence". In Bolivia, the author states, "coca and alcohol are destroying the very backbone of our social organism. The time has come to defend it with radical and drastic measures; self-interest must give way to the collective national interest or to the interest of the State".

"It is generally believed in Bolivia that coca provides a valuable food element. Moreover, there are some students who consider it to be a condiment. Both these opinions are serious errors.

"The consumption of coca in our country is not only a custom but an unhealthy habit of our working masses which reaches its extreme among the miners." They chew a much greater daily quantity than the Indians of the *puna*, for example. Moreover, "it is worthy of mention that workers in the coca-producing regions do not chew the leaf as one might be led to believe".

There is a characteristic change in appearance and in conduct between the young and the adult Indian. "In general, during his childhood, the Indian is gay, lively and communicative, yet on reaching adult age his mentality becomes dull, a change which, it is believed, is due to the action of the coca leaf. Although the coca leaf is the primary factor, yet there are other important factors which influence our race: (1) feelings of inferiority; (2) sexual precocity; (3) perpetual state of hunger through the ages (deficient diets, coca and alcohol)."

"This daily coca-leaf chewing over a period of many centuries since the subjugation of the Kollas¹ has undermined our indigenous races biologically, and this inveterate custom has become the greatest obstacle to the practice of liberty and the material and intellectual progress of our country."

The author refutes the idea that coca leaf is an important food element because of its vitamin content (on that point see No. 97).

2. ARGENTINA

Report of the Health Service of the Fifth Division of the Argentine Army on an educational mission in 1924.

This report contains the following: "Mention should also be made of another condition of the population because, even though it does not represent a state of constitutional illness, it is produced nevertheless by an intoxication which we might describe as chronic, caused by the use and abuse of the vice

¹ Indians of that region.

of coca-leaf chewing, which for the population of the valleys and of these Andean uplands is a traditional system of nourishment and finally produces anaesthesia of the stomach and thereby pleasantly prolongs periods of fasting.

"If, to the lack of proper nourishment in this inhospitable region, we add the weakness caused by the coca-chewing vice with all its consequences, physiological destitution and tuberculosis, it is conceivable that by a slow process of exhaustion this indigenous race is being irresistibly brought to almost complete extermination.

"The slowness of their movements, the innate indolence which is their natural heritage and dominates them, the indifference and resigned expression which they assume are also the result of the chronic, permanent intoxication to which they are subject. It is the duty of our authorities out of kindness to the indigenous population and for reasons of humanity to adopt measures in the near future to counteract this way of life of the Indian which constitutes a loss to the nation of so much energy. It will be essential to obtain for them a supplementary element that without injuring the body will gradually take the place of the ancient practice of coca-leaf chewing which has become second nature to them." (Textually quoted by Giménez; see No. 15.)

3. ARGENTINA

Debates in the Chamber of Deputies and the Senate of the Province of Salta, Argentina (1942 to 1943). Extracts from the Official Journal.

In connexion with the discussions concerning an increase in the tax on the consumption of coca, one of the deputies, Chairman of the Budget and Finance Commission, referred to the fact that coca is "considered to be harmful to health" and that therefore the increase in the tax was to be recommended. In the Senate, members—with no medical qualifications—expressed the most divergent opinions, but only in very general terms, referring to traditions, isolated observations in the rural districts and so forth. One of the senators, expressing a favourable opinion of the effects of the coca leaf, confessed that he himself was a coca-chewer. In complete contrast with that opinion, another senator, who was a dental surgeon, insisted that "the tax on coca should be so high as to be prohibitive in view of the deplorable effect of the coca leaf on human health". He went on to say: "We see the evil effects of cocaine on the rural worker" [he was referring to the use of coca.—P.O.W.] "Our rural regions abound with degenerates, reduced to that condition by the use of coca. The disastrous effect of coca is shown by the high percentage of citizens unfit for military service; the figures are shameful amounting to about 60 per cent . . . If we encourage the consumption of coca, we shall go downhill at such a rate that we shall soon have a race incapable of work."

Another senator referred to the opinion of Doctor C. A. Alvarado, who in his hospital service never observed symptoms of abstinence and added that "in our opinion the use of coca produces physiological effects which are still not clearly explained". He then quoted the findings of Doctor Ortelli of Salta, who in 1933 "submitted to the National Conference on Social Service organized by the Ministry of External Affairs at Salta a documented work calling for steps against the coca vice". Doctor Ortelli, who was then a senator and a medical practitioner with long local experience, referred to the "definite sensation of danger which I experienced on seeing a number of sick persons . . . who brought home to me the ravages produced by coca". He added that the sums spent on coca imported from Bolivia into Salta would suffice to buy large quantities of meat and bread for the people. "The disturbances are most serious on the mental and psychological plane, and I have seen young persons of great promise destroy all their spiritual activities and impulses through the use of coca . . . Looking at two workers, one can readily distinguish between the chewer and the non-chewer. One is an automaton, while the other is a conscientious worker . . . In Bolivia, those whom

we esteem are not chewers . . . and it may be said that before the advent of coca or alcohol at our frontier, our gauchos were strong and intelligent men . . . It has been said that it is impossible to cross the mountains without using coca. That is just a local fable." He adds that the worker spends almost half of his monthly pay on coca and alcohol, thus "reducing by so much the percentage which he should spend on his own food and that of his family". Later on, Doctor Ortelli referred to a murder case in which one of the suspects, deprived by the police of his leaves, after a period of agitation and insomnia, confessed his crime and the complicity of another suspect on receiving a promise that his bag of coca leaves would be returned to him.

4. ARGENTINA

Resolution of the Society of Forensic Medicine and Toxicology concerning coca-chewing, Buenos Aires (Meeting of 24 November 1948).

"The Society of Forensic Medicine and Toxicology of Buenos Aires, at a time when the United Nations is considering the effects of coca-leaf chewing on the inhabitants of certain regions of Latin America, declares that in its opinion it is erroneous to say that chewing coca leaf is useful and almost essential to life and work in the Andean uplands. Medical observations have repeatedly shown that white inhabitants of those high altitudes, with very few exceptions, and also some of the Indians—in particular the better educated Indians—do not chew coca, with the result that they fulfil their tasks much more efficiently and conscientiously. It is recognized that coca chewing is a very deep-rooted custom among the Indians of the Andes; nevertheless, that historic fact does not prevent us from affirming its harmful effects. The daily chewing of coca leaves in the amounts habitually consumed leads to chronic intoxication, which greatly contributes to the physical and mental degeneration of the Indian race. The ultimate ideal goal should be the suppression of this habit; nevertheless, it would be prudent and practical to adopt a gradual procedure accompanied by a decided improvement in the general living conditions of the aboriginal populations."

(5) BALCÁZAR, JUAN MANUEL

"Coca y Cocomanía" (Coca and coca addiction). *Archivos Bolivianos de Higiene Mental*, 1, No. 2, 45-51, 1945.

The author, a former Minister of Health and Hygiene, now a professor of Hygiene in the Faculty of Medicine at the University of La Paz, states that coca "was used in medicine in pre-colonial times and continues to be used at the present time in the teaching of medicine. The leaves and stems are used for vaporization, fomentations, poultices and infusions for the cure of gastralgia, various types of neuralgia, paralysis, gastro-intestinal disorders, etc." He adds that "coca-leaf chewing is a veritable art", which he describes in great detail. "In spite of all the proposals to restrict its use and cultivation, coca consumption is constantly growing. The Government sent large quantities of coca to the theatre of operations during the Chaco campaign, and commercial undertakings maintain an abundant supply of coca in their stores for their own convenience—in order to attract workers—and also in pursuance of statutory provisions."

The author relates that "the amount of cocaine absorbed daily by a native is equal to 39 centigrammes on the assumption that he consumes only 50 grammes of coca leaf. The daily dose of 39 centigrammes which is increased with habit is sufficient to maintain a state of chronic intoxication which inhibits mental and physical functions." According to the author, if *liipta* (alkaline ashes) is added, a double quantity of cocaine is absorbed. Even admitting that only one-half or one-third of the cocaine is absorbed, "intoxication is still inevitable" because that quantity is much higher than the amounts laid down in the pharmacopoeias as the toxic limit.

"The native who does not consume coca is keener, more intelligent and of a happier disposition; he is more willing to

work, more vigorous and has greater resistance to disease. He is more inclined to join in the progressive movements of the country . . . The coca addict is abulic, apathetic, lazy, insensitive to his environment; his intelligence is clouded and with the passage of time he becomes an automaton; his emotional reactions are infrequent and violent, like those of all chronically intoxicated persons. He is morally and intellectually anaesthetized, a social subjugate and almost a slave."

The author stresses the fact that "there is no evidence that the use of coca confers greater resistance on the organism". On the contrary, "the greatest consumers of coca—the inhabitants of coca-producing regions (Yungas, Caupolicán, etc.)—have the least resistance to disease."

"Some owners of coca plantations who previously advocated the use of coca have become convinced of the necessity of limiting its use through a State monopoly or by replacing the cultivation of coca by other products: coffee, fruit trees, etc."

The author concludes with the statement that "85 per cent of the production is consumed within the country". Such a consumption means the intoxication of the working classes; it maintains "at least two-thirds of the national population in a state of intellectual poverty and physical prostration".

(6) BALCÁZAR, JUAN MANUEL

"Coca y Cocaína" (Coca and cocaine). *La Razón* (La Paz, Bolivia, 13 February 1948.)

The author, who has already been quoted (see No. 5), refers to certain publications according to which the nutritional qualities of coca leaf are superior to its narcotic qualities. The United Nations is at present investigating coca leaf at the request of the Government of Peru, with the support of the Government of Bolivia. If the analyses had shown that the percentage of cocaine in the Bolivian coca leaf was small, it would have been inexcusable to submit the matter to the United Nations. "No occasion was more propitious for dispelling doubt. Whether the quantity of cocaine contained in coca leaf is large or small, there is one fact which brooks no denial and is final: cocaine is a narcotic drug, and its consumption must be forcibly limited to protect public health."

"If Bolivian coca really contained only a small quantity of cocaine, the degree of toxicity would depend on the greater or lesser amount of individual consumption. This is the question which must first of all be answered: Is the quantity consumed by the Bolivian worker toxic or not? Daily observation leads us to reply in the affirmative. Our workers, particularly the miners and rural workers, are coca addicts . . . At a conservative estimate, a native consumes 50 grammes a day, or 39 centigrammes of cocaine . . . a toxic dose according to therapeutics and toxicology. Even if our coca chewers absorbed only half (19.5 centigrammes) or one-third (13 centigrammes), and supposing that our coca contained only a minute quantity of cocaine, slow intoxication would be bound to result. It is laid down in the pharmacopoeia that the toxic limit is 3 centigrammes of cocaine . . . These conclusions admit no argument. Our coca, like all others, is poisonous . . . If it is true—as it certainly is—that coca contains vitamins, . . . it should be made public . . . coca could solve many problems, but only on condition, and this is essential, that its toxic effects (that is to say the cocaine) are eliminated."

(7) BALCÁZAR, JUAN MANUEL

"Más sobre coca y cocaína" (More about coca and cocaine). *La Razón* (La Paz, Bolivia), 21 February 1948.

The author refers to the comments to which his preceding article (see No. 6 above) gave rise. He mentions the fact that analysis carried out in the United States, showing the vitamin content of coca leaf, has been made public . . . He adds: "But this was not the main purpose in writing the earlier article . . . We threw doubt on the phrase 'minute quantity of cocaine'. This is the very essence of the matter, and it is on this point that we must insist. Simply to state vaguely that the

Bolivian coca leaf contains a 'minute quantity of cocaine' smacks of vacillation and timidity. It is not a technical, categorical conclusion. What is this amount and why does the laboratory which made the analysis not express it in figures? . . . Is it of any advantage to our national economy to assert, for reasons of patriotism or local sentiment, quite without proof, that our coca is not a narcotic? . . . Bolivia was unable, or did not wish at the time, to submit analyses proving its nutritive qualities . . . We cannot go on groping in the dark in defence of both arguments". The author closes with a reference to the United Nations Commission of Enquiry which will be able to fix standards for the toxicity of the coca leaf.

(8) BEJARANO, JORGE

"El cocaísmo en Colombia" (Coca addiction in Colombia). *Boletín del Instituto Internacional Americano de Protección a la Infancia* 19, 243-255. *Boletín de la Oficina Sanitaria Panamericana* 24, 303-310; 1945. (See also No. 10.)²

The author, Professor of Hygiene in the Faculty of Medicine at Bogotá, and Deputy Director of the Pan American Health Office, refers in this communication to the National Academy of Medicine of Bogotá, to a report from Dr. Gerardo Bonilla Irigorri (see No. 10), a high health official in the Department of Cauca, "on the vice of coca chewing, which is widespread today among the natives in the Departments of Cauca and Huila, and is not only not limited to them but seems to be spreading at an alarming rate among the rural population . . ."

According to the author, the origin of the vice among the natives of Bolivia, Peru, Ecuador and Colombia "was perhaps simply a desire to preserve the race. They led lives of perpetual hardship, subject to continual strain and limitless fatigue; their trade across the Andes continually forced them to bear on their shoulders heavy loads that their beasts of burden could not carry, and thus they were induced instinctively to seek for a substance which would replace food, appease hunger and stave off the cold; all this they thought they had found in the coca leaf, which seemed to be a heart stimulant at high altitudes, to mitigate hunger and to produce a sensation of euphoria once the alkaloid was set free. Today, the coca-chewing habit is maintained in all its force simply through tradition", although in "certain regions . . . wages and working conditions have improved. This should have induced their Governments to make an effort to free the race from the age-old vice which will undoubtedly mean their extermination, unless steps are taken in time."

When under the influence of coca, "the individual has an agreeable sensation of happiness and well-being. Respiration is more ample; the nervous and cardiac stimulus increases; the muscles appear to acquire greater strength; the eyes become brighter and everything seems to indicate a better inclination for work. This explains why the Indian feels that he has, as it were, fallen a prey to a great uneasiness: he goes about his duties, takes up his tools, the machete in particular, and attacks his work with an enthusiasm that is almost frenzied", so that "in these circumstances he may constitute a danger to his fellow workers at his side, . . . which probably explains the very frequent accidents to which coca chewers and their fellow workers are subject . . . This euphoria and optimism border on megalomania." When the effect wears off, the Indian "re-awakens to the misery and wretchedness of his daily life . . . A new *mambeada* revives the first illusion of happiness induced early in the morning, and thus the vice perpetuates itself indefinitely."

"Coca-chewing finally becomes a habit like morphine to the morphine addict . . . and since the vice or addiction starts very early in life, between seven and eight years of age, it is easy to imagine the physical development of a human being subject to an artificial stimulus which makes food seem quite unnecessary."

² This article also appeared in *América Indígena*, Vol. V, No. 1. Mexico, January 1945, pp. 10-20.

"This explains why the Indians addicted to coca-chewing are as a group extremely small. By the time the Indian reaches maturity, he has grown deathly pale, his skin is wrinkled and he is clay yellow in colour. His formerly well-developed muscles begin to deteriorate. The addict is already anaemic and his anaemia can be confidently put down to three factors: certain intestinal parasitosis, denutrition and vitamin deficiency. In very early life the Indian develops chronic diarrhoea and a complete inability to digest almost all foods; thus, through diarrhoea, dehydration develops in addition to denutrition. It is easy to see why they fall such an easy prey to tuberculosis . . ."

"The repercussions of coca-chewing affect not only the individual but the race. The children of addicts are markedly deficient in intelligence . . . Many of them fail to learn to read after three or even four years' consecutive schooling."

"There are moral repercussions as well as physical degeneration. Criminality is widespread among these people. They seem to obey only their instincts, and the tendency to lie, which is one of their most marked characteristics, very probably originates in the moral disequilibrium produced by the coca-chewing habit.

In spite of the efforts of the authorities, so far from diminishing, this vice is spreading—or was in 1945—like a veritable epidemic and, as we have already said, not only among the Indians.

The author considers that "the Academy of Medicine is morally obliged to take some initiative in this matter" and he therefore proposes that "the total destruction of the coca plantations should be called for, the owners being compensated in money or crops which will provide them with a proper diet."

He estimates that "coca addiction affects approximately 60,000 persons, including men, women and children in the two Departments of Huila and Cauca."

(9) BERMANN, GREGORIO

Toxicomanías (Drug addiction). Buenos Aires, El Ateneo, 1926.

The author, who was formerly Professor of Forensic Medicine in the Faculty of Medicine at Córdoba (Argentina) states that he has "collected data and information showing the disastrous effects [of coca chewing—P.O.W.] on the mental state. Coca chewers, I have been told, live in a state of stupefaction. Mr. . . . who lived for many years with the Bolivian Indians used to tell me that when they drank alcohol in addition they became like wild beasts in their impulsiveness and ferocity".

(10) BONILLA IRAGORRI, GERARDO

El problema del cultivo y masticación de hojas de coca en Colombia (The problem of the cultivation and mastication of coca leaf in Colombia). Republic of Colombia, Ministry of Health, Bogotá, 1948.

This book of 121 pages is a collection of several papers, compiled by the Departmental Director of Health of Cauca, where coca-chewing is very widespread.

The first paper "*El cocaísmo en Colombia*" (Coca-chewing in Colombia) by Jorge Bejarano, at that time Minister of Health, is a reproduction of the paper summarized in No. 8.

The second paper, entitled "*Los masticadores de coca en Huila*" (Coca chewers in Huila) deals with another Department where coca-chewing is also endemic. The author, Jeremías Repizo Cabrera, a student of medicine and pupil of Dr. Bejarano, is a native of the Department. The paper contains many details of great interest regarding geographical distribution, the ethnic factor, the cultivation and preparation of coca leaf, etc. He says "coca is the Indian's whole life. He cannot imagine life without it. How carefully he tends his shrubs; he prunes them, provides them with shade, loves them, worships them. When he dies, he leaves his trees as a precious

inheritance to his wife and children. They are the centre of his emotional life, his only reason for living.

"A *cocada* lasts about two hours, after which the leaves are changed. The Indians take two portions between breakfast and the midday meal, two more between the midday and evening meals and two more between supper and 7 o'clock in the evening. They do not chew during the night.

"Without coca they do not work. They never undertake to work unless they are promised coca. If any peon finishes his leaves, he borrows from his companions and returns the loan on the next market day with almost religious punctuality. If his coca runs out, he will search in every direction, visit his friends, try every means, lawful or unlawful, until he succeeds in obtaining more. It is as necessary, as indispensable to him as morphine to the morphine addict or tobacco to the smoker."

The author then describes the well-known physical and mental effects of coca-chewing and refers to "frequent miscarriages" among "women who chew coca".

"If we bear in mind that children begin to chew coca at the age of seven or eight years, it is easy to explain the stunted and mediocre development of the Indians."

"Coca takes away their appetite: they eat little, partly because food is scarce but also because coca has made them lose the desire to eat. They defecate two or three times a day; the excrement is liquid and the ingested food is eliminated only half digested. Thus they very soon begin to suffer from denutrition and dehydration, with a consequent loss of strength and vitality. At the end of two or three years, they become tubercular.

"The havoc wrought by tuberculosis among these undernourished people is terrifying. Those who do not die of bacillosis, perish of incurable diarrhoea, accompanied by algidity, which I consider to be a symptom of avitaminosis complicated by enteric infection. They suffer from galloping amoebiasis. Thus, the remnants of a race which once seemed vigorous will disappear at an accelerated rate in a few years.

"The nervous system suffers a great deal of harm from coca: the coca chewer is weak, dull and sluggish of mind. He is incapable of learning anything involving moderate mental effort; he clings to his outlandish beliefs, his premonitions, spells and superstitions. His work and conduct is governed by instinct. He leads a life of the subconscious. A child may go to school for three or four years and still not learn to read. Generally speaking, the children of chronic chewers are idiots or degenerates. They are a heavy burden on the State. Extremely susceptible to suggestion, they are easily persuaded to commit the most frightful crimes. Their moral behaviour is ruled by instinct. If they have no coca or money to buy it, they rob, steal or do incredible things to obtain it. They obtain it by fair means or foul. The Indian's life often ends in mental confusion or prostration. To crown all, he is a liar, a dull, stupid liar. Idiocy is his common heritage."

The difficulties encountered in the anti-coca campaign are illustrated by an event in the town of San Agustín where "measures to put down the use of coca were being tested. Some ten years ago there was an order that existing plantations should be counted. The Indians rose and threatened the authorities; they refused to go to work. The pastures were overgrown with weeds; food grew scarce; famine reigned and the order had to be withdrawn so that normal conditions could be re-established".

All the money spent on coca "comes from poor people earning wretched wages, since the wealthy and comfortably-off do not chew coca. That is the scandalous paradox". Further "in winter time, when the roads are impassable, the price of coca from Cauca rises . . . but the Indians buy it no matter what it costs. They cannot do without it".

Discussing the best methods to employ in the anti-coca campaign, the author, who is familiar with conditions and the

general atmosphere in his native province, advises against brusque and immediate steps such as destroying the shrubs (which would, in his opinion, cause an uprising among the Indians), or purchasing them in order to destroy them afterwards (not only because the cost would be so much greater, but also because the Indians would use the money to get drunk and would only go back to growing coca plants). The best method would be to give the children a better education and to "forbid heads of families, under penalty of heavy fines, to teach the habit to their wives and children. The coca-chewing adult could be left the eighteen or so trees necessary to yield a harvest of 52 lb. of leaves a year, which is what is needed for the habit for one year . . . The rest would be destroyed by the competent authorities". The author makes detailed proposals to this effect.

The next paper, by Dr. Bonilla Iragorri, "*El consumo de hojas de coca en el departamento del Cauca*" (The consumption of coca leaf in the Department of Cauca), considers the problem to be very important. "If this monstrous problem, of overwhelming gravity from every point of view, does not horrify the leaders of the Government and make them determined to solve it drastically and implacably in the shortest possible time, we shall very soon witness—if we are not already contemplating, and without the possibility of later remedying it—the liquidation of enormous human groups in the rural districts, victims of intoxication by this alkaloid, denutrition, tuberculosis and infectious and contagious diseases of every kind."

The author further refers to the evil custom still existing by which "owners of great estates, and persons of wealth in the Cauca, pay their workers and farm labourers wretched wages and, what is even more serious, pay a considerable portion of those wages in coca leaf".

He advocates a drastic procedure "without reservation or restriction", "since other measures have not so far produced satisfactory results", while "the rural workers of Cauca are scourged by many and serious illnesses, as a result of the state of lowered biological resistance to which coca poisoning inevitably leads". Among other things he proposes "the immediate destruction of all coca plantations in the Republic", with the payment of compensation to the owners, etc. He presents a draft resolution to that effect.

In the next paper, "*Coca*", Dr. Laurentino Muñoz, apart from more general considerations, notes that in certain regions of the country which he enumerates, "coca is cultivated in abundance for the exclusive consumption of addicts, who do not belong solely to the indigenous race, since part of the black, half-caste and white population also shares in the vice".

Juan Friede, in the work "*El indio en la lucha por la vida*" (The Indian in the struggle for life) explains that "the custom of using coca as a means of appeasing hunger or, what is the same thing, of supplementing an insufficient diet, and its generalization in America, appears to be due to certain social conditions and not, as is erroneously believed, to an ancient custom or tradition of the Indian". To demonstrate this, he cites from "*Problemas sociales de algunas parcialidades indígenas del occidente colombiano*" (Social problems of some native tribes in Western Colombia) by Luis Duque G. (published by the Institute for Indigenous Studies of Colombia), the following fact observed among the Guambiano Indians. "The native reservation is situated on the bank of the Piendamó River. On the opposite bank is the Chimán estate, on land which was formerly part of the same reservation but which was taken from it. The labourers on the estate, some eighty families who rent their land, and the inhabitants of the reservation, are Guambiano Indians. The Indians of the estate, however, chew coca, whereas those of the reservation, who are relatively well-to-do, do not chew it."

He proceeds to explain that "the growing pauperization of the Colombian peasant in the south of the country would per-

haps explain the continual spread of coca consumption among the white, coloured, or half-caste population in the southern districts of the Republic".

He then shows that "the harm done by the continual use of coca for generations, in other words, the age-old destruction of the Indian of the district, can be observed in his stunted growth and in his moral and mental debility".

"Today, as a hundred years ago, all work for the municipal council, the '*obligación*', as it is called, is unpaid, the only remuneration being in the form of coca."

The next contribution "*La coca entre los indios de América del Sur*" (Coca among the South American Indians) is by an anonymous author. Among other things, he states: "The custom of chewing coca was most widely spread in the mountain ranges of the Andes. The Indians of the forest regions are nearly all fervent consumers of this drug. At present, consumption of the leaf is particularly prevalent among the Quichuas and Aymaras of Peru, Bolivia and the adjacent regions of Chile and Argentina. The use of the drug has also spread, however, beyond these territories, reaching the neighbouring valleys of the Amazon".

"In the north of Peru and above all in Ecuador, coca has now almost disappeared, but in former times it was also very well known there. Its importance is again noticed in the south of Colombia."

"An extensive and fairly well-defined region in which coca is consumed is also found close to the upper tributaries of the Rio Negro, whence it probably extends to the banks of the Orinoco. On the northern banks of the Amazon and of its southern tributaries, coca is not consumed by the natives except on certain occasions."

"The consumption of coca not as an article of enjoyment, but for medicinal purposes against fever (a custom observed among the Motilonos of Venezuela and in Colombia), as well as its use to stimulate the visual and auditory powers, do not appear to be original uses, but due to later foreign influences."

"A drug which, like coca, dispels hunger and fatigue, creates a feeling of well-being and energy and also possesses curative powers, would naturally not only be highly esteemed by the natives but would also be considered as a bearer of magic virtues. This is the reason why coca has played and still plays such an important part in the social and religious life of the Indians, for whom it is something more than a mere article of pleasure. Thus, for example, the cultivation and gathering of coca are often accompanied by certain ceremonies."

"In territory in which women consume coca it is generally a case of a recent degeneration or of the use of the drug as a restorative or medicament. It is rarely reported that coca was also used in ancient times by women."

"In spite of the wide spread of Christianity among the Indians, many of the customs and ideas connected with coca have been conserved to the present day." "Even at the present time coca plays an important part in relation to sickness and death."

The author also refers to the different methods of using coca as snuff, as tea, with tobacco, etc.

Another work on the subject is the inquiry made by the Public Health Directorate of the Department of Cauca.

In his capacity as director of this service, Dr. Bonilla Iragorri, in 1947, requested medical practitioners in the department of Cauca, in conformity with Executive Decree No. 896 of that year, the purpose of which was to prohibit coca-leaf production, to reply to the following questions: (a) for their opinions regarding "the use of coca as a nutritional factor, a toxic factor, an economic factor and a social factor"; (b) for their opinion as to whether "the Government should continue to allow the daily consumption of coca leaf by the Indians."

The replies of eight local medical practitioners were all negative; that is to say, they all advocated the abolition of coca-leaf chewing. Several of the replies expressed the opinion, however, that the process of abolition should not be carried out too suddenly. In connexion with the situation prevailing in Colombia, the letter which the Director of the Ethnological Institute of Cauca University, Dr. Gregorio Hernández de Alba, who is not a doctor of medicine, wrote to the President of the Cauca Assembly, is interesting. In that letter it is stated that although the doctors have expressed the above-mentioned opinions, "the growers and landholders concerned are working to ensure the continuation of the state of affairs brought about by coca addiction". This letter also refers to "the need to consume coca because of the lack of adequate nourishment". It concludes with the statement that "the matter should be studied from every angle, rather than from the medical viewpoint alone, in order to try to find the most logical, the most just and the most acceptable solution".

(11) CAPRILES, DAVID

La alimentación como factor social en el indio (Food as a social factor among the Indians). La Paz, Imprenta del Instituto Nac. de Readopción y Reeducción de Inválidos, 1937.

According to the author's calculations, "the food ration of the Bolivian Indian is inadequate to enable him to lead an active life. The idea that he is strong is explained by the fact that, in spite of his poor food, he performs the small amount of work of any importance done in Bolivia . . . He tries to exert the least possible effort, thereby saving physiological and other energies." From time to time, non-medical authors in particular "report nutritional properties of coca" which it does not in fact possess.

The author goes on to explain that "it is also said that when he chews coca, the Indian does not feel hungry, because he anaesthetizes the gastric mucous membranes. There is no solid support for this theory because hunger is a reflex experienced by the stomach owing to the need of all the cells of the body for nourishment . . . Our interpretation would be that the weak dose of cocaine extracted from the leaves enters the circulatory system and comes into contact with the tissues. The cell suffers its analgesic effects but, owing to the small alkaloid dose, desensitization does not go very far and hypo-functioning of the cells is caused, with the result that nutritional changes are slow and hence the amount of renewal elements physiologically desirable are not needed. The result would be what occurs in hibernating animals . . ."

"Possibly if the Indian did not chew coca, his organism would be aroused, become exigent and combative, thus bringing about the reaction of the individual and of the race as in the case of all peoples suffering from hunger. As occurs with some opium-consuming peoples, tradition and custom have resulted in a meek serf, who, although not very productive, nevertheless works more than anyone else in Bolivia."

(12) CRUZ, PEDRO E.

"Lan sanidad en Colombia" (Health in Colombia). *Boletín de la Oficina Sanitaria Panamericana*, No. 9, September 1948, pp. 806-813.

The author, who is Minister of Health, refers to "the heritage of the Incas . . . the vice of coca-leaf chewing which is undermining the health and race of the indigenous population and threatens to spread to bordering agricultural areas. The seriousness of this problem lies not only in the harmful effects of the drug but also in the fact that coca-chewers receive a deceptive sensation that their hunger is satisfied; they therefore substitute coca-leaf chewing for food, become victims of denutrition and fall an easy prey to endemics, especially tuberculosis. The difficulties of eliminating this vice are very great."

(13) CUNHA LOPES

Toxicomanías (Drug addictions). Rio de Janeiro, Tip. America, 1939.

The author, a professor of psychiatry at the University of Brazil at Rio de Janeiro, in his brief comments on coca expresses the opinion that "it clearly illustrates the paradox of greatness and decadence. It is a plant which produces hallucinosis. It is the cause of types of addiction which are highly hallucinatory".

(14) FERNÁNDEZ MIRANDA, EMILIO

"La Cocamania en Bolivia" (Coca addiction in Bolivia). *Revista Argentina de Higiene Mental*, 4, 37-56; 1945—*Archivos Bolivianos de Higiene Mental*, 1, 61-84; 1945.

The work of this Bolivian author is reproduced here at some length because it explains very completely what he himself saw and observed. The author fulfils two conditions: he is a psychiatrist and he is a Bolivian, which qualify him to form an adequate judgment of the phenomena he observed among his compatriots. In his very full communication he explains, among other things, that "the whole picture of coca addiction is dominated by the excessive consumption of coca leaf, by the irresistible urge to chew which becomes, as it were, a biological² necessity. It is a narcotic of habit and occupation (or work) which leads to addiction, and this in turn leads to the urge to increase the dose until the imperious and irresistible need to chew becomes almost an obsession."

"Intoxication by daily coca-chewing in constantly increasing doses is accompanied by permanent disorders such as extreme abulia and apathy. The addict's urge to obtain coca is so compelling that he often goes to town for the sole purpose of buying coca, sometimes in exchange for poultry, eggs, and particularly cereals which are his only provisions."

Perpetual coca-chewing gives rise among the natives to "a kind of contagion from father to son, sometimes through imitation and sometimes through the tradition and customs of the home, the region, the community and the race . . ."

"In order to ascertain whether excessive coca chewing impairs the intellectual functions and makes mental effort impossible, it would be necessary first of all to make a study of the psychology of the native population to serve as a basis for a knowledge of the psychology of the indigenous coca-chewer. In that way the changes noted in the conduct of his personality would represent a real scientific source of material. We have, however, no scientific knowledge, for example, of the intelligence quotient of our native children, still less of that of the adolescents, and we are in an even worse situation regarding their psychology. Sporadic studies, unrelated and isolated, are our only sources of information . . ."

"The young Indian of the plateaux and the plains is strong, vigorous", in excellent health, adaptable to the varying climates of his country, "intelligent, alert, gay, ambitious, quick to learn and think. His moral conduct is satisfactory and he is full of good will". At school, high school and college, "he shows himself to be the mental equal of the half-castes and whites and in some cases he is even superior to them". But "that same Indian, once guilty of the abuse of coca, presents the following psychological characteristics: he is a slave of routine, his memory and ideation are defective; he is a liar, a hypocrite and a pickpocket and is neglectful of his own person and of his family; he is indolent, resigned, submissive, abulic, apathetic and indifferent. He is depressed, unconcerned and a mental defective."

"The psychological characteristics noted above . . . are in part the result of chronic intoxication through coca-chewing."

Some examples are given of the tremendous physical effort which is exerted under the influence of coca leaf. Reference is made to "the fact that in 1879, when the soldiers returned to the interior of the country from the shores of the Pacific, they

² Capitalized in the original.—P.O.W.

climbed the western range of the Andes and traversed the difficult highlands of that area and covered distances of 500 kilometres on foot with only handfuls of coca (Dr. Jaime Mendoza). Reference is also made to "the forced labour of five days and nights in excavations (mine tunnels) with only two hours sleep each night . . . (José Moreno y Fuentes). Then after the task was completed as a normal procedure, the native was often put to such tests as marches of nineteen leagues, and then required to continue his forced labour for five more days and nights."

For eighteen months the author was health director of a province in a native village where he was able to observe that each native "consumed a daily average of fifty grammes of coca leaf and that that quantity was constantly being increased, particularly when fatiguing work had to be done".

According to an analysis of Bolivian coca made by Dr. Juan Bautista Coria, head of the laboratory of the pathological and clinical centre for infectious diseases of the Faculty of Medicine of Buenos Aires University and Dr. Roberto Nery Paylos, head of the pharmaceutical service of the Las Mercedes Hostel in the same city, one hundred grammes of Bolivian coca leaf contain from 0.75 to 0.81 grammes of cocaine. "From those facts we might conclude that the Bolivian native consumes an average of 0.39 grammes of coca gastrically each day. But even if we make a conservative estimate that only a third of this quantity is actually absorbed, we still have a figure of 0.13 grammes which is a toxic dose" since it is several times as great as the maximum dose indicated in the best pharmacopoeias.

In the Chaco campaign (1932), the author himself chewed coca leaf on several occasions, under unpleasant circumstances, with the result that he suffered visual hallucinations and false acoustical perceptions.

"Many citizens who became soldiers and who had never chewed coca in civilian life, acquired the vice of coca-chewing during the campaign, and some of them reached the psychiatric hospital at Sucre (*Manicomio Nacional "Pacheco"*). There we found them and when their condition had improved, we discharged them, only to re-admit them as recidivists. We saw them in that state for five years and when we left, cachexia was undermining the constitution of one of them."

"Supervision was completely useless in their case. They sold or bartered their personal effects for coca. They chewed coca all night in their beds. The *jacchu* (residue of coca-chewing), which is usually discarded, was carefully kept by these patients in an appropriate place for use during periods when the heavenly leaves became scarce."

Sexual perversion was also noted [as in the case of cocaine—P.O.W.].

The author proposes that the Bolivian Government should supervise the cultivation, production, and sale of coca and that its active principle should be industrialized, that the production of coca leaf should be reduced and that it should be replaced by the cultivation of food products. "In that way the interests of mental health would be safeguarded . . . as well as the economic interests of the State and of the coca-producing landholders." At the Latin American Neuropsychiatric Congress⁴ the author proposed a declaration to the effect that "in the name of eugenics, coca addiction is harmful to the individual because it contributes to the deterioration of the human personality."

(15) GIMÉNEZ, ANGEL M.

"*Sobre la represión del coqueo (acullico). Proyecto de ley*" (On the abolition of coca-leaf chewing. Draft law). *La Semana Médica* (Buenos Aires) 41, II, 1892-1895; 1934.

As a national deputy, the author, who was also a medical practitioner, proposed a draft law in 1934 for the "abolition

⁴Held at Buenos Aires in 1944.—P.O.W.

of coca-chewing" in view of the prevalence of that habit in the provinces of Salta and Jujuy in northwestern Argentina. In the preamble to the draft, he refers to some personal observations made at high altitudes. He states: "My personal experience has shown the usefulness of coca at high altitudes. In 1911, I stayed for five months in the cordillera of the valley of Uspallata (Mendoza) at 3,000 metres, and I had occasion to visit several mining establishments such as the copper mines on the Navarro ridge at 4,500 metres in which the working personnel, entirely composed of Chilean peons, worked very long hours without alcohol and without artificial stimulation, but with good and nutritious food. I made the same observation as regards the workers of the Trans-Andean Railway, particularly the gangs working on the permanent way and structures."

(16) GUTIÉRREZ NORIEGA, CARLOS

"*Acción de la coca sobre la actividad mental de sujetos habituados*" (Action of coca leaf on the mental activity of habitual users). *Revista de Medicina Experimental* (Lima), 3, 1-18; 1944.

This psychiatric study furnishes a broad background for the understanding of the effects of chewing coca leaf. Only the most important points are mentioned below.

In the introduction, the author says that "a great number of studies of acute and chronic intoxication caused by cocaine have been made, but in spite of the large amount of material dealing with the subject, there exist almost no observations on the effects that coca leaf produces on persons accustomed to chewing it.

"Studies were made on twenty delinquents in the central prison of Lima, and on five non-delinquents." The age of most of these men was between 24 and 32 years. Fifteen of them were half-castes. "The period of chewing or habituation varied from 7 to 14 years for the majority, with extreme cases of 5 and 25 years", and the quantity of coca leaf chewed daily was between 50 and 100 grammes, but more frequently the latter amount.

The most frequent and noticeable symptoms were the following: "Without exception, all the subjects examined showed disturbances of perception. Only in very rare cases were true hallucinations caused. Of course, the intensity and quality of the disturbances depend upon the quantity of coca leaf chewed and upon the predisposition of each individual. In cases of slight or medium intoxication, changes of visual and auditory acuity, and auditory, visual and kinesthetic illusions were found; the majority of the subjects examined said that under the influence of the coca leaf they saw better in the dark, and it seemed to them that colours were clearer and brighter; . . . others, on the contrary, felt dazzled and unable to distinguish details. According to the experience of those who are accustomed to chew large and small quantities of coca leaf, changes in visual acuity depend upon the quantity ingested: moderate amounts would stimulate perception, large amounts disturb it." In some cases "the letters move, and are filled with coloured spots". It is not known whether such disturbances are founded upon "a subjective impression or an objectively demonstrable fact".

In more serious states of intoxication—but not with the moderate amounts of coca that are habitually chewed—"fantastic visions, macropsia, micropsia, dysmorphopsia", personalization of objects, "the sensation that someone, an enemy for example, is beside or behind the addict", are experienced. Much more common are paraeidola ("if a spot on the wall is looked at, it is transformed into an image, and then begins to move"), and "disturbances of spatial perception (everything seems very near, even the most distant objects)"; the opposite phenomenon is less common. "Pseudo-hallucinations and fantastic visions are very frequent and typical; the majority of the chewers confess that they experience them frequently" . . . Almost always they are visual hallucinations. Fantastic visions which are seen only in the dark are very common among chewers,

although the degree and intensity that they assume "depend more upon the constitutional type of the subject than upon the amount of coca leaf".

"True visual hallucinations are seen only in rare cases after absorbing a large amount of coca . . . Auditory illusions and hallucinations are as frequent as visual ones; noises are transformed into voices or melody."

Moreover, in almost all the cases, illusions of temporal perception are observed (time seems to be shortened).

"In ordinary doses, coca does not produce any changes in affectivity worth mentioning. The most frequent reactions are those of joy, anger, anguish or fear. Only exceptionally large doses of coca cause uncontrollable emotional manifestations in habitual users . . . The drug does not, as has been stated, display any predetermined tendency to develop any particular type of feeling. The latter depends, in particular, upon the content and quality of the thoughts or fantasies and on the events through which the subject passes during intoxication. It depends also upon the company in which he finds himself and other social factors . . . It is still more significant that coca leaf produces, in the majority of cases, a state of well-being or a feeling of happiness which is undoubtedly one of the most important factors of habituation."

"Attention undergoes various modifications, according to the subjects and especially according to the quantity of coca ingested. According to statements of the majority of the chewers, small doses, which predispose towards extroversion, increase attention. With large doses, with the arrival of fantasies and disturbances of perception, the subject becomes introverted, with autism and hypoprosia . . . When coca chewing is begun, everything interests the chewer and he likes to talk; on continuing to chew, he seeks solitude and nothing outside himself interests him."

However, "individual dispositions are much more important than the changes caused by the amount of coca chewed. Zapata [the author's collaborator—P.O.W.] observed that while some subjects, at the beginning of chewing, adopted a frankly introverted attitude with progressive hypoprosia as they chewed more coca, others, on the contrary, developed a gradual tendency towards extroversion, loquacity and hyperprosia. The subjects in the first group were irritated at being questioned; those in the second group, on the contrary, talked incessantly and also indulged in spontaneous confidences.

"Zapata's experimental observations show that cocaine acts unfavourably on the attention of persons not accustomed to it, and that coca has a favourable influence on the attention of the chewers, but retards their reactions."

Numerous and very interesting disturbances of thought are caused. First "abnormally quick associations of ideas (tachypsychism), eidetic representations and obsessions are observed; in states of great intoxication there are interceptions, ebullition of ideas, confused thought and automatism of thought.

"States of autism, full of wish fantasies with an impression of vivid reality, are frequent. This is probably one of the most characteristic disturbances of coca addiction.

"In some cases perceptive delusions and exaggerated self-importance are present and only in rare cases of great intoxication are there true delusions.

"Some disturbances of the instinctive tendencies (sexual, self-assertive and hunger) are frequent."

"The symptoms of abstinence are always slighter and less prolonged than those observed in other drug addictions.

"The symptoms of coca addiction or coca mania are similar to those of cocaine addiction, from which they differ only in that they develop more slowly and the principal symptoms disappear during periods of abstinence.

"The coca-leaf chewer is much better adapted to his drug addiction and can endure it throughout his life. His mental symptoms always pass unnoticed; they do not become objective as in cocaine addiction and can be discovered only through interrogation. Moreover, they are manifested only under the influence of coca and never during periods of abstinence. Thus the drug addiction takes a superchronic course.

"This slowness of evolution and its perfect adaptation to the coca chewer's life are related, according to our observation, to the most important and characteristic feature of coca addiction, the development of a type of autistic and schizoid personality, and the illusory satisfaction of desires by wish fantasies which succeed, in certain cases, in giving an impression of vivid reality so perfect that it produces genuine relief in the most adverse circumstances of life."

(17) GUTIÉRREZ NORIEGA, CARLOS

"*Acción de la cocaína sobre la resistencia a la fatiga en el perro*" (Action of cocaine on resistance to fatigue in the dog). *Revista de Medicina Experimental* (Lima), 3, 329-340; 1944.

This work is included because it furnishes experimental knowledge on the effect of coca-leaf chewing in combating fatigue. As a test, a swimming exercise was used. In a pool a dog was kept "swimming until the first symptoms of fatigue appeared, i.e., loss of ability to remain afloat, the animal sinking and beginning to swallow water." The tests made under various experimental conditions always led to the conclusion that, after subcutaneous injections of cocaine, resistance to fatigue increased considerably, from 69 to 150 per cent (with the exception of one of the dogs). The following observation is also important: In the control phase (that is, without cocaine) "the animal tries to escape from its predicament by jumping over the wall of the pool, or to remain afloat with a minimum of movements of the limbs. The contrary occurs when the dog is injected with cocaine; it swims untiringly, without trying to escape from the pool, and its movements are more rapid and vigorous. This means that its activity and resistance to fatigue surpass those of the dog not injected, not only in relation to the total time of the exercise, but in intensity of the work done.

"From the point of view of the action of coca or cocaine on human work, this observation is very significant. It would indicate that the prolongation of the working period is due not only to neuro-muscular, but in part to more complex, possibly psychological factors.

"Dogs under the influence of cocaine have, with remarkable frequency, shown a tendency to carry out stereotyped movements and always remain in the same place as long as the influence of the drug lasts (sometimes for months on end, in long experiments). This means that there is not only a state of motor excitation, but an impulse towards rhythmic repetition of movement without changing position.

"According to the information which we have obtained from many coca-chewers, this tendency to rhythmic activity is also present in human beings. During coca chewing, they are impelled to make certain movements—corresponding to the work they are doing—and sometimes experience a certain sensation of well-being from this motor activity.

"It is very probable that the impulse to make rhythmic and stereotyped movements is one of the factors intervening directly or indirectly in the mechanism of the effect of coca on output of work and resistance to fatigue."

It has not yet been ascertained whether there is a difference between the period of recuperation in dogs not under the influence of cocaine and those under the influence of the drug. These observations confirm in principle those made at an earlier date by Thiel and Essig.

(18) GUTIÉRREZ NORIEGA, CARLOS

"*Datos históricos sobre la habituación a la coca en el Perú*" (Historical data on the coca habit in Peru). *Revista de Medicina Experimental* (Lima), 3, No. 4, 341-353; 1944.

"Coca, the effects of which on the peripheral nervous system have been exhaustively investigated, still presents many problems in connexion with its effects on the central nervous system. It is not known how cocaine affects the brain and sub-cortical centres; we know even less about coca addiction in South America.

"The observations and hypotheses which have been made with regard to the effects of coca have been so far exclusively empirical." The notion that coca-chewing is necessary for life and work in the "rarefied atmosphere of the Andes" and that the coca-chewer abandons the habit on coming down to the coast lands (as stated, for example, by Merzbacher, see No. 90) is erroneous. "It is not difficult to refute such hypotheses, since it is observed that workers from the mountains do not abandon their habits on going down to the coast; in many cases the habit is as deep-rooted among natives of the coast who have never been in the mountains as it is among the mountain dwellers. Moreover, although coca-chewing is a very ancient habit among the people of the mountains, it probably originated among the tribes in the Amazon region, where it is still practised and where coca is a native plant."

Furthermore, to the north-west of the Amazon, i.e., in the plains, coca is used as a stimulant (see Murdock, No. 80).

Thus coca-chewing is not a method which is employed exclusively for adapting the organism to high altitudes.

(19) GUTIÉRREZ NORIEGA, CARLOS

"*Observaciones en enfermos mentales habituados a la coca*" (Observations on mental patients addicted to coca). *Actualidad Médica Peruana*, 9, 154; 1944.

Of six mental patients having the coca habit, only one showed any obvious relation between coca addiction and mental deterioration; in the rest, although intoxication and mental disease co-existed, the relation of cause to effect was only probable. The most frequent symptoms among these six patients were visual hallucinations, delirious notions of persecution and kinesthetic deterioration.

(20) GUTIÉRREZ NORIEGA, CARLOS

"*Observaciones sobre el efecto de la coca y de la cocaína en estados carenciales de tiamina*" (Observations on the effect of coca and cocaine in cases of thiamin deficiency). *Revista de Medicina Experimental* (Lima), 5, 1-12; 1946.

"Neuro-stimulants intensify muscular activity, and this in turn intensifies the consumption of thiamin⁵; neuro-stimulants increase resistance to fatigue, and thiamin deficiency produces the opposite effect; lastly, neuro-stimulants and thiamin act on the metabolism of the nervous system." For this reason, the relations between coca and thiamin are of great interest, particularly in connexion with the Indians in Peru, for example, who use coca as a neuro-stimulant and whose diet is lacking in vitamins.

In pigeons deprived of thiamin "a slight increase in the sensitivity of the organism to cocaine and an intensification of the symptoms of vitamin deficiency" were observed, "on the daily administration of coca powder."

"If we bear in mind that coca acts on the metabolism of carbohydrates and phosphorus and always increases basal metabolism, while thiamin, combining with phosphorus, acts as a co-enzyme in the breaking down of glucose, the results we have obtained can be interpreted on the basis of these relations. If coca increases basal metabolism and thereby increases body temperature, it must logically increase the consumption of thiamin. This would explain why the administration of coca to pigeons subjected to a diet without thiamin accelerates and intensifies the symptoms of avitaminosis."

⁵ Vitamin B.

(21) GUTIÉRREZ NORIEGA, CARLOS

"*Alteraciones mentales producidas por la coca*" (Mental deterioration produced by coca). *Revista de Neuro-Psiquiatría* (Lima), 10, No. 2, 145-176; 1947.

The author says: "Addiction to coca is one of the most important medical problems in Peru. At present, the consumption is more than seven million kilogrammes a year but it is probable that the real quantity is much higher. The highest consumption, 4,500,000 kilogrammes, is in the provinces of the southern hill regions; the provinces of the central and northern hill regions come next with two million kilogrammes; the littoral and uplands provinces come third, with a consumption of only 500,000 kilogrammes. It is likely that in the first two areas, one-half or two-thirds of the population, including . . . women and children, are affected by the coca habit. In some places, all the adult inhabitants and many children are addicted to the drug. Coca chewing predominates among persons performing heavy work, particularly field labourers, miners and herdsmen. The proportion of addicts is much smaller in the towns and among the upper classes."

Since 1936, the author has been engaged in psychological and psychiatric research of a general nature among the Peruvian Indians, and has thus a good background for his comments on the subject of coca-chewers. In 1944 he published some material on the effect of coca on mental activity and the deterioration caused by the drug (see Nos. 18, 21). In the present work he deals more fully with problems, providing interesting data and case histories. These studies are of particular importance because they refer to native chewers, peasants in the province of Huancayo; "although Huancayo is not considered as the province in Peru most seriously affected by coca-leaf chewing . . . it is undoubtedly one of the provinces where addiction reaches its highest intensity".

The previous comments of the author and his collaborators on the behaviour of addicts during chewing are worthy of note because of their methodical reasoning on the subject. They reveal the following details: "Symptoms of an anti-social nature and of introversion; when chewing begins, the attitude is co-operative and sociable, and then, as the effects of the drug increase, the chewer retires into a corner, avoiding any intercourse with other people, and becomes irritable if questioned. In many cases extroversion was observed to increase at the beginning of chewing with a striking change-over to introversion as the effects of a heavy dose began to make themselves felt."

This survey was carried out among Indians and half-breeds (and one white person), all coca-chewers. "More than one hundred addicts were subjected to psychological interrogation in relation to the problems of coca-chewing, but only thirty persons were given systematic psychological examination, all males between 25 and 60 years of age, most of whom had begun to acquire the coca habit in childhood. Two-thirds of the subjects studied were accustomed to doses of 30 to 50 grammes a day, and the remainder to larger doses, varying between 70 and 120 grammes a day . . . Two of those examined were salaried employees and the rest were rural workers in very poor circumstances.

"One of the chief obstacles to the progress of the survey was the tendency of the majority of the subjects examined to deny the psychological effects produced on them by coca-chewing . . . The tendency to deny symptoms is very frequent among mentally-ill persons of Indian race."

It is necessary to differentiate between "acute or temporary mental disorders, i.e., those appearing in an addict during chewing" and "the chronic disorders observed among coca-chewers as a permanent phenomenon, independent of the periods of chewing, which might, in some cases at least, be the result of the toxic effect of the drug over a prolonged period of addiction.

"Acute mental disorders . . . are a result of the stimulating effect of the drug and only last while it is active in the body.

They show great variations according to the amount of coca used and the character of the subject.

"The most frequent acute disorder, observed in one hundred per cent of the cases, is the elimination of vital sensations. Chewing eliminates or decreases the sensations of hunger, thirst, cold, sleepiness and fatigue."

The author has been able to prove that in the same province of Huancayo, labourers who chew coca have less instead of more capacity for work than those not addicted to coca. "The coca-chewing labourer never works for as much as four hours on end; he divides his work into shifts of one or two hours, corresponding to the duration of the stimulating effect of a *cocada*. When the stimulating effect wears off, he stops work, rests, and chews more coca. The farm worker addict chews coca four times a day regularly . . . Each *cocada* provides, according to circumstances, 20 to 50 grammes, which means that the addict consumes at least 80 grammes of coca a day. Despite this vast quantity of the neuro-stimulant drug, he generally works only five hours a day."

In industry "the coca-chewing worker produces much less than the non-addict. It has been observed that he works fast at the beginning of each *cocada*, which usually lasts one and a half hours, then he falls off and produces less . . . In quality and quantity, his work is inferior to that of the worker not addicted to this drug".

"In factory work it has been observed, in addition, that the coca-chewer is completely lacking in initiative, works automatically, and if some unforeseen change occurs, for example if a defect appears in his machine, continues his work without apparently realizing that anything is wrong. This phenomenon tallies with the data obtained from the case histories of coca-chewing rural workers" and from the experiments with dogs (see No. 17).

"In only about twenty-five per cent of the cases examined were there any disorders of the perceptions. The most common are the following: modifications in visual acuity [when the dose was exceeded.—P.O.W.], dyschromatopsia, polyopsia, micropsia, macropsia and dysmegalopsia. In much rarer cases, there were paraeidola, fantastic visions, auditive hallucinations and acoustico-visual synaesthesia. On the other hand, we do not find among rural coca chewers either the pseudo-hallucinations or the true hallucinations found in some cases, though actually very few, among coca chewers in the jails. Kinesthetic disorders and deterioration in space perception and consciousness of time are also rare, but do occur in some cases.

"Deterioration in affectivity . . . is much more frequent than deterioration in the perceptions . . . Euphoria is present in almost all cases and, less frequently, other affective reactions (grief, anxiety, irritability). Euphoria is usually combined with wish fantasies or sanguine projects."

"The sentiments of fear and distrust frequently met with during chewing among coca chewers in the jails" are relatively very rare among rural coca-chewers. When these feelings occur among rural workers "they are related to exaggerated self-importance in the same way as states of gaiety are related to exaggerated anticipations of future success."

"The most frequent thought deterioration is the autistic wish fulfilment which occurs in the majority of cases. An almost constant intensification of association of ideas is produced . . . In some cases, memories prevail, in others wish fantasies and in others plans of exaggerated optimism. Thought images become more strongly visual. In many cases, the subject sees his own thoughts almost objectively like figures, like a film, even in colour." "Half-breed subjects who chew coca to procure pleasant sensations say that they experience wishful sexual fantasies with a vivid impression of reality."

In only one case were disturbances in the consciousness of the ego observed. ("Sometimes he thought, while he was chewing, that he was someone else," with notions of dual personality etc.)

"Chronic mental deterioration only occurs among inveterate coca addicts. It is not clear that they are caused by the toxic effects of coca, since other factors might intervene. The author is inclined, however, to consider coca to be the principal cause of the deterioration, affecting the personality, thought processes, intelligence and memory.

"With respect to personality, among other characteristics, the schizothymic anaesthetic type predominates. The deterioration observed in inveterate coca addicts is diametrically opposed to that observed in chronic alcoholism. In the first case, there is an asthenic and autistic attitude, while in the second an asthenic and hypomanic attitude predominates."

"Addicts used to large doses, sometimes more than one hundred grammes a day, show very significant traces in their expression and general appearance . . . They live in the worst hygienic conditions . . . remain sitting immobile and silent for hours on end . . . sometimes they wear the typical oligophrenic facial expression. In some cases, there is an irascible expression and wild eyes, the whole appearance like that of chronic schizophrenics; in addition, the hair is unkempt and there are other signs of complete personal neglect. These cases offer the impressive and dramatic general appearance and facial expression of lunatics of former times, which today we see only in psychiatric illustrations of the last century."

"When spoken to, they are very unsociable. Those who are much intoxicated show obvious symptoms of hypoprosexia and mutism. Often they turn their backs on the speaker and avoid questions, becoming irritated."

"Our knowledge of the mental and intellectual characteristics of inveterate addicts is so far very scanty, and it is not possible to classify them accurately in the corresponding psycho-pathological categories. We believe, however, that they do not correspond to any given category of psychiatric nosography."

"It is difficult in the extreme to converse with an inveterate chewer, not only because he is distrustful and negative in his attitude, but also because he hardly ever understands the questions we ask him, even if he knows Spanish. The difficulty which the questioner experiences when trying to converse with an inhabitant of the Andes is generally in direct proportion to the degree of his addiction to coca. The more ingrained the habit has become, the greater the introversion, autism, negative attitude and dullness of the subject."

"Another important characteristic of the line of thought of the Andean inhabitants, especially of the coca chewers, is the evasive reply. Even when we succeed in making our question understood, an evasive reply is still made, or the reply is vague, muddled and inaccurate. The tendency to give evasive replies appears to be one of the main mental characteristics of the chewer since we have observed this very frequently and all those with experience in dealing with coca addicts have also noted this defect. With regard to the vagueness of the replies, we believe that it is a psychological phenomenon requiring special research."

"It is observed that some of the chewers are white men and half-castes of high social and educational position, who chew coca leaf regularly without suffering mental deterioration. The cases referred to have not been studied, and we must be very careful to give them general application as proof that the drug is harmless."

Chewing is generally less common among women than among men. That might be the reason for the "apparently higher intelligence" of the women. However, "among women chewers the same dullness is observed as among men".

Chewing also exists among school children, as much as 100 per cent of the children being affected in some schools. This is due to various causes: rather heavy work in the fields at an early age, appeasement of hunger, and—an important reason—as a sign of manhood. "The general opinion of teachers is that the child who chews does not learn to read, or quickly forgets what he has learned.

"Generally it is observed that children who chew coca are duller and more backward than those who do not chew; they are introverted, apathetic, uninterested in games and appear prematurely old . . . They are highly emotional and very difficult to bring up. They frequently leave home and become vagrants.

"It is very probable that the effect of coca is much greater on the intelligence of children than on that of adults, as in the case of the former the drug probably has a disturbing effect on mental development. Adult chewers showing signs of mental deterioration had in almost every case acquired the habit while of school age, which makes it permissible to suppose that the effects of chewing on the mind may be more serious during the period of growth than later."

No data are available on the hereditary deterioration produced by chronic coca addiction. "Nevertheless, the large number of degenerates, especially deaf-mutes, semi-dwarfs and idiots, in communities where chewing is prevalent, is remarkable." There does not seem to be an equal proportion of somatic and mental defectives amongst natives on the coast. At all events, "as far as psychiatry is concerned, there is no proof of hereditary consequences of coca addiction in the same way as there is proof of hereditary consequences of alcoholism.

"According to the information which we have obtained, there is no regular increase of the dose as the chewing habit continues . . . Apparently, therefore, there is no evidence of the increase in tolerance characteristic of other drug addictions.

"The phenomena of addiction are very striking. Once the habit has been acquired it is extremely difficult to break it. However, cases have been reported of chewers who gave up the habit when they came to the coast. It is possible that this happens with persons accustomed to take small doses, but it is extremely doubtful whether confirmed chewers give up the habit."

(22) GUTIÉRREZ NORIEGA, CARLOS and ZAPATA ORTIZ, VICENTE

Estudios sobre la coca y la cocaína en el Perú (Studies on coca and cocaine in Peru). Lima, Ministry of Public Education, 1947. 140 pages.

This book, by the well-known Peruvian investigators, recapitulates their studies and those of their collaborators during the years 1937 to 1946, which in this bibliography are summarized under the various works of those authors. The problem of chewing is thoroughly studied from the historical, physiological, pharmacological, pathological, psychological and social points of view.

(23) GUTIÉRREZ NORIEGA, CARLOS and ZAPATA ORTIZ, VICENTE

"Observaciones fisiológicas y patológicas en sujetos habituados a la coca" (Physiological and pathological observations in respect of coca addicts). *Revista de Farmacología y Medicina Experimental* (Lima), 1, 1-31; 1948.

From September 1947 to February 1948 "expeditions were made to Huancayo province for the purpose of studying coca addiction."

"The majority of the native male population of that province consists of coca addicts, of whom we studied more than five hundred. This work only records the investigation of 170 individuals from this group. Fifty addicts were examined from a very general medical and physiological point of view as a kind of introduction to the problem, which has not yet been studied closely. Special investigations were carried out in regard to the rest. Publications issued so far on the coca habit refer mainly to chewers in the coastal districts or to natives from chewing areas who have settled on the coast. The present study and others made during the expeditions mentioned were, with the exception of a publication by one of our members last year

(see No. 21), the first systematic investigations into the coca habit among native subjects in one of the Andean regions where coca-chewing is most prevalent.

In that Andean province, "the consumption of coca amounts to approximately 90 thousand kilogrammes per year according to the official statistics. The actual quantity is five times greater, since a calculation of the consumption of coca in the local market made by the authors gives a figure of 500,000 kilogrammes per year".

On the basis of the official census, the total number of habitual consumers, most of whom are Indian, but a few of whom are half-castes, children and women, may be estimated at approximately 30,000 to 40,000 persons (that is, from about 25 to 33 per cent of the total population of the province, which numbers some 126,000 persons). The result is therefore "an average consumption per head of 45 grammes of coca per day, if we accept the figure of 30,000 habitual users, and 34 grammes per day if we accept the figure of 40,000".

"The observations which we made on 500 habitual coca-chewers show that the latter consume from 20 to 100 grammes per day, the average being from 30 to 40 grammes, according to the groups studied, which tallies exactly with the figures obtained from the preceding calculation." All persons tested were chosen at random in the town of Huancayo and all were male adults; "the majority were Indians and the remainder half-castes . . . coca addiction begins, in many cases, between the ages of 10 and 12 years; the male native of the Andes who does not chew coca by the time he is 20 is exceptional; the result is that relatively young subjects have been addicted to coca-chewing for long periods of time, from 20 to 30 years, for example, sixty per cent of the cases studied were inveterate coca addicts, with more than ten (16 to 21) years of addiction.

"As regards the constitutional type of the subjects, 76 per cent were leptosomatic." The "excessive thoracic development is a phenomenon of adaptation to the atmosphere, poor in oxygen at high altitudes, which some authors have erroneously considered as an ethnical or constitutional characteristic, asserting that the athletic type is prevalent among Andeans." In a previous work (*Actualidad Médica Peruana*, 1, 571, 1936; 2, 118, 1936) Gutiérrez Noriega "called attention to this detail; the predominant Andean type has more characteristics of the respiratory constitutional type of Sigaud, or of the leptosomatic type, than of the true athletic type".

"The subjects, habitual coca-chewers, were permitted to chew the amount to which they were accustomed, in a state of complete rest and lying down. The time of the coca-chewing varied . . . from 2½ to 3½ hours. Observations were taken every half hour. The amount of the coca chewed by the subjects tested, per period of chewing, varied from 15 to 60 grammes, with an average of 30 grammes per case. This amount as compared with the body weight varied from 0.4 to 0.7 grammes per kilogramme, the average being 0.6 grammes per kilogramme. In less frequent cases, the amount may reach one gramme per kilogramme, and more rarely two grammes per kilogramme. The chemical analysis of the balls of coca after they had been chewed indicated that the average amount of alkaloids ingested varied between 2.5 and 3.7 milligrammes per kilogramme, although there were cases in which only one milligramme per kilogramme was swallowed and others in which more than 5 milligrammes per kilogramme were swallowed.

"There is no definite relation between the amount of coca chewed at one time and the period of addiction.

"In the group of habitual coca-chewers . . . numerous constitutional disturbances or signs of degeneration and a high incidence of pathological conditions were found. These data indicate that the state of health of the coca-chewing population is, in general, bad.

"Such a statement does not necessarily mean that coca is the factor directly responsible for either series of abnormalities. The related examination of pathological conditions (acariasis,

keratitis, pellagra, chylosis, glossitis, pulmonary diseases, blepharitis and conjunctivitis, conditions of undernourishment) makes it permissible to assume that the disorders are due to poverty, which in turn causes very bad hygienic conditions and malnutrition. There are special connexions between coca addiction and poverty; coca addiction is the result of poverty and poverty is the result of coca addiction.

"The high frequency of degenerative signs raises other problems. The former may, indeed, be the result of malnutrition and the bad hygienic conditions which have existed among the coca-chewing population for approximately four centuries. Another reason may be advanced, namely, the probable toxic influence of coca addiction and alcoholism, the effects of which on heredity should not be overlooked. In-breeding, which seems to occur in some cases, may be suggested as another possible factor. In our opinion, the first-mentioned factors, that is, malnutrition, coca addiction and alcoholism, are the most important. But as coca addiction is partly responsible for the malnutrition—it is well known that the coca addict chews coca to prevent hunger and to reduce his diet to a minimum—coca-chewing may indirectly be one of the causes which determine the adaptation of the Andean people to an inadequate diet. The latter is very poor in proteins, fats and fruits. Shortages of the vitamin B-complex are obvious and frequent in the group of coca-chewers, since the existence of numerous cases of incipient pellagra and of riboflavin deficiency is noted. It should be remembered that coca and cocaine accelerate and intensify the symptoms of avitaminosis among animals deprived of thiamine." (See No. 20.)

The principal findings on the subject were: "dwarfishness (6 per cent); atrophies of bones (10 per cent); cranial malformation (8 per cent), in particular, microcephalia and oxycephaly. Moreover, deformations of the spinal column (kyphosis and scoliosis) in 16 per cent of the cases; rachitic thorax (8 per cent); asymmetrical facies (4 per cent); deaf-mutes (4 per cent); convex nails (13 per cent); and cracked nails (34 per cent) were noted.

"The pathological findings indicate that, contrary to the general belief, the average level of health is not very good among the population accustomed to chewing coca. We do not claim, of course, that it is the addiction to this drug which causes the various maladies found.

"Nutrition was deficient in 16 per cent of the cases, good in 14 per cent and mediocre in 70 per cent. Some subjects showed signs of latent vitamin deficiency, but cases of manifest vitamin deficiency were also observed . . . (pellagroid states existed in 12 per cent of the cases). Chylosis—a sign of riboflavin deficiency—existed in 20 per cent of the cases and abnormalities of the tongue in 38 per cent . . . We do not attribute all these disturbances to vitamin deficiencies, since it is probable that part of them are caused by the chronic irritation due to the coca and the alkaloid ash, as is proved by the presence of chronic pharyngitis in the majority of the cases (70 per cent). Skin affections are frequent . . . The majority of the cases show affections or diseases of the eyes. Dental caries is relatively frequent." [Some, however, attribute to coca a preservative effect on the teeth—P.O.W.] "Moreover, in 34 per cent of the cases hyper-thyroidism is found in various degrees, there is hyper-sympathicotonia in 52.5 per cent and hepatomegalia in 24 per cent of the cases.

"During coca chewing, discrete cardio-circulatory changes, and changes of respiration, bodily temperature and metabolism are produced. Such changes take the form, in most cases, of functional increases, and in functional depressions in a smaller number of cases." Nevertheless, the authors have "the impression that this stimulating effect on the cardio-circulatory system produced by coca-chewing is more noticeable among coca-chewers on the coast than among those in the mountains."

Moreover, the following "functional changes in the central nervous system were observed: increase of tendinous reflexes, changes in cutaneous sensitivity and disturbances of the oculo-

cardiac reflex. These effects are neuro-stimulating in the majority of the cases and, less frequently, neuro-depressive," according to the constitutional type of the individual. "It is, possibly, an aspect of the amphotonic action of cocaine," which has also been observed in other systems of the body.

It seems that "coca-chewing causes a slight decrease of sensitivity to pain in a great number of cases," but owing to the mentality of the coca-chewers "it is almost impossible to obtain any help from them when it is a question of delicate sensations".

The reaction time (determination of chronaxia) was found to be "very prolonged in the majority of addicts, and bears a certain relation to the degree of chronicity of the addictions. Addicts of long standing have the longest reaction times". That fact "gives us a general idea of the most complex functions of the superior nervous system or, rather, of the psycho-physical activities". But it should not be assumed "that the significant increase in the reaction time which is observed in inveterate coca-chewers is due to increase in age".

The results of measurements of muscular strength are not uniform. "The experiments made before coca-chewing give figures lower than those obtained for normal subjects along the coast, chosen, for example, from among medical students . . . While the experiments made when the subject was stimulated by coca were positive in 50 per cent of the cases, no significant variations were obtained in 25 per cent of the cases, and a decrease of strength was noted in 25 per cent of the cases."

(24) GUTIÉRREZ NORIEGA, CARLOS and ZAPATA ORTIZ, VICENTE
"Estudio de la inteligencia en sujetos habituados a la coca"
(Study of intelligence among subjects accustomed to coca).
Revista de Farmacología y Medicina Experimental (Lima),
1, 32-68; 1948.

"The Departments in which the greatest quantity of coca is consumed show a percentage of illiterate persons much greater than the departments where the consumption of coca is less", "but this does not necessarily mean that coca addiction is the cause of such high frequency of illiteracy, because other factors may be involved."

"In order to determine the influence of the coca-chewing habit on the high incidence of illiteracy in certain regions of Peru," the authors undertook "an investigation of intelligence among subjects accustomed to coca-chewing and among subjects of the same social and economic status and of the same race who were not accustomed to coca." By this study, they intended only "to ascertain the intellectual conditions of the community of coca addicts without prejudging, for the time being, what might be the cause of the high proportion of illiteracy characteristic of communities of coca-chewers." As regards the relation between the coca habit and drug addiction, the authors say: "In all our previous publications we have tried to avoid the errors . . . which have led many authors dealing with the subject of chewing to maintain that the entire problem is merely one of deciding whether chewing is or is not drug addiction. The relationship between chewing and drug addiction is not the main question, as there are many toxicological problems which have nothing to do with drug addiction. The study of the intelligence of coca addicts does not depend on the question whether the coca habit is or is not drug addiction, nor on whether coca and cocaine have a direct effect on the cortical neurones and on the intelligence of the habitual consumer."

They studied "200 chewers in the province of Huancayo" and fifty-three persons taken at random in a village in the Department of Puno. Thus "the group includes subjects used to taking large doses of coca and others used to taking small doses; however, the majority were accustomed to taking 30 or 40 grammes of coca leaf daily. Almost all the subjects examined belonged to the humblest social class and lived in the poorest economic circumstances. Eighty per cent were peasants; all were adult males; the age of the majority varied

between 20 and 50 years . . . The subjects were specially engaged and paid for the mental examinations . . . They were all co-operative. In most cases the examination took place outside the chewing period."

Peasants of Indian race and in similar economic circumstances from other areas were also studied, as part of the experiment, because "in the areas where the chewers live it is almost impossible to find for control purposes male adults who do not indulge in the drug".

Principal results: "For all the coca-chewers subjected to the Binet-Simon test the intelligence quotient (I.Q.) is very low, the arithmetic average of the I.Q. being 67 per cent.

"The I.Q. graph of coca chewers tends toward subnormal coefficients; for the most part the graph fluctuates between 60 and 70 per cent, with maximum deviations to 20 and 90 per cent. The average mental age works out at seven years and six months and the maximum deviations range from three years to ten years and five months.

"The existence of a relationship between the I.Q.'s and the periods of addiction to coca was established. Very low quotients were much more frequent than high quotients amongst inveterate addicts; the highest quotients were much less frequent than the low ones amongst non-inveterate chewers.

"The existence of a relationship between the I.Q.'s and the incidence of illiteracy was established; illiteracy is much more prevalent amongst individuals with low I.Q.'s than amongst those with high I.Q.'s.

"The mental age of coca addicts, as determined by the Porteus test, varied from three to ten years. In a group of non-addicts from the mountain district, the mental age determined by this test was from 12 to 14 years.

"In the case of the group of coca addicts subjected to the Porteus test, a relationship was also found between the period of addiction to coca and the mental age. The lowest figures corresponded to the most addicts of longest standing.

"The results of the Hamburg test in assessing the powers of attention of the coca addicts are inconclusive. In the case of a group of subjects from the mountain regions who were not coca addicts, the result of the test was almost normal.

"A relationship was found to exist between the lack of ability to concentrate and the duration of coca addiction. Deterioration is much greater in inveterate addicts than in non-inveterates.

"The I.Q.'s of 120 non-addicts from the littoral who were examined were, on the whole, higher than the I.Q.'s of the coca addicts.

"The authors of this work are not for the moment trying to establish any relationship of cause and effect between coca addiction and the defects of intelligence found in the chewers, although there are some factors—for instance the relationship between the period of addiction and the degree of intellectual deterioration—which favour the belief that the use of coca contributes to the defects found . . . It is very probable that the unsatisfactory results of the intelligence tests are due to a series of factors which combine to affect the intelligence adversely."

(25) GUTIÉRREZ NORIEGA, CARLOS

"*Errores sobre la interpretación del cocaísmo en las grandes alturas*" (Erroneous interpretations of coca addiction at high altitudes). *Revista de Farmacología y Medicina Experimental* (Lima), 1, 100-123; 1948.

In the introduction the author points out that "prejudice has had a deplorable influence on the study of coca-leaf chewing in South America. The number of works on the subject which, without investigation or personal experiment on the part of the authors, proclaim the excellent effects of coca and cocaine

on human health, can be counted in dozens. Their authors are probably unaware of the serious social harm caused by their ideas".

He makes particular reference to two recently published works (see Nos. 87 and 91) in which "it is maintained, on the basis of mere supposition and frequently inaccurate data, that coca is a drug for necessary adaptation to life at high altitudes and is not toxic. They do not adduce experiments or direct observation to support these ideas, but restrict themselves to impugning the results of investigators who are not in favour of coca-chewing."

He states that the authors mentioned "try to prove that there is no toxic danger in the coca habit and that, in short, coca is necessary to the native of the Andes".

Gutiérrez Noriega states that this conclusion is erroneous, and that chronic poisoning is caused by the cocaine absorbed while chewing coca leaf. With regard to this alkaloid, he says: "cocaine is partly destroyed in the liver, like other alkaloids; but the liver does not achieve this effect without serious consequences. We have demonstrated the existence of grave hepatic lesions in dogs subjected to a continuous regime of cocaine. The poisonous effect of cocaine on the liver is more serious still when the diet is deficient. It should be borne in mind that coca-chewers eat very little."

He goes on to say that Monge "affirms, in addition, that an increase in the pH decreases the toxicity of cocaine, which does not agree with basic and proven facts"; on the contrary "alkaline substances strengthen the effect of convulsion-producing and neuro-stimulant drugs", and he quotes other reactions produced by alkaline substances in the same sense.

Cocaine does not "become ineffective in the digestive tract" as Monge affirms: instead "it is readily absorbed". In dogs, absorption occurs "much more rapidly than with other drugs of the same type".

"The experience of the coca-chewers themselves, who immediately distinguish coca with a high cocaine content from coca not rich in cocaine by its effect, is another irrefutable proof that cocaine is absorbed. When cocaine continues to be taken through the mouth, its toxic effect increases rather than diminishes."

He goes on to say that "there is a contradiction in this respect" in the works quoted above, "since, when they are dealing with the toxic effects of coca, they try to prove that it is hardly absorbed at all or is destroyed in the digestive tract, but at the same time they assert that cocaine produces a marked effect in allaying fatigue in coca-chewers, and has other supposed effects which adapt or acclimatize the native to high altitudes".

In addition, "Monge affirms that the coca-chewer chews about 60 grammes of leaves a day, with a probable content of 50 milligrammes of cocaine, whereas in reality 60 grammes of coca contain at least 300 milligrammes of alkaloids, 50 to 80 per cent of which are cocaine. The coca leaf generally used by coca-chewers contains at least 0.6 or 0.7 grammes per cent of alkaloids; therefore, 60 grammes will contain 360 to 420 milligrammes, i.e., seven or eight times as much as is supposed in Monge's calculation".

"One of Monge's chief arguments in favour of coca-chewing is based on the general observation that coca-chewers do not show the grave and spectacular symptoms of abstinence characteristic of morphine addicts.

"It is not true that inveterate coca-chewers do not show symptoms of abstinence, but even if it were true, it should not be forgotten that one of the basic differences between cocaine addiction and morphine addiction is that in the first there are no symptoms of abstinence, or else they are of minor importance, while in the second the symptoms are nearly always grave.

"In addition, Monge asserts that whereas the drug addict enters into a state of repose after taking the drug, the coca-chewer chews in order to work and takes this as proof that coca does not produce addiction." However, "it is well known—that a large number of drug addicts—cocaine addicts, morphine addicts, alcoholics, marijuana addicts etc.—take drugs to increase their activity and output of work and not in order to induce repose".

"As for our opinion on the question whether or not coca-chewing is a drug addiction, it is perfectly clear from our previous publications. We have never said that the thousands or millions of South American coca-chewers were drug addicts; we simply called them 'subjects habituated to coca'. There is a considerable difference between habituation and drug addiction, although there are many transitions between the two states. The most we have ever said in any of our works is that there are certain cases in which habituation to coca acquires the characteristics of drug addiction, which is obvious. But the danger from toxicity in coca-chewing does not lie in the production of drug addiction only, for there are other toxic reactions of the chronic type which are in no way related to drug addiction. The Peruvian people consume 24 to 50 tons of cocaine a year. Can medicine and public hygiene allow this monstrous consumption of a drug the toxic effects of which have been so universally demonstrated?"

Gutiérrez Noriega censures the statement made by certain travellers (see, for example, Merzbacher, No. 90) that "coca is necessary to life in the Andes". Such statements must be regarded as "devoid of any foundation". He says, "I do not exclude the possibility that coca may produce a favourable effect at high altitudes—but I do not believe that it is therefore indispensable to life at high altitudes".

He then gives in detail the reasons which lead him to "deny that coca is 'indispensable' to life at high altitudes."

"It has been proved that in the days of the Incas, coca-chewing hardly existed among the rural population of the Andes."

"If coca is indispensable to life at high altitudes, it is inexplicable that a large number of communities situated more than 3,000 or 4,000 metres above sea level should be able to live perfectly well without coca." [See also Giménez, No. 15, quoted by Gutiérrez Noriega.—P.O.W.] He adds that in other parts of the Andes and in other continents, "there are communities situated at high altitudes where coca is completely unknown".

"Not all the inhabitants of the high regions of Peru are coca-chewers; many of them never take coca or chew it only very rarely, and nevertheless their adaptation to life at high altitudes is as good as, or better than, that of coca-chewers. I refer especially to the majority of Indian women, to whites and half-castes of both sexes, and to a small fraction of native men who are not habituated to coca. It follows from this, and also from the fact that there are many communities adapted to life at high altitudes which are not habituated to coca, that the relation between coca-chewing and altitude is not general. Of all the earth's population adapted to life at high altitudes, only a minority chew coca.

"It is without foundation" and "a hypothesis in favour of the coca habit to affirm, as Monge has done, that 'there is a direct relation between altitude and the coca habit'. He says that it may be asserted that between 12,000 and 15,000 feet above sea level, all the natives of the Andes chew coca, that between 8,000 and 12,000 feet, the coca-chewing population diminishes, and that below that height, and particularly at sea level, the coca-chewing habit is entirely abandoned." Gutiérrez Noriega goes on to say that "this conclusion is not based on statistical data", and he quotes as an example the fact that "the Chicama valley on the coast consumes more coca than many mountain provinces; half a million kilogrammes according to the latest official figures. This coastal hot-bed of coca-

chewing is due to the fact that colonies of Andean natives are settled on estates in the Chicama valley, which contradicts the statement that on coming down to the coast, people abandon coca-chewing because of the climate."

There are also coca-chewing regions in "Brazil, where there are certain tribes, particularly the Huitotos of the Amazon region, which chew coca leaf with lime as the natives of the Andes do. In this case the habit is not caused by the peculiarities of the climate of the low forest region, but by the proximity of coca plantations". He also refers to similar altitudes in Tibet, where at 5,000 metres, and even up to 8,000 metres, the natives carry loads without chewing coca, while white men can hardly walk, let alone carry any burden. He adds that "there is no constant relation between coca consumption and altitude; . . . in many cases, provinces at a medium altitude consume more coca than provinces situated in the highest regions."

He later adds that "coca is not an indispensable factor in life at high altitudes." The author also says that "in the Department of Puno there are farms where efficient work is done without any need for coca. In the factories of Huancayo, I was told that the best workers were those not habituated to the drug . . . These instances could be multiplied." Dr. Sáenz (see No. 59 *et seq.*) related to the author personally "a very interesting observation which is almost an experiment: the same task was set to two groups of workers, the first made up of individuals not addicted to coca-chewing, and the second of coca-chewers who used the drug during the work. The result was spectacularly in favour of the first group."

If, as Monge maintains, "the acclimatized native of the Andes constitutes a genuine climato-physiological racial variety, . . . it is nothing but a contradiction to invoke the assistance of a drug in bringing about acclimatization". Furthermore "the Spanish white race, and other races which have in the last few years adapted themselves to the climate of the Andes, do not use coca to assist in their acclimatization".

"It is almost certain, of course, that the organism reacts rather differently to cocaine at high altitudes and on the littoral; . . . nevertheless, these small benefits should not be exaggerated to the extent of agreeing that the toxicity of narcotic drugs disappears at high altitudes."

Malnutrition among coca-chewers plays a very important part in the coca problem. "We agree with the statement that the less the coca-chewer eats, the more coca he needs. Generally speaking, he eats only half the normal ration." This observation is important. I wonder whether any conscientious medical man can maintain that coca can replace half the minimum ration of foodstuffs, and whether it is logical to accept diets below the minimum, simply because coca diminishes the sensations of hunger and fatigue.

"It is also suggested, in the works on which we are commenting, that the inhabitants of the Andes display greater resistance to cocaine than other races." Referring to the notion of a climato-physiological race, the author says: "How can it be explained that the difference in the susceptibility of this so-called race to cocaine extends only to its toxicity and not to the other properties of the drug? If we raise a race's resistance to a drug's toxic action it is more than likely that its resistance to the other pharmacological effects will increase also. In the case of a climato-physiological race of coca-chewers, we should have to admit that, owing to their ethnoclimatic variation, the toxic effect of cocaine diminishes, but its acclimatizing and 'anti-fatigue' effects remain."

The "anti-fatigue" effect of cocaine—like that of many other neuro-stimulants—justifies its use "in cases of emergency, but it is inadmissible that such drugs should be administered regularly in normal conditions. No Government or scientific body would accept this abnormal procedure in order to increase the output of work. Output can only be improved through a diet rich in calories and vitamins, and hygienic working conditions.

"It would be most gratifying if as a result of the studies of life at high altitudes, better legislation regulating labour at high altitudes were to be enacted, the wretched diet of the inhabitants of the Andes improved, and a study made of the special hygienic requirements of life at high altitudes. To imagine that coca-chewing is the solution to these problems is a very serious mistake, showing a grave lack of discrimination. We have already seen, from the previous survey, that the arguments in favour of coca-chewing not only contradict fundamental principles of pharmacology, but are totally illogical since they even contradict each other."

(26) GUTIÉRREZ NORIEGA, CARLOS

"*Estudios sobre el hábito de la coca*" (Studies on the coca habit). *Revista de Farmacología y Medicina Experimental* (Lima), 1, 124-126; 1948.

The author states that "although the number of coca-chewers and the quantities of coca consumed are not known exactly, it may be estimated that the first constitute the majority of the Andean population of Peru and Bolivia, while the consumption of coca leaf in the two countries is certainly not less than 10,000 to 14,000 tons a year".

Reference is made to the Commission of Enquiry which the Economic and Social Council of the United Nations is to send to Peru at the request of the Peruvian Government. He adds "We should note that much emphasis has been placed on the fact that opinions on the effects of coca-chewing are contradictory. There is no doubt that those who have investigated the problem are unanimous in agreeing that the effects of coca-chewing on human health are unfavourable. Its effects are favourable only according to those who put forward purely theoretical opinions not based on any serious arguments."

"We hope that the intervention of the Economic and Social Council of the United Nations will be a powerful influence in restricting or abolishing coca-chewing in the Andean region, and in giving effect to the conclusions of the Peruvian investigations into this great South American social problem. The elimination of coca-chewing would be one of the greatest historical events for the good of the Andean people. A drug which has done so much harm to public health in other countries, where it is strictly prohibited, cannot be of benefit to the peoples of South America."

"The phenomena to be inquired into by the investigator of this great South American problem are . . . very many and of particular complexity. The work still to be done . . . is enormous and heterogeneous. Let us hope that its great scientific value, its medical and social significance and its eminently humanitarian purpose will be recognized, for only in that way will it be possible to continue the task already begun with such effort, in the face of so many difficulties."

(27) GUTIÉRREZ NORIEGA, CARLOS

"*Observaciones sobre el cocaísmo obtenidas en un viaje al sur del Perú*" (Observations on coca-chewing obtained during a journey to Southern Peru). *Revista de Farmacología y Medicina Experimental* (Lima), 1, No. 2, 232-252, 1948.

In July 1948, the author, accompanied by Dr. Vicente Zapata Ortiz, made a study tour of the Departments of Cuzco and Puno in the south of Peru, where there are extensive areas producing coca.

According to their observations, the drop in coca production which occurred between 1932 and 1935 in the valley of Convención, an important centre of coca cultivation, was due "probably to an increase in malaria after 1932, which decimated the population of Convención so that there were not enough rural workers to cultivate and harvest the coca . . ." "As the health conditions improved", thanks to an effective anti-malaria campaign, "and the population increased, coca production also rose gradually . . . This meant that the good results of the anti-malaria campaign had an unlooked-for effect on public health as a whole, since the decreased mortality in a province

of 20,000 inhabitants indirectly produced an increase in the production of a drug affecting the health of millions of people. If it is borne in mind that, also as a result of the better health conditions, the cultivation of sugar cane for the preparation of spirits increased to such an extent that the annual production was doubled, we come to the paradoxical conclusion that the anti-malaria campaign . . . had the result of increasing the supply of two undesirable drugs".

"In general, less coca is consumed in the valleys than on the plateaux or neighbouring uplands; however, we believe that the physiological effects due to high altitudes are not in any special way the cause of this. It is primarily due to economic factors. The people living at high altitudes are extremely poor—as a result, they eat coca to alleviate hunger. Secondly, they chew coca in order to feel the cold less, just as in other cold countries alcohol is drunk for the same purpose. Thirdly, there is a cultural or social factor; the mountain dwellers are extremely isolated, living in very wretched and primitive conditions, and they lack distractions of every kind. Thus, because of the artificial sensation of well-being that it produces, coca acts as a palliative of these unfavourable circumstances."

The observation of persons habituated to coca confirms earlier conclusions. "It is impossible to draw a hard and fast line between the genuine drug addict and the habitual coca-chewer, who chews a small ration of coca without experiencing its toxic effects. In certain cases, . . . the number of persons among the rural population accustomed to large doses is very great.

"The majority of habitual coca-chewers do not show such obvious signs of chronic intoxication as the inveterate coca addicts. This does not mean of course, that twenty or forty grammes of coca leaf—very common individual doses—do not produce any toxic effect. Individuals with symptoms of malnutrition and very low mental capacity are much more frequent in communities where coca-chewing is widespread than in communities where the habit has not developed to the same extent."

On the other hand, villages "where the consumption of coca is less than in neighbouring villages, are remarkable for the intellectual capacity of their inhabitants as compared with those of the latter". Also, the proportion of illiterates is "much lower than the average for the area".

"It would be a mistake to invoke ethnic factors to explain such variations, since there are villages in the same region, with a high proportion of white inhabitants, where the coca habit is very widespread, and the same degree of economic poverty and intellectual deterioration is met with as in the most miserable coca-chewing village. We have also collected a great deal of information on white men, some of European nationality, who have fallen into the habit of coca-chewing, with all its deplorable repercussions on personality and intellectual capacity."

The following observations which confirm similar ones made previously by Ricketts (see No. 55), seem to us of particular interest:

"The example of the Salcedo Farm in Puno, where the Salesian Fathers are educating two hundred Indian boys, is worthy of special mention. The physical and mental state of these boys offers a significant contrast to the rest of the population. All the boys receive primary education and some go through the first stages of the intermediate course, with results greatly superior to the other schools, and, in addition, they learn various trades. When we visited this school-workshop, we had the impression that this little group of natives were freeing themselves from the great disaster overshadowing the rest of the community. Something similar is to be observed on farms in Yucay and Quillabamba. The young people working on these farms have not been specially chosen, and the only explanation of their greater capacity for work and their intellectual characteristics is that they have been removed from the coca and alcohol habits and the wretched atmosphere of their homes . . . The boys educated there, many of whom

chewed coca before entering the institution, often on leaving the farm retain the good habits they have acquired, but there are cases in which they slip back into coca-chewing and alcoholism under the influence of their environment."

The good example just mentioned "cannot be generalized, since inveterate coca addicts can never free themselves from their addiction. There are women who cannot give up the coca habit in spite of the severe punishment they receive from their non-chewing husbands who consider the habit degrading.

"Our opinion with regard to the possibility of persuading coca-chewers in whom the vice has not become inveterate to abandon the habit is optimistic. The work being done by the Adventists of Puno is an example worth studying. This religious sect has obtained some 6,000 converts, who pay 10 per cent of their wages to belong to the Order. The Adventists teach them that since the body belongs to God, it is sacred, and must not be soiled with impure things, among which they include coca and alcohol. Thus they succeed in weaning them from coca-chewing and alcoholism, which means that their capacity to contribute to the subsistence of the Order is increased."

"Many believe that coca is an important factor in the national economy, but we consider that its elimination would be much more profitable . . . Consequently, those who consider that the health of the people is less important than the mediocre profit produced by coca, should bear in mind that the abolition of coca-chewing may produce more money than the coca trade.

"This statement is perhaps too optimistic if it is applied to all coca-chewers, since genuine cases in which the vice has become inveterate or an addiction—which constitute a minority—present a different problem. It would not be easy to make them give up coca. The Adventists themselves confess that they are most successful with persons who are only slightly habituated, which means that they choose their converts."

"Coca-chewing is very frequent among workers in the factories in the Andean region in the south, who chew coca while at work." Of two factories, situated in Cuzco itself, one had two hundred and fifty workers, 90 to 95 per cent of whom chewed coca, while the other had one thousand workers, only 5 to 10 per cent of whom had the habit.

"A comparison between these two groups, who work in identical climatic conditions, is instructive, particularly for those who believe that the stimulating effect of coca is necessary if the people of the Andes are to work.

"In the first factory, where coca-chewing is prevalent, the workers show marked physiological and mental deficiencies and their physical output is probably low also . . . The general opinion of the foremen . . . is that coca-chewing reduces the workers' mental capacities. Among the female workers, who are noticeably more punctilious in carrying out their work, coca-chewing is very rare." On the other hand, the workers in the second factory "have a much better general appearance" . . . "Their mental, physical and economic capacity is much higher, and they work with greater regularity. Glossitis and conjunctival congestion are as rare among these workers as they are frequent among the first group."

Another example is as follows: "In general, in textile factories where the workers chew coca, one worker can tend only a single loom, while in other factories one man can tend two looms". Reports from other factories confirm these observations.

Similar observations have been made with regard to the output of peons, for example: "The stimulating effect of this drug, though very powerful, is not enough to counteract the physical debility produced by malnutrition and the toxic effects of the drug".

The authors affirm the extremely bad influence of the coca habit on the teaching of children, and education in general. "Any attempt at education, including the teaching of better

hygiene and living habits, fails completely. With natives who do not chew coca, the results are different, since their capacity to learn may be regarded as normal."

"The mental deterioration . . . in the personality of the coca-chewer" is also shown "by the Rorschach test, the results so far obtained showing very serious abnormalities."

With reference to the relations between coca-chewing and alcoholism, the authors say that "coca-chewing and alcoholism are very closely linked. But whereas the first is continuous, alcoholism is intermittent [feast days, etc.—P.O.W.]. In other words, in coca-chewing the chronic toxic effects are of special importance and the acute toxic effects less important; in alcoholism among coca-chewers, on the other hand, the acute toxic effects are more important than the chronic.

"In the provinces where coca-chewing does not exist, or only to a small extent, alcoholism is not very widespread among the native population . . . The coca-chewer, whose intelligence and personality have been undermined by the drug, gives himself up to alcoholism unreservedly, and it would be useless to try to persuade him to abstain from alcohol so long as he is not deprived of coca . . . In none of the villages in the provinces not affected by coca-chewing, is 40 degrees alcohol sold in such large quantities as in those where abuse of coca is rife; here alcohol is consumed not only by adults of both sexes, but also by adolescents and in some cases even by children . . . The spread of alcoholism is, in our opinion, an indirect result of the collective mental deterioration produced by the coca habit.

"It is very probable that the stimulating effects of coca increase resistance to the depressive effects of large doses of alcohol, which does not prevent their chronic toxic effects from combining, since both drugs are taken simultaneously on certain occasions. Cocaine, like benzedrine, alleviates inebriation and makes it easier to support an excess of alcohol.

"In this connexion, a very interesting revelation was made to me by some coca-chewing Indians of Cuzco, namely, that the stimulating effects of coca are far more intense after a day of alcoholic inebriation. The toxic effect of the alcohol therefore diminishes the resistance of the body to cocaine."

(28) GUTIÉRREZ NORIEGA, CARLOS; RICKETTS, CARLOS, and SÁENZ, LUIS N.

Resolución sobre los efectos del coqueo, 1948 (Resolution on the effects of coca chewing).

The three authors prepared the text of a resolution for the Second Indigenist Congress of Cuzco, which was to have been held in October 1948.⁶ (See as regards this resolution, Nos. 40 and 57.)

The authors state "that coca constitutes the greatest obstacle to the improvement of the Indians' health and social condition, because it harms the physical and mental health of those who consume it, increases their susceptibility to diseases preventable in normal persons, and hinders their education by transforming them into infra-social beings, all of which means that they suffer grave economic prejudice;

"That as long as coca-chewing is unrestricted as it is today, there will be no possibility of improvement for the Indians, and methods successfully applied in other countries for the physical and social betterment of the human race will not bear fruit."

They propose that the Indigenist Congress "should recommend . . . the draft laws submitted to Congress for the suppression of coca-chewing, and especially the establishment of a State coca monopoly", and that the people should be educated "so that the ignorance now reigning in Peru regarding that harmful practice should no longer subsist".

⁶ The Congress was held at Cuzco in June 1949.

(29) GUTIÉRREZ NORIEGA, CARLOS

"*El cocaísmo y la alimentación en el Perú*" (Coca-chewing and nutrition in Peru). *Anales de la Facultad de Medicina* (Lima), 31, No. 1, 3-92; 1948.

In this paper the author explains in detail the reasons why "coca-chewing is a result of the deficient diet of the peoples of the Andean region". He propounds, among others, the following arguments:

Under the rule of the Incas, the coca-chewing habit was almost unknown (prohibited) among the "very well nourished" people. According to the few facts known about the pre-Inca period, "the first rulers of Cuzco drove the primitive coca-chewing peoples out into the forests".

"The diffusion of coca addiction originated at the time when, as a result of the war of conquest and the change in the country's organization, there was a considerable decrease in agriculture and agricultural production, and an almost complete destruction of the early cattle-raising industry of the Andes region . . . this was the cause of a catastrophic national impoverishment . . . Some historical data reveal that the Andean people submitted to poverty and privations of all sorts as a means of passive resistance" against the conquerors. "Coca . . . was in these circumstances an indispensable factor in the adaptation of the organism to such deficient and abnormal conditions of life. This drug has been an extraordinary aid to the Andean people for four centuries in supporting extreme poverty.

"Coca-chewing is prevalent in the social class poorest from the economic point of view, and least developed intellectually.

"The present investigations . . . also show the close connexion between coca addiction and poverty, and particularly between coca addiction and under-nourishment. In the districts in which there is the greatest consumption of coca—from 2 to 4 kilogrammes yearly per head—the daily food ration is 767 grammes per head . . . in districts in which there is the least coca addiction, 0.1 kg. of coca yearly per head, the food ration averages 1,096 grammes daily.

"The phenomenon presents anthropo-geographical evidence of a spectacular kind: the scantier the diet, the greater is the intensity of coca addiction; with a more ample diet, on the contrary, there is a reduction in the intensity of coca addiction.

"The food rations current in provinces in which there is intense coca addiction do not provide the minimum of calories indispensable for human life. The number of calories in such rations is less than 2,000, and the minimum necessary to support a peasant worker is from 3,000 to 4,000 calories. Coca, of course, is completely lacking in nutritive and energy value.

"Such an obvious insufficiency in the caloric value of the diet is one of the main causes of the chronic fatigue from which coca addicts suffer, and their almost complete inability to carry out work without artificial stimulus . . . There are many very significant examples which show that the rural dweller of the coast who does not chew coca, and who in general is better fed than the hill worker, has at high altitudes a much greater capacity for work than the hill dweller who chews coca, which indicates that the stimulating effect of coca is not sufficient completely to counteract the organic weakness produced by partial inanition.

"Since in the regions in which coca addiction is intense, there is an exaggerated consumption of alcohol, it is very probable that part of the physiological minimum of calories is provided in certain cases by alcohol. Since this substance is not a food and is as toxic and dangerous as cocaine, its toxic effects . . . are added to those of this alkaloid."

Later we find the following passage: "It is exceptional to find a chewer who is not at the same time an inveterate alcoholic. In the geographical areas in which coca addiction predominates, the consumption of alcohol is considerable. In villages in which there is intense coca addiction, big tanks of aguardiente and bales of coca are to be found in one and the

same shop and constitute an article of primary necessity with a high consumption. In the same places, the rural workers receive, as almost their only wages, weekly rations of coca and aguardiente, and both products circulate almost like regular money. It is almost inconceivable that this monstrous situation should be tolerated and encouraged.

"There is no doubt, since one gramme of alcohol provides seven calories, that part of the minimum calories requisite for life is provided by alcohol, to which in some districts grown men, women and children are accustomed. In certain cases, as much as half the minimum energy quota may come from alcohol. The consumption of this substance, as well as that of coca, is increasing in a progressive and alarming way.

"In all parts of Peru the diet is deficient because of its low protein and vitamin content, but this deficiency is much greater in the coca-consuming regions. The diet in the latter is not only deficient because of its scanty energy-producing value, but also because of its deficient protein, fat and vitamin content; those substances are present in quantities less than the physiological minimum.

"The Andean people offers an almost unique example in the history of humanity, because it has endured and survived so many privations in the course of four centuries. Persons of some authority state that such a capacity for resistance is due to coca. It would be more logical to say that such a resistance has existed in spite of coca, and that the present Andean people is not an expression of the great power of adaptation of the Indians to such abnormal conditions of life, but is composed of the survivors of a great catastrophe. For the protagonists of coca consumption, only the living count; they have no inkling of the millions of victims it has caused in the course of four centuries. Nor do they mention the present high mortality rate among children and adults in coca-chewing regions.

"The problem of the relation between under-nourishment and coca addiction is becoming alarmingly and progressively worse, since in recent years there has been noted, along with a decrease in the production and consumption of food, a considerable increase in the production and consumption of coca . . . People begin . . . to chew to appease hunger, and end by acquiring an abnormal moderation in the consumption of food, caused by chewing. Chewers, in fact, are excessively moderate eaters who end by adapting themselves to deficient diets. At the first they chew because they do not have enough to eat; then they do not eat enough because they chew.

"At the same time a parallel increase in the production and consumption of alcohol is observed.

"The ancient Spanish chroniclers deplored the fact that in their time there was in Peru a thousand times more coca than during the period of the Incas, and we deplore the fact that in our time ten times more coca is produced in Peru than in colonial times.

"It is urgently necessary to take immediate steps to reduce the production of both toxic substances and to prevent the increase of their corresponding addictions. The advisability of replacing plantations of coca and of sugar cane for the production of spirits by plantations of food-producing plants is suggested.

"All plans for combating coca addiction and alcoholism and the production of the drugs which cause them, must be accompanied by plans for improving food production and the diet of the Andean inhabitant, and by other indispensable measures to improve his living conditions and deliver him from addiction to these vices."

(30) GUTIÉRREZ NORIEGA, CARLOS

"*El hábito de la coca en el Perú*" (The coca habit in Peru). *América Indígena* (Mexico, D.F.), IX, No. 2, April 1949.

The author, after a short historical summary, describes the causes which favoured the expansion of coca addiction, and deals, as in other works of his, with the phenomena of habitua-

tion to mastication. These are as follows: "There are important differences between the coca habit and cocaine addiction in spite of the existence of common phenomena . . . In subjects addicted to coca, cocaine enters the organism orally and in smaller doses than those to which cocaine addicts are accustomed. Although the average dose is 179 milligrammes, it may in special cases be twice or three times that amount, but even in these cases, it is always much smaller than the daily dose of cocaine addicts, which may be from 1 to 5 grammes. Consequently, in coca addiction, the dramatic toxic accidents which are frequent among cocaine addicts scarcely occur and its toxic effects are much slower and essentially chronic in character. For that reason, we stated that coca addiction is a slow process of intoxication, with changes of a chronic nature, which last as long as the life of the individual."

"The chewer's symptoms of habituation are relatively weak, which means that the subject can with relative facility free himself from his addiction to the drug. In very serious cases, which absorb 100 to 200 grammes of coca leaf daily—quantities two to ten times greater than the majority of chewers—it is very difficult and almost impossible to give up the drug, and its suspension may give rise to moderate symptoms of abstinence."

"Phenomena of acquired tolerance, that is to say, a progressively increasing resistance to coca and the need to increase the daily doses with the passage of time, are not observed among chewers. We found that in the majority of cases the dose remains unchanged through life. Moreover, experiments on rats, dogs and other animals show that cocaine does not produce phenomena of tolerance but phenomena of increasing sensitivity."

"The causes which give rise to the coca habit in the majority of cases are the following: the necessity of allaying hunger; the necessity of obtaining a stimulus for physical labour and to counteract the fatigue of prolonged work; and, thirdly, coca is used for its psychological effects in order to obtain freedom from states of depression or psychologically disagreeable states. An accessory use of coca is to diminish the sensitivity of the organism to cold, and to prevent sleep when night-work is undertaken."

"Finally, it should be remembered that among all the stimulants of the nervous system which have been experimentally studied, cocaine is the one which produces the most intense and spectacular phenomena of habituation."

The author then refers to the acute physiological disturbances produced by coca, which he considers "not very important". As regards the psychological effects, he says: "The acute effects of coca on mental activity are very distinct. Big doses produce disturbances of thought, of affectivity and of the main perceptions. The acute effect of coca on mental activity is very different from the effect of alcohol; the latter favours extroversion while coca favours introversion and autistic states."

The present work, which may to a certain extent be considered as a reproduction and summary of other previous works, ends with an examination of the relations between coca addiction and nutrition (see above, No. 29), and between coca addiction and fatigue, referring to his previous observations.

(31) IBÁÑEZ BENAVENTE, ABELARDO

"La sanidad en Bolivia" (Health in Bolivia). *Boletín de la Oficina Sanitaria Panamericana*, 21, 2; 1942.

Among the "negative factors" which "contribute to aggravating and rendering difficult the solution of the problems inherent in any scientific and co-ordinated action in favour of the health and hygienic conditions of the inhabitants" of Bolivia, the author, at that time, Minister of Labour, Health and Social Welfare of that country, mentions "alcoholism and the continuous immoderate use of coca".

In the memoir presented to the National Congress, he states: "We shall say little of the other harmful factor of coca, the chronic poisoning which it produces in the organism: that factor, which undoubtedly exists and causes serious damage in

a slow but sure way, has not yet been scientifically studied. Nevertheless, it should be carefully borne in mind in any action by the State against the habit of chewing coca, which weighs like a fatal burden upon the majority of our population."

(32) KUCZYNSKI-GODARD, MÁXIME H.

La Colonia del Perené. Contribución al estudio de la colonización de la selva peruana. (The Perené Colony. Contribution to the study of the colonization of the Peruvian forest). Lima, Ed. *La Reforma Médica*, 1939.

This colony is in the Amazon river basin and is from 650 to 1,300 metres above sea level. It is a cultivated zone (particularly fruit and rice) in a completely tropical region with a very scanty native population. Some diseases, particularly ancylostomiasis, as well as denutrition and coca, contribute to its poor health conditions.

"Unfortunately it is not easy to eradicate the abuse of the coca leaf . . . Coca would appear to do more harm in the forest regions than in the uplands. Coca addicts can be recognized at first glance: they are apathetic, expressionless, lose part of their sleep chewing coca . . . Coca-chewing may be very useful in special circumstances to enable a healthy and well-fed person to work long hours without interruptions for meals. It becomes, however, an absolute danger in regions where adequate nutrition under adverse climatic conditions is a *sine qua non* of normal resistance against infections of the malarial type and against intestinal infections. Coca-chewing promotes under-nourishment . . . Coca and ancylostomiasis usually go together, and quite naturally its addicts can only do a small amount of work."

"It seems to me that this deleterious effect of coca-leaf chewing in the forest regions springs from the bad somatic condition of the addicts, and from demands on their physique which are beyond their powers . . . I have been told by such an experienced observer as Dr. Caravedo that there is a world of difference between a healthy Indian child and the adult chewer; they are two completely different human beings."

The author considers that coca-leaf chewing is "a vice that threatens immediate danger to the individual and damages the reputation of the community".

(33) KUCZYNSKI-GODARD, MÁXIME H.

Idem, Second memorandum. Lima, 1939.

"The majority of cases of incapacity for work are undoubtedly still due to malnutrition. In this connexion discussions were held in the Colony on possible methods to combat the practice of chewing coca leaf. Administrative measures appear to me to be quite inadmissible. What is required is a patiently conducted system of education, starting with the children, and the organization of working and living conditions in the Colony to the best advantage. The vice of cocaine [coca chewing—P.O.W.] practised by the degenerate workers must be eradicated by a moral campaign, by an effort of regeneration that must spring from an enthusiastic and educated youth. These ideas must be sown in youthful minds through a serious campaign of propaganda entrusted to the schools. Children of five years of age can still be seen chewing coca leaf!"

The author states that he has "observed workers who chew up to two pounds of coca leaf per week. This corresponds to about 100 grammes of dry leaf every twenty-four hours. The coca leaf comes from Huánuco and is very rich in cocaine, with a content of 8 to 10 grammes per kilogramme. The leaves therefore contain nearly 0.8 grammes of cocaine and it may be assumed that the extraction by prolonged mastication with lime and alkaline ash is fairly complete. It should be remembered that this quantity is more or less the toxic dose as laid down in the pharmacopoeia. In two men that I had under observation, I clearly noticed hallucinations, persecution mania, and jealously with intense temptation to kill the woman. They thought that their farm was bewitched, etc. They both showed almost classic characteristics of the well-known syndrome of chronic cocaine poisoning."

(34) KUCZYNSKI-GODARD, MÁXIME H.

El departamento de Amazonas. Algunas observaciones médico-sociales (The Amazon Department. Some medico-social observations). Lima, 1940.

The author states that in only some towns are there people who chew coca leaf.

(35) KUCZYNSKI-GODARD, MÁXIME H.

"El hambre de proteínas, la anquilostomiasis, la coca y la opilación" (Protein hunger, ancylostomiasis, coca and opilation). Ed. *La Reforma Médica* (Lima), 1940.

The symptoms of "opilation" as defined by H. W. Maier in his monograph on coca-leaf chewing (Leipzig 1926, Paris 1928,) do not correspond to those generally observed. In reality, opilation is the clinical expression for a "loss of proteins aggravated by intestinal disorders which impede the optimum, or at least regular, absorption of food", very often accompanied by ancylostomiasis. Coca plays no part in opilation. "On the other hand, I have always held that in the forest region the coca leaf is a homicidal drug because it engenders malnutrition through the suppression of that protective urge which is called hunger."

(36) KUCZYNSKI-GODARD, MÁXIME H.

Estudios médico-sociales en minas de Puno, con anotaciones sobre las migraciones indígenas (Medico-social studies in the Puno mines, with notes on indigenous migrations). Lima, Ministry of Health and Social Welfare, 1944.

The San Antonio de Esquilache mine, where the studies were undertaken, is situated at an altitude of 4,490 to 4,675 metres above sea level; it produces lead and zinc. The author states that among the miners "there is always that corrective but somewhat dangerous drug known as coca". He considers that coca is "rather a continuous condiment in the life of the impoverished Indian" and compares it to the "pub, and its alcoholic beverages, of old England". Therefore, he says: "when the social and economic conditions improved, the "pub" went into a decline and its role in the life of the people diminished gradually and appreciably. When sport became the moral force of youth, alcohol became taboo". As regards coca, "it is observed, as in the case with social alcoholism, that an improvement in economic standards tends to cause the disappearance of the drug".

(37) KUCZYNSKI-GODARD, MÁXIME H.

La Pampa de Ilave y su hinterland (The Pampa de Ilave and its hinterland). Lima, Ed. *La Reforma Médica*, 1944.

This region is situated on the high plateau at an altitude of over 3,800 metres above sea level, near Lake Titicaca. The author found that a considerable part of the Indians' wages was still being paid in the form of coca leaf.

(38) KUCZYNSKI-GODARD, MÁXIME H.

Estudio familiar, demográfico-ecológico en estancias indias de la altiplanicie del Titicaca (Ichupampa) (Family, demographic and ecological study of Indian farms in the Titicaca (Ichupampa) highlands). Lima, Ministry of Public Health and Social Welfare, 1945.

The author points out, with detailed figures, the "primary importance of the coca leaf and alcohol in the (family) budget". "Young men chew relatively little; women of the same age, much less. The habit of coca leaf chewing becomes progressively more intense among men after their thirtieth year, especially among those employed in the fishing and weaving trades. Older men chew much more than do the women of the same age group, though relatively less than the men."

(39) KUCZYNSKI-GODARD, MÁXIME H.

"El pensamiento arcaico-místico del campesino peruano y la arqueología" (The archaic-mystical outlook of the Peruvian rural dweller and archaeology). *América Indígena*. (Mexico), 7, 239; 1947.

The author shows how "alcoholic, and even more, cocaine intoxication induces pleasant hallucinations and illusions of the wish-fulfillment type".

(40) KUCZYNSKI-GODARD, M. H., AND PAZ SOLDÁN, C. E.

Diseción de indigenismo peruano. Un examen sociológico y médico-social (Dissection of the Peruvian Indian. A sociological and medico-social study). Lima, Publications of the Instituto de Medicina Social, 1948. 156 pages.

This book contains the results of studies undertaken by the author who spent a considerable time carrying out investigations among the Indians in various parts of Peru. One of its chapters is called: "Indigenous coca-leaf chewing".

In the author's opinion "it may well be" that the official figure for the consumption of coca leaf, that is, an average of 5,000 tons per annum, is below the actual figure.

He considers that "the use of this plan by well-nourished individuals does not cause serious damage, either to the individual or to the community", but "the practice becomes vicious when food is scanty or lacking", that is, when food is replaced by coca leaf.

The chewers maintain at all costs the degree of torpor which suits them; quite a few rise two or three times during the night to prepare a new "ball" and chew it carefully. The consequences of such perversion can readily be seen in their faces and in their reactions.

"Over-indulgence and demoralization reach their maximum among migratory workers or those who have not settled down, like those we found in the Yunga valleys of the forest region where the coca plant is cultivated. The interest of the inhabitants is concentrated almost exclusively on the coca plantations." [The indigenous workers on the coca plantations of Java do not chew coca.—P.O.W.]

Even today "work is frequently paid for with coca leaf"; the addicts "not only indulge in their habit day and night, but they also induce other people, including their own sons and daughters under age to follow their example . . . The stupor that such ingestion produces in many individuals is so evident to a medical observer that it seems absurd to speculate whether the coca chewed is or is not toxic". [The author refers in particular to the work of Cabieses, No. 87.—P.O.W.] "In 1939 I published photographs of strongly addicted workers, men who more closely resemble a group of paranoiacs or half-wits than farm-workers who are supposed to be able to do some work".

He goes on to say that "the indigenous social problem of coca is closely related to the wandering and dual life led by many rural workers, their 'rural nomadism' in search of work and money, and they take their dietary habits with them to the hot valleys where they live. Their life is one of great privation, with very little farinaceous food and they refuse to eat the local products because they have not acquired a taste for them and in order to avoid spending a few centavos".

"The coca problem is one of hunger. Like the problem of alcohol, it is an economic problem because of the existence of the coca plantations and a social problem because of the lack of food and the failure of men to adapt themselves to a new environment . . . Never have I seen a case of gastric ulcers or serious abdominal disorders in those truly addicted to chewing the coca leaf, in spite of the fact that they eat enormous meals at long intervals, interrupted frequently by long spells of 'hunger plus coca' with the addition of a strong alkali (*Ilipta*)."

The Adventists have "eradicated the habit among their parishioners in the Lake Titicaca region. There is enough food in that region; the suppression of the coca habit did not prove very difficult, as the toxicologists pointed out some years ago would be the case.

"Experiences of this kind show what suitable education can do towards eliminating the use of coca when it is also possible

to eliminate the chief cause of the habit, namely chronic hunger."

As a result of his observation of workers on road construction, the author was able to distinguish two categories of workers: the first category were "all suffering from malnutrition and addicted to chewing the coca leaf", the others were all properly fed and had not contracted the coca habit. The latter category earned far more money "and they showed the value of the human factor, good food, health, strength and all that results from these fundamental conditions of the wealth of a nation. That was a decisive proof in favour of a high standard of living and its importance to national welfare and efficiency.

"In the same way, the exact returns of the engineers in construction work show quite clearly that the human output at Cuzco is barely half that at Lima." At Cuzco the workers lived "miserably, with bulky food low in nutritive value and they chewed coca leaf"; while at Lima "the coca habit was non-existent or at any rate insignificant and everyone was well fed."

In conclusion, the author states that "observations of this kind put us on our guard against any mystical approach to the subject and against the supposed 'sacred value' of chewing the coca leaf. Rarely, if ever, has it been possible to compare the fundamental factors in the positions of addicts and non-addicts."

(41) KRUMDIECK, CARLOS F.

Introducción al estudio de la psiquiatría (Introduction to the study of psychiatry). Lima, 1934.

According to this author, a professor in the Faculty of Medicine at Lima, the marked prevalence of mental deficiency among the indigenous population is due to the habit of chewing the coca leaf.

(42) LASTRES, JUAN B.

Investigación histórica del pasado nervioso peruano (Historical survey of the nervous system in Peru). Thesis for a doctor's degree, Lima, 1935.

The author, professor of the history of medicine in the Faculty of Medicine at Lima, explains that "the coca leaf has an intensified effect on the indigenous population because they are constitutionally hypo-sensitive." He also says that "it is correct to state chiefly that the drug has extremely harmful effects on the nervous system, which it attacks, and that the doctors of ancient Peru were most certainly familiar with its pharmacodynamic effects but did not interpret them correctly".

(43) LINARES

Draft law for the suppression of alkaloids, submitted to the Argentine Senate on 18 October 1924.

This draft, the author of which is a doctor and was at that time Senator for Salta, provides: "No person or undertaking not authorized to sell medicaments may sell coca leaf in public".

The preamble states, *inter alia*, that "the Creole of the north, because of the blood of the Incas he has inherited from his forbears, considers the coca leaf as a divine gift". It adds that "the lower classes of our northern population, who have some of that blood in their veins, believe not only that the use of the coca leaf is harmless, but also that it is desirable and even essential in order to restore their strength when they are exhausted with fatigue, to alleviate pain, to give them courage and to make life more agreeable. They are born and bred with that idea . . ."

"There are many workers who chew 100 grammes of coca leaf daily, that is to say one kilogramme in ten to twelve days, which means that their organism absorbs eight grammes of cocaine in a little more than a week."

Referring to the known stimulating effects of cocaine as well as the harmful ones, such as insomnia, "over-excitation of the nerves, serious intestinal . . . disorders" the author says that "they attribute their illness to other causes and continue in their vice with even greater frenzy."

". . . I have seen some most deplorable cases. Strong and tireless workers changed by the coca habit into skeletons, weak in body and will power, their health and their resources ruined, struggling with their families against extreme poverty. I do not exaggerate when I say that there are some addicts who work solely to obtain the coca leaf, since they spend the greater part of their pay in its purchase. The coca leaf is greatly valued by merchants because it is certain to sell well and to bring in easy profits."

In certain regions "more evils are attributable to it than to alcoholism."

(44) MARROQUÍN, JOSÉ

"Cocásmo entre los indígenas peruanos" (Coca addiction among the indigenous inhabitants of Peru). *La Crónica Médica* (Lima), 60, 309-315; 1943.

Nowadays the indigenous inhabitants, besides chewing the coca leaf, use it as an instrument for religious activities, to work miracles and cures.

"Two things are clear concerning coca addiction among the indigenous inhabitants: in the first place it is so widespread that we can almost say that there are no non-addicts among the Indians, apart from those who have been converted to Christianity. In the second place the quantities consumed are generally moderate . . . That explains why no very notable physical effects are produced on the native chewer.

"Believing erroneously that coca increases his energy, the Indian is initiated into this vice at the age of eight to ten years and he keeps up the habit throughout his life. When he has to do unusually arduous work, such as at the sowing or shearing period etc., he increases his ration of coca leaf because he thinks that, in that way, he will replace the extra energy he has used. If he thought it would increase his energy, he would not use it, because the work is done for another person. When he ceases to chew coca leaf, he feels the evils of abstinence: a tired stomach, weakness, a feeling that he is unwell etc. He does not, however, feel the violent craving felt by other drug addicts, since he can stop chewing the coca leaf for a certain time (like domestic servants and military conscripts) or he can stop completely like the Adventists."

Nowadays, and since the work of Valdizán (see No. 65), "no one can defend coca addiction among the indigenous inhabitants. In the first place, it is a vice and as such is reprehensible and cannot fail to have a harmful influence because of the alkaloids contained in the coca leaves which are not in themselves innocuous . . . If it is reprehensible as a vice, it cannot be supposed that it is beneficial to the body, since those who do not use it feel much better, and they even cure themselves of their unhygienic mouths and their distended cheeks caused by the constant presence of the wad of coca leaf.

"Without losing sight of the harmful effect that constant use of an alkaloid is bound to have on every organ, it seems to me that many of the ailments peculiar to the mountain regions which are usually attributed to the high altitude might well be caused by coca addiction. For example, hepatitis, which is so prevalent among the indigenous inhabitants because of the constant calls made upon the liver to eliminate poisons," digestive disorders, nervous and muscular excitation, "biological impoverishment so that the body has to use up its reserves and even feed on its own substance in the absence of any compensatory food . . . And as a result of that organic impoverishment the people become predisposed to catch the endemo-epidemic diseases of the mountains. Thus their life of extreme poverty forces the indigenous inhabitants to continue chewing the coca leaf, a habit which precludes requests for a better food

ration and enables the people to live and carry on their very reduced amount of work with the minimum of food.

"It has been said that coca addiction has an influence on crime among the indigenous inhabitants. If that is the case, we consider that this applies to personal assaults, because the barbarity of some of the murders can only be explained by a certain moral insensitiveness. According to Krumdieck, the mental deficiency which is so frequent among the natives is due to the coca habit.

"The remedy for the present would be to disintoxicate the native gradually by decreasing the production and consumption of coca leaf, by restricting the freedom of trade, by educating the native population to understand that the habit is harmful and cannot possibly have a beneficial effect, by eradicating the superstition about the magic effect of the coca leaf and its veneration, by forbidding the initiation of native children to the vice, by preventing employers from paying the settlers or labourers in the uplands with coca leaf, by solving the problem of feeding the Indians during normal work and regulating their labour on the farms and in the mines. Those are probably the chief ways in which we could first of all diminish the increasing demand for the coca leaf and then later establish strict control over its cultivation." According to official statistics, the quantity of coca imported into the Department of Puno in the year 1942 was one-fifth higher than in 1938 (36,000 arrobas as against 30,000 in 1938).

(45) MENDOZA CATACORA, GREGORIO

El empleo de la coca en Bolivia (The use of the coca leaf in Bolivia). La Paz, Bolivia, *Imprenta Artística*, 1941. Pamphlet 8 pp.

The author, a professor in the Faculty of Medicine at La Paz, says that "since it is in their own interest, the owners of the mines and coca plantations continue to encourage and spread the custom of chewing coca leaf. As a logical consequence, the production of coca has increased year after year and at the present time has become an important economic factor in various regions of the country."

In 1938 some 4,400,000 kilogrammes of coca leaf were consumed in the country. "Considering the fact that a kilo of Bolivian coca contains 2½ grammes of cocaine, this means that in that year, the quantity of coca absorbed in the country contained 11,000 kilos or 11 tons of cocaine. Those figures fill one with dismay."

"This constant consumption of cocaine, even in small quantities, must, because it is a chronic vice, sooner or later be harmful to the vigour of the race, threatening and jeopardizing its future."

Under the sub-title, "False Assertions" the author goes on to say: "Until recently, persons directly interested in gaining larger and easier profits tried to convince all and sundry that coca-chewing far from being harmful was beneficial. They claimed that the vitamins in coca produced greater vigour for work, greater resistance to sickness and that coca served as a food. In some cases, they even went so far as to maintain that it produced greater mental alertness.

"Nothing could be farther from the truth actually observed. The workers in the coca-producing areas are the Indians who chew the most and the best coca; that is tantamount to saying that they absorb the most cocaine. Nevertheless, they are victims of tropical diseases on a larger scale, they look emaciated and their abject poverty is clearly visible. On the other hand, the workers of Beni, who do not chew coca and who also are affected by tropical diseases, do not have that deplorable and pitiful look and are able to endure forced labour.

"The idea that coca can replace food is a vain illusion.

"In general, the Indian as a child is gay, lively and communicative; yet, once he has reached adulthood, his mentality is sluggish, he is reserved and taciturn. The explanation of that marked change is that Indian children do not chew coca, while

adults of both sexes chew it constantly until the time of their death."

According to the author, at a National Health Congress, the doctors by a unanimous vote decided to make the necessary recommendations to the Government of Bolivia for the gradual and later the complete suppression of that harmful habit, which endangers the vigour of the native population."

"Taking into account the preceding conclusions," the author proposed "the following resolution" at the fourth Pan American Conference of the Red Cross which met at Santiago de Chile: "Considering that the coca chewed by the Indians in Bolivia contains cocaine which is harmful to the vigour of the race, recommends the Government of Bolivia and the National Red Cross to take steps for the gradual reduction of the coca-chewing vice in the country until it has been completely eradicated." The Peruvian delegate voted in favour of the resolution approved by the Conference.

The author indicates that "one of the largest coca producers proposed a draft for a 'coca monopoly' stressing three fundamental points: (1) collection of funds for the State, (2) gradual elimination of coca production, (3) construction with the funds obtained of a road from La Paz to Beni and drainage of the vast Yungas area".

(46) MUÑOZ, LAURENTINO

"Coca". See No. 10.

(47) PAGADOR, A. J.

The author, a doctor of medicine who was a Spanish delegate to the Second International Opium Conference (Geneva 1925), made the following statement at Lima in 1929, according to Ricketts (see No. 54):

"The natives of Peru and Bolivia chew coca leaf which, for the populations in both regions is a substitute for food on long marches and steep ascents in the high regions of the Andes. This habit which has brought about slow intoxication over a long period, is the principal reason for the stagnation, not to say the degeneration, of these human groups."

(48) PAZ SOLDÁN, CARLOS ENRIQUE

Un memorándum sobre la situación actual de la coca peruana (A memorandum on the current situation of Peruvian coca). Lima, Ed. *La Reforma Médica*, 1936. Pamphlet of 35 pages with annexes (31 pages).

The author, a professor of Hygiene and Director of the Institute of Social Hygiene of the Faculty of Medicine of Lima, who was at that time Assistant Director (now an honorary member) of the Pan American Health Office, refers in his introduction to the "tragic dilemma of coca, which may be defined as: wealth and poverty at the same time".

According to the author, coca chewing, a thousand-year-old practice, is the implacable tyrant which keeps the natives of the plateaux and valleys of the Andes in subjection, the defenceless slaves of the fatal drug which for those unfortunates replaces Paradise and is the only goal of all their efforts. Coca provides the driving force for their everyday tasks: it is wealth. Yet through coca, that very same driving force breaks down through impotence or fatality, and the public conscience fails to react against such a situation: the result is poverty. "That is the dilemma which our nation has not resolved in more than four centuries . . . We have always considered native coca-chewing as one of the principal causes of the backwardness and the poverty of the population of Peru."

Elsewhere he adds: "Things must be seen as they really are. The majority of the indigenous population of Peru is a legion of drug addicts. Coca holds the Indian under the influence of its leaves in the same way as their wrappings bind the petrified mummies left to us by the Incas. It is difficult to rouse him from his immobility, bound as he is by the thousand-year-old habit of coca-chewing. Yet if like fatalists we await with folded arms a divine miracle to free our indigenous population

from the deteriorating action of coca, we shall be renouncing our position as men who love civilization."

"To advise drastic measures would be completely to ignore human nature and political possibilities . . . Hence a slower but surer procedure should be followed. It consists in eliminating the use of coca among the new generations. The school, the barracks and, as a valuable and decisive element of union, the sports ground, such are the stages of progress in the conquest of this enemy. Education is therefore the sovereign remedy to be used unceasingly so that within a quarter of a century we may achieve the liberation of the Indian while still a child from the misery of coca-chewing."

Nevertheless, that action must be accompanied by "measures directed at ensuring the welfare of the family with healthy housing and a full pot through a just and equitably organized system of work . . ."

(49) PAZ SOLDÁN, CARLOS ENRIQUE

"*Actualidad de la coca*" (Present situation as regards coca). *La Reforma Médica* (Lima), 33, No. 514-15, p. 26-27; 1948.

In connexion with the discussions at Lake Success concerning the Peruvian Government's request for an enquiry into the effects of coca-leaf chewing, the author, who is also director of the above review, reproduces an article, which he had previously published (August 1947) in another magazine, intended for the general public.

In the subtitle of his article, he refers to coca as the "leaf which tyrannizes over the race" and "from time to time comes in to the forefront of events . . ."

He goes on: "I am not going to speak here of the appropriateness of the usefulness, and still less, of the danger involved. I am merely going to recall certain matters I have frequently dealt with in my deep preoccupation with this merciless poison which pitilessly saps the best energies of our native population. I do not agree that coca adds to the strength, health or optimism of those who chew it. For me that phenomenon is responsible for the decadence of the erstwhile imperial race."

He then speaks of the "terrible drug" and of the "tremendous problem of intoxication". Referring to the 70,000 kilogrammes of cocaine which the three million Indians chew each year, he says that "it would be difficult for me to agree that this is beneficial . . . On the contrary, coca was always considered an evil force. A few years ago on a solemn occasion I raised my voice in connexion with this problem and asked that we should fight against the slavery of indigenous coca addiction." Then, referring to the international and national efforts, he had said repeatedly but in vain: "Coca is there, all powerful, the fatal consoler of pain and sorrow in the Andes".

He describes the part played by coca throughout the centuries, as well as its various aspects: economic, chemical, etc., and adds that "in modern times when social considerations predominate, coca assumes a place in human preoccupations. In any case we are awaiting the report of the technical experts who, it is announced, will come to Peru".

50. PERU

Report of the Society of Medical Science of Arequipa, dated 22 April 1936 (see Ricketts, No. 54).

A commission of the above Society has stated the following:

"That the daily dose taken by the Indian is excessive and constitutes true drug addiction, harmful for the individual and the race, as is the case with all poisons. The dose is toxic not only because of the quantity ingested but particularly because its ingestion becomes a daily habit.

"That since it has been well established that a sudden discontinuance of the habit can have fatal results for the individual and the community and, besides causing individual disorders, may provoke popular uprising, we suggest that the newly created Ministry of Public Health should appoint a group of leading medical experts to study suitable and effective methods

of suppressing this inveterate habit among the Indians of consuming cocaine in toxic quantities; the ideal solution would be that they should take the drug in tonic and stimulating doses, but this is impracticable.

"That only through the suppression of the use of the coca leaf and its alkaloid will it be possible to embody the indigenous race in the life of the nation where it will be a powerful factor of progress, since it is a race that possesses many qualities."

(51) PÖPPIG, E. F.

Reise in Chili, Peru und auf dem Amazonenstrome während der Jahren 1827-1832 (Travels through Chile, Peru and along the Amazon river, 1827-1832). Leipzig, 1836.

This traveller and doctor provides valuable information, in line with modern notions, on the subject under consideration. According to him, the Indians of the Peruvian plateaux chew coca and drink strong alcoholic beverages in order to obtain at least a temporary escape from the gloomy and melancholy state of mind induced by their living conditions. Some Peruvian research workers, among others Gutiérrez Noriega and Ricketts, say that this idea is mistaken. [This mistake is somewhat common.—P.O.W.]

Pöppig had occasion to observe cases of multiple corporal, mental and social disorders which he attributed to coca-chewing and realized the terrible consequences of this habit. Among other things, he says:

"It has never been possible to make a coca-chewer give up his vice; they all state that they would rather do without the greatest necessities. The habit has such a powerful attraction that the craving increases with age in spite of the unmistakably evil consequences . . . Coca is the source of the Peruvian's greatest joys, because under its influence his habitual melancholy leaves him and his drowsy imagination conjures up fantasies which he never enjoys in his usual circumstances . . . Only after somewhat lengthy observation does this fact become apparent, as the newcomer, though astonished at the many evils which befall men of many social classes in Peru, is far from attributing them to coca. One look at an addict supplies the desired explanation. Such an addict, who is useless as far as any more serious purpose in life is concerned, is a slave to his passion even more than the drunkard and, to satisfy his craving, he will expose himself to greater dangers than the drunkard. As the magic of the plant can only be fully experienced when the usual demands of daily life or the distraction of daily intercourse cease to occupy the mind, the real coca-chewer withdraws into solitude and darkness or into the wilderness as soon as the longing for the drug becomes irresistible . . . He generally comes back two days later with sunken eyes, pale, trembling, the terrifying picture of an unnatural indulgence . . . Those who once succumb to this craving and find themselves in circumstances favouring its development are lost. In Peru really sad stories are told of young men from the better class families who happened to be on a visit to the forest region and began to try coca out of boredom, soon acquired the taste for it, and from then on were lost to civilization and, as if under some evil spell, refused to return to the towns. People relate how finally relatives discovered the fugitive in some remote Indian village and brought him back to his civilized home in spite of his tears. However, in every case life in the wilderness had become as dear to those unfortunate people as the more orderly conditions in town had become hateful to them, since public opinion condemns the white coca-chewer as we outlaw the uncontrollable drunkard. Consequently they escape again on the first opportunity, only to die prematurely, degenerate, unworthy of their high station, and reduced to the state of semi-savages as a result of their dissolute indulgence in the stimulating leaf."

(52) REPIZO CABRERA, JEREMÍAS

Los mascaradores de coca en el Huila (The coca-leaf addicts of Huila). See No. 10.

(53) RENTERÍA BELTRÁN, SEGUNDO

The author is a medical officer in the Argentine army who at one time was Chairman of the Public Health and Social Welfare Council of the province of Salta [where, as already stated, some sections of the population are addicted to coca chewing—P.O.W.] In a communication on the subject, Dr. Rentería Beltrán says:

"I consider that coca-leaf chewing, which is as widespread in the provinces of Salta and Jujuy, as alcoholism, is the consequence of the ravages caused by endemic malaria; their effect is to give temporary relief from certain symptoms of malaria, particularly neuralgia and shivering, though in the long run they are harmful to the health of their victims. The evil is well entrenched and coca leaf, which is subject to taxation, is sold in the grocery stores.

"In the remainder of the country, coca leaf is sold subject to a medical prescription. These forms of drug addiction, of course, entail physiological deterioration because part of the wages are used to buy coca leaf instead of food and because the alkaloid by its tonic action temporarily appeases the sensation of hunger."

(54) RICKETTS, C. A.

Ensayos de legislación pro-indígena (Efforts at legislation for the benefit of the natives). Arequipa (Peru), 1936. Pamphlet 62 + iv pages.

The author, who is a doctor at Arequipa, has studied the problem of coca-leaf chewing for many years. In 1929, when he was a member of the National Parliament, he proposed the setting up by the State of a coca-leaf monopoly combined with other suitable measures for obviating the habitual use of the drug.

The author states that "the problem of the Indian is above all toxicological" (coca and alcohol) rather than administrative, economic, social or agricultural. "Convinced as I am of the fundamental part played by coca and alcohol in the life of the Indians, I am of the opinion that they cannot be rehabilitated until they are separated from these poisons . . . The effects of alcohol and of coca are stamped on their constitution and still more on their mentality.

"Young Indians who have not yet misused these toxins show, when medically examined, that they leave nothing to be desired as specimens of humanity . . . They show no anomalies in their intelligence, morals or strength of will.

"An adult Indian who has become an addict of coca and alcohol shows signs of malnutrition and an enfeebled muscular system, insomnia, loss of appetite and a decrease in the acuity of his sensory organs. His mental faculties are markedly deficient. He is content with his daily routine and finds it difficult to learn anything new; his memory is defective, he thinks with difficulty and his mental processes are slow.

"His morals leave much to be desired: he is a liar, hypocrite, a petty thief or pickpocket, dirty and unkempt; he has little affection for his family, gives up his children without a pang, and has largely lost his self-respect.

"But it is in the will power that the major defects appear: he is lazy, resigned to his wretched lot, and makes no effort to improve it. He is submissive, allows himself to be humiliated by whites and half-castes alike; he is apathetic and indifferent, depressed and incapable of great mental effort.

"In the adult Indian, then, we note a great physical change but the change in his mentality is even greater. The most obvious defects are the loss of will power and weakness in moral sense and intelligence, all characteristic changes produced by the habitual use of cocaine.

"The number of persons who chew coca in Peru, Bolivia, Ecuador and Colombia is calculated to be eight million.

"Some have even gone so far as to state that coca is a food, which is, of course, ridiculous . . . Others imagine that the

Indians suffer no harm from coca because they are used to it, which is equivalent to the physiological absurdity of saying that the Chinese are not harmed by opium or the drunkard by aguardiente.

"Others again say that the harm is small because the amount of cocaine absorbed in coca-chewing is very little, but this is also untrue.

"It is also said that the Indians do not increase their daily dose as the cocaine addict does, which shows that they are not real addicts. This allegation is also untrue, since it is common knowledge that although young Indians only chew coca occasionally when they have very heavy work to do, both the quantity and frequency of the dose increase with age, and by the time they are adults, they chew coca continually and cannot give it up. If the quantity does not increase, it is simply because the mouth will not hold more.

"On the other hand, it is said that when he goes to the coast, as a recruit for example, the Indian can give up coca without great effort. This is true, just as at that age, when nobody is a confirmed drunkard, it is possible to give up alcohol. But when the old Indian goes to the coast he does not give up coca nor can he accustom himself to working without it.

"Daily observation has convinced us that in spite of the degeneration of many individuals, the Indian race has magnificent potentialities. Those natives who as young men enter the schools and universities and the army, and later figure in public life and the professions, do not show any mental inferiority as compared to white men and physically they are frequently superior.

"The Protestant missionaries at Juliaca, for example, have given us a practical lesson in how to deal with the Indians, beginning with the elimination of coca and alcohol, and I have been able to note many surprising and very gratifying results. Those Indians are happy, contented, clean, hard-working and honest. They have also learned to respect themselves and make themselves respected by others.

"The only possible treatment is to deprive the Indians of coca and strong alcoholic liquor. None of the arguments of the coca or liquor traders should be allowed to carry the slightest weight in face of the enormous importance of these measures to our human capital.

"The opposition to the proposed Coca Monopoly came: (1) from the coca growers, who feared that their industry would be ruined; (2) from the 'landowners' who 'objected in some cases . . . alleging that the Indians need coca to perform their agricultural work'. Ricketts admits that today coca is indispensable to an Indian coca addict and I agree that it would be inhuman suddenly to deprive him of it. He would suffer greatly and furthermore, it is known that without it he will not and cannot work; (3) from the coca traders who 'also objected, but without any justification' since 'no one can claim the right to traffic in human health'".

Further on, the author refers to the amount of cocaine absorbed. A joint committee of medical practitioners and chemists appointed by the Medical Society of Arequipa came to the following conclusions: "If we take the smallest amount observed (50 grammes a day), we reach the conclusion that a man chewing coca without *llipta* absorbs 42.5 milligrammes of alkaloid, and with *llipta*, 91 milligrammes". The chewing experiments lasted from thirty-five to forty minutes, which corresponds approximately to the time the Indian retains the ball of coca leaf in his mouth.

The ordinary dose is therefore "strongly toxic", according to the figures laid down in various pharmacopeias, "particularly if this amount is taken daily throughout life".

It was also found that the urea content of the urine of coca-chewers rose 40 to 50 per cent, "a fact which clearly demonstrates the increase in the disintegration of proteins under the toxic influence of cocaine".

(55) RICKETTS, CARLOS A.

"La cocaïnomanía del indígena, factor de degeneración racial" (Cocaine addiction among the natives as a factor of racial degeneration). *La Crónica Médica* (Lima), 57, 25-30, 73-78; 1940.

Similar to the preceding work.

(56) RICKETTS, CARLOS A.

El problema indígena en el Perú. Jornadas médicas del Sur, 1943 (The native problem in Peru. Medical voyage in the South). Arequipa, *El Pueblo*, 24 June 1944.

The author emphasizes that "the coca factor is the key to the native social problem". "Alcohol and coca are essential factors in, and the causes of the Indians' present lamentable state", i.e., their decadence and introversion.

"Take away coca and the Indian will recover his ego, he will recover his normal personality and be able to co-operate with those who are striving to remedy his wretched condition. This has been understood by the foreign missionaries in the uplands." The author also refers to the similar experiments of the Peruvian physician, Dr. Nuñez Butrón, who has achieved "brilliant results" in the same direction. "First, by removing coca and alcohol from the Indians, he has been able to convince them of the need to co-operate with him in putting an end to ignorance, dirt, bad faith and anti-social customs. His transparent honesty has enlisted the essential co-operation of some of them, and he has been able to carry out effective civilizing work with splendid results; it is a practical and simple lesson in how the Indian can be redeemed." Afterwards "they no longer try to become supermen by chewing leaves, only to remain subhuman.

"It can be argued that these results are due to more and better food, education, hygiene and the training received, but not to abstinence from coca and alcohol." In order to find out, the author sought information from the persons who had carried out this "long task in intimate contact with the realities of the Andes". One of these persons, for example, who has lived there for some twenty years, says: "There are young men of this region who have never chewed coca, who today occupy good posts at Lima, Callao and Arequipa, young men of good intelligence, while their parents who have chewed coca all their lives are dull, ignorant and stupid; I assure you that it is extremely difficult to teach a person used to coca-chewing to read (in many cases they have no desire to learn anything new) while it is relatively easy to teach those who do not chew coca." Another witness with thirty-five years' experience confirms these statements and says that he can "support them with thousands of witnesses", Indians who do not chew coca. Other reports of the same kind follow.

Since the symptoms of abstinence are "relatively slight, it could be a matter of one generation to rid the Indians of the vice completely".

The "measures to be taken" are as follows: (1) representations by the medical profession to the Government; (2) formation of a National Anti-Coca League [which seems to have been planned in 1940, but not yet established, for various reasons—P.O.W.]; (3) creation of a Government coca monopoly; (4) restrictions on the sowing of coca shrubs."

(57) RICKETTS, CARLOS A.

La coca, problema de prevención social (Coca, a problem of social prevention). Arequipa (Peru), *Escuela Tipográfica Salesiana*, 1948. Pamphlet of 56 pages.

This pamphlet was dedicated to the Second Inter-American Indigenist Congress at Cuzco, and is an amplification of the preceding work.

Among other things, the author says that "when a white man becomes a habitual coca-chewer, he is more addicted than the Indian or half-caste and shows very marked mental deterioration.

"The use of coca is spreading at lower altitudes, such as Arequipa [2,500 metres above sea level—P.O.W.], where the rural worker had already learned to chew at his work. The use of coca is also frequent at nocturnal fiestas and particularly at wakes. In the valleys too, the peons chew coca, some occasionally, others regularly. In the forest regions coca-chewing is extending, and there are even coca-chewers on the littoral itself. For example, I can confirm that at Mejía, a small seaside resort near Arequipa, many of the fishermen are coca-chewers . . . A colleague has assured me that in the central region, there are people who even supply the Indians with powdered cocaine . . .

"Many outstanding investigators single out coca and alcohol as factors inseparable from crime among native mountain dwellers. Their primitive instincts are let loose by coca and inflamed by alcohol; the result is terrifying crime, carried out with the savage and sadistic cruelty that marks these offences, evidence of the degenerate moral perversion directly caused by coca and hidden until then in the subconscious.

"To provide us with better illustrations of the effects of coca and alcohol, I called upon our colleagues, the public health officers", residing in the areas where coca-chewing is habitual. With the exception of one whose opinion was not very clear, the other ten medical officers and also five social workers agreed with the author that "(1) the coca-chewing habit is extremely harmful to the mentality of the native race; (2) the vice should be gradually restricted and finally suppressed".

(58) RISEMBERG MENDIZÁBAL, FRANCISCO

Acción de la coca y de la cocaína en sujetos habituados (Effect of coca and cocaine on habitual coca-chewers). *Revista de Medicina Experimental* (Lima), 3, No. 4, 317-328; 1944.

The author, one of Dr. Gutiérrez Noriega's collaborators, carried out observations on "18 inveterate coca-chewers, the length of whose habituation varied between four and 25 years and their ages between 23 and 54 . . . The amount consumed was approximately 80 to 100 grammes, over a period of three hours, during which time each subject was under observation. The cocaine content of the powdered leaves used varied between 0.6 and 0.7 grammes per cent.

"The following were observed during chewing: discrete mydriasis; rise in temperature to a sub-febrile state in some cases; moderate tachycardia but no variations in rhythm; increased arterial pressure, chiefly of the main artery; stimulating effect on the nervous and respiratory systems, shown in intensification of the spinal and neuro-vegetative reflexes, and by certain modifications of mental activity; . . . increase in basal metabolism, in some cases to figures above normal."

During chewing the subjects, formerly "introverted and mistrustful", become transformed, "a phase of extroversion and euphoria" sets in, "not unlike the initial phase of acute alcoholism, with diminution of conscious inhibitions and decreased auto-critical powers".

In contrast to the cocaine addict, "the coca-chewer, as his reaction progresses, feels a desire to be alone. He withdraws into himself, answers in monosyllables and concentrates only on chewing and selecting the coca. At this stage, they say that they act in this way because of the multitude of thoughts which present themselves. Prisoners think about their discharge and what they would do if they were free, and imagine entire scenes which seem to them to be completely real. Their attitude and external appearance is one of gloom and mutism. Nevertheless, they say that at this stage their imagination 'soars'. None of them confessed to erotic images, although we pressed the point. When they are in this state, they say that if they are doing manual work, they do it mechanically, almost unaware of their actions. They can work in this way for hours, since they 'are not there', to use the literal expression of one of the subjects observed. When asked what they would like to do at this time, they nearly all say they would like to drink alcohol.

"This second phase of introversion, imagination and mutism seems to last as long as they chew the coca, although they seem to do so less rapidly at this point, choosing the leaves with more care and remaining as though ruminating for a long time, without touching the packet, as if they wanted to maintain a dose but not increase it. If they stop chewing, they fall into a long sleep, dreaming almost always, they say, of what they were thinking about while chewing. If they go on chewing, they remain in this state uninterruptedly, and none of them says that he has experienced or noticed in other chewers symptoms of intoxication due to excessive chewing. According to them, the initial stage of the phase of mutism is ideal for working, because they are aware neither of the work nor of fatigue or hunger, and above all they 'are not there', but always abstracted and dreaming."

The effects on three students of doses of coca of less than 50 grammes did not differ appreciably from those observed in the habitual coca-chewers (preliminary observations).

(59) SÁENZ, LUIS N.

La Coca. Estudio médico-social de la gran toxicomanía peruana (Coca. Medico-social study of the great Peruvian drug addiction). Lima, 1938, 235 pages.

This monograph is a synthesis on the state of the problem up to 1938, the date when Gutiérrez Noriega and others started their research work. The book is lucidly written, and contains interesting bibliographical information and a large quantity of data and reports, in addition to the author's personal comments.

It is divided into three main parts: "The drug", "The effects of the drug" and "Therapeutics of drug addiction".

In the "Prologue" the author records the fact "that in Peru it is believed that coca is 'not more harmful than tobacco and coffee'", whereas in reality "it is a contributing factor to the bad dietary, sanitary and hygienic conditions observable among the mountain people; and it may be said without exaggeration that its suppression would mean the elimination of 90 per cent of the diseases affecting them.

"Drug addiction in the nation has been supported by prejudice and ignorance; both are still the accompaniments of coca addiction . . . Coca-leaf chewing has not received the careful study which has been devoted to cocaine addiction . . . In defence of coca, false arguments are brought forward, of sufficient plausibility to impress the non-medical public, to the great detriment of the campaign against addiction.

"We consider coca-leaf chewing as a social disease, and we understand that the addict is a sick man and not a vicious and depraved person." The author "is convinced . . . that the suppression of coca-leaf chewing is no utopian ideal, but an aim possible of achievement"; in this connexion he refers to the days before the Spanish conquest "when coca poisoning had not yet begun its ravage".

Nevertheless in "the last third of the last century" a commission of the Faculty of Medicine of Lima proposed to the Peruvian Government "a series of measures designed to propagate the use of the leaf abroad". It is also a fact that "until a few years ago, coca was part of the usual ration of Peruvian soldiers".

In the mountains "the males" are usually "the most seriously affected by addiction", but "in some regions of Peru, particularly the central region, both sexes use coca to the same degree. Social status is also a factor; there are many regions in the country where drug addiction is confined to the lower classes, while in others the drug is used by all social classes, with the sole distinction that the lower orders reveal their addiction in public, while the other classes are careful not to be seen chewing coca leaf. In the mountains drug addiction bears no reference to age; children begin to chew coca leaf at the age of eight or ten years, and continue throughout their lives; they only give it up when they move to other regions where it is literally impossible for them to continue; then they show an

unconquerable longing to return to their mountains and to the addiction which has enslaved them. The fact that subjects are employed or unemployed, or members of the professional or labouring class, does not cause them either to indulge or to abstain, because in all circumstances the Indian is equally addicted to the leaf.

"At the present time, the habit is progressively on the increase, and there is nothing to hinder it—on the contrary, there are many factors that promote it. Thus, we see that the rise in wages in many parts of Peru . . . only serves to enable the Indian to consume larger quantities of coca . . . Improved travelling facilities today existing in Peru . . . have spread drug addiction to the coastal areas."

Sáenz states that "Bolivian coca generally contains a larger quantity of cocaine than the Peruvian variety" [which appears to contradict the conclusions of Bolivian writers, according to whom Bolivian coca is less harmful—P.O.W.].

"The effect of coca upon the perceptions and the elimination of fatigue, hunger and thirst caused by chewing in the early stages, is succeeded next morning by a feeling of lassitude and general indisposition, and persons who are not addicted to the drug, but who have used it on some occasion out of curiosity or for some other reason, inform us that these sensations are so strong as to render all activity impossible, in some cases for a period of several days. This indisposition disappears when a fresh dose is taken [This would appear to be a typical abstinence symptom.—P.O.W.] and it is thus easy to see why the mountain people, once they have started to chew coca leaf, and are obliged to engage in daily work, find it necessary to return to this means of gaining strength for the work required of them.

"When the mountain people start to use the drug, they continue for some time to chew the leaf only during working hours, but as the years go by, the addiction to coca becomes stronger (probably because the physical and mental activities of the coca leaf addict are far below normal at times when he is not chewing), and then the time devoted to the vice increases; they start to chew the leaf outside working hours; then they continue to chew on holidays and feast days; and in the end they are chewing it all through the twenty-four hours, keeping their wad of coca leaf in their mouths even during the few hours of sleep that the drug allows them. Thus the mountain dwellers spend four-fifths of their life in this 'doped' condition.

"Coca plays an important part in Indian medical practice." Sáenz thinks that coca was formerly used as a local anaesthetic during operations. The leaves are also used "in infusions, decoctions, and steeped in alcohol, and also externally as poultices and ointments," and for headaches, rheumatism, chilblains, skin diseases etc. "Frequent recourse is had to coca for its aphrodisiac effects, and this is often the reason for its consumption".

"The only ambition in the life of the mountain people is the satisfaction of their hunger for coca leaf; it is greater than their love of money or any other desire, which is the usual effect of a drug upon those addicted to it."

Sáenz does not think "that coca is the exclusive cause of the psychosomatic complaints to be found among the mountain people", but he thinks that it contributes largely, on both the physical and mental side, to the deterioration observable, adding that "the effect of cocaine is precisely to separate the organic from the psychic".

Among "the effects of the drug" the author emphasizes, in addition to other well known features, the anaesthesia of the mouth, which is a contributing factor to the "monotony of Indian cooking", and therefore causes undernourishment. "The addict's mouth eventually becomes frothy and hard, like a toad's", says Sáenz, quoting López Albújar, and referring to the burns frequently caused by the *llipta*. "The teeth are frequently worn away to an excessive degree, as in herbivorous animals, more than can be accounted for by natural friction."

He adds, among numerous other medical considerations, that coca-leaf chewing may produce disturbances of the endocrine glands, which would explain certain of the phenomena observed, and also the apparent disturbance of the basal metabolism. In sixteen out of twenty subjects examined by Sáenz, metabolism had increased by about 41 per cent.

"Women generally consume less coca than men, and this difference in consumption is shown in their intelligence, which is generally considered greater than that of the men."

Nothing certain is known concerning hereditary defects caused by coca; the author writes that it would not be "hazardous to assume that coca has no influence on transmissible organic and somatic degeneration . . . On the other hand, hereditary psychological deterioration may with good reason be attributed to coca, if we try to explain the causes of the many abnormalities so frequently observed in the psychology of the mountain dweller".

"The part played by coca in causing insanity in the descendants of addicts has not been explained. Valdizán accepted it as an important factor. In view of the deterioration in character and the oligophrenia so frequently found in the descendants of coca addicts, it is logical to accept the opinion of our late national psychiatrist, although no statistics are available for our mountain areas."

"Medical practitioners frequently observe lowered resistance to infection in drug addicts."

The influence of coca-leaf chewing on the mental condition has already been noted. In a special chapter, the author insists that the Indian is not "psychologically inferior", that "he is the same Indian as he was under the Incas," and that "alleged racial inferiority does not exist". But, on the other hand, he admits that "there seem to be good reasons for believing that coca has had a direct or indirect influence" (on certain forms of deterioration).

"The recognized influence of climate on the psyche cannot explain the psychological abnormalities from which the mountain dweller suffers: first, because high altitudes are known to have stimulating physical and psychical effects, and second, because persons coming from other places to the Sierra and remaining there without contracting the coca habit, do not show the mental deterioration which marks the native of Peru."

"The habitual use of coca by the mountain dweller alters the normal psychosomatic relation; however, the psychological harm predominates . . . From the mental and moral point of view, the effects of cocaine seem to be more harmful than those of other narcotics." Sáenz quotes Valdizán who attributes "to drug addiction [among the Indians—P.O.W.] their submissive attitude, their poor hygiene, their malnutrition, their bad housing, their lack of confidence, their obtuse emotivity, and their characteristic behaviour: irritable, ungrateful, lying and slanderous".

He refers to genuine "fits of hallucination" and other phenomena, including the "access of courage", even in children, who use the leaves to overcome the fear produced by dark or loneliness.

The author also discusses in detail the effects of coca on the sexual instincts. "The genital excitation produced by coca, plus the low moral sense of the mountain dweller, explain the incestuous relationships so frequently met with in those regions, although these are also affected by the influence of bad housing conditions in the mountain regions, which force promiscuity on children and adults, and bring the faults of the parents conspicuously before the children's eyes. Thus, they are prematurely introduced to sex, and in many cases, unfortunately, led by example into perversions."

The author puts forward various psychological and psychiatric considerations and analyses of the coca-chewer, reaching the conclusion that "coca causes mental retrogression".

He adds that "note should be taken of the remarkable results achieved in respect of cleanliness and hygiene among the natives in areas where the evangelical missions have succeeded in suppressing the coca habit among their native converts. These achievements are a heartening example of the results brought about by the suppression of coca".

With regard to the well-known coca-alcohol association, he says: "Alcohol should take second place and coca move up to the first".

Further on, he says that "alcoholism among the mountain dwellers has been greatly exaggerated". The following comment appears to us of great importance: "when a coca-chewer is under the influence of coca, the amount of alcohol needed to make him drunk is much larger than when he has not been chewing; similarly in a case of drunkenness, inebriation decreases as the chewing proceeds, due to the effect of the coca". Elsewhere he says: "Alcohol (together with coca-chewing) seems to be the addiction best fitting the mountain dweller's constitution".

"With regard to the high proportion of criminality among the mountain dwellers . . . in our opinion, coca is the main cause of crime among the Peruvian Indians . . ."

He also refers to the "infra-social" attitude of many coca-chewers and the difficulties experienced in trying to educate them; "they combine all the conditions which are said by Adler to generate abnormalities in social behaviour".

In concluding his book, the author proposes far-reaching legislative (restrictive), educative and punitive measures, the introduction of which would be of great help in improving the situation of the Indians and suppressing the coca habit.

(60) SÁENZ, LUIS N.

"El coqueo factor de hiponutrición" (Coca as a factor in hypnutrition). *Revista de la Sanidad de Policía* (Lima), 1, 129-147; 1941.

"The role of coca-chewing in hypnutrition is known to most Peruvians, since coca has been so exalted as to be considered a plant of almost miraculous virtues, because of its power of dispelling hunger.

"The mountain dweller's really pathological lack of interest in improving his diet would be inexplicable, if one did not remember that it is caused by coca-chewing . . . In fact, unfortunately, even today, the mountain dweller is convinced of the virtues of coca and the practicability of using it to replace a large part of his diet, while at the same time enjoying the charms of the narcotic, of the insidious effects of which he is unaware.

"We do not share the opinion put forward by certain persons that coca-chewing is a result of the scarcity of food in the uplands and the difficulties which the poor mountain dweller encounters in trying to obtain it. In our view, coca-chewing is a cause and not an effect . . . it is a fact many times confirmed that drug addiction generates anorexia and lack of interest in the food which the healthy man seeks and has sought for at all stages of human life, often making great efforts and sacrifices to obtain it."

"Coca encourages undernourishment, allying itself with the factors universally recognized as being likely to produce it, and making them in many cases, by its singular action, more powerful and active."

Coca encourages hypnutrition in general, and in particular because in the uplands coca leaf still constitutes an important part of the worker's wages.

The "anaesthesia of the mucous lining of the mouth, which causes deterioration of the sense of taste, explains why the cooking of the poor mountain dwellers is so lacking in variety, and why their soups are so insipid as to be disgusting to anyone who is not a coca-chewer. This appalling cookery undoubtedly helps to make their nutritional state even worse . . . Moreover,

coca-chewing, particularly with lime, causes burns on the mucous membrane which are painful when the influence of the coca wears off. This undoubtedly makes the Indians chew coca more frequently, and also means that eating is painful and difficult."

"The daily ration of a Peruvian mountain dweller . . . is not enough to provide the energy he needs."

Modern knowledge of nutrition makes it possible to "imagine the psychical deterioration that coca-chewing, which causes anorexia, undernourishment and hyponutrition, particularly through qualitative nutritional deficiencies, must bring about in coca addicts. If we also bear in mind the psychosomatic disturbances and the rupture of the normal unity of the organic and spiritual elements of the human being, caused by the specific pharmacological effect of cocaine, in addition to the coca-chewer's nutritional deficiencies, it becomes possible clearly to understand the mechanism of this drug addiction, which nevertheless, through the inscrutable designs of Providence, has not yet succeeded in wiping out our mountain people."

(61) SÁENZ, LUIS N.

"*Investigaciones científicas sobre el coqueo*" (Scientific investigations into coca-chewing). *Revista de la Sanidad de Policía* (Lima), 4, 333-34; 1944.

In this "Medical Comment on News of the Day", the editor of the review congratulates Professor Hurtado on his intention of studying, in the Institute of Physiopathology of the Lima Faculty of Medicine of which he is director, "the effects of coca on the organism of persons using it to generate artificial energy".

He then refers to the former "lack of knowledge of most Peruvian medical men" regarding coca-chewing. "Far less was known about it from the medical point of view than about opium addiction, alcoholism and other addictions usually mentioned in medical texts. Since they were unaware of the substantial differences between the effects of coca and those of other narcotics, it was not unusual to hear Peruvian doctors say that coca-chewing was not a drug addiction, because coca-chewers did not show certain symptoms observed in most morphine addicts, for example, while the symptoms of abstinence shown by opium addicts (but not by cocaine addicts) were absent in coca-chewers.

"But what is missing in Peru, and exists in most other countries which, like Peru, suffer from drug addiction among large groups of the population, is a conviction of the social harm caused by the drug habit." Social work "will doubtless provide the most efficient support for State action to restrict the consumption of coca leaf. In the case of opium and Indian hemp and most other narcotic drugs, it has not been the physiopathological effects on the addicts, nor the excitement caused by the drugs, nor yet the clinical proof of the deterioration brought about by their use, which have led to their prohibition, but the deplorable social effects which are plain to all eyes."

(62) SÁENZ, LUIS N.

"*El control mundial de narcóticos y el Perú*" (World control of narcotics and Peru). *Revista de la Sanidad de Policía* (Lima), 2, 225-226; 1945.

In another "Medical Commentary on News of the Day", the editor of the review says, *inter alia*, the following:

"It is fitting that coca-chewing should be placed in its real category as a drug addiction, and that public opinion and that of our rulers should not be led astray in a way which benefits the coca producers and propagandists . . ." He goes on: "It is essential that things should be looked at in their proper light; it is necessary that pharmacological studies of coca should be encouraged and applauded; but those who have an interest in the continuation of the coca habit must be prevented from making use of these studies to create a lamentable confusion between the pharmacological uses of coca and its effect as a social scourge".

He concludes that "the system of restricting the planting of narcotic plants has been postponed in Peru because of a request made at a Health Conference, and there is already reason to believe that the world organization referred to at the beginning of this article [the Permanent Central Opium Board—P.O.W.] will urge us to restrict the planting of coca. Thus, for a number of reasons, apart from the benefits we should ourselves derive, it would be well if, by the time world action against narcotic drugs was initiated, we were already on the way to suppressing them; this applies in particular to coca, and we should thus avoid being forced by outside action to take the steps that have for so long been necessary in the interests of our own culture and welfare".

(63) SHARP, GORDON

"*Coca and Cocaine Studied Historically*." *The Pharmaceutical Journal*, 82, 28-30, 117-118, 184-186; 1909.

Under the subtitle "Can coca do all that the Peruvian claims for it?" The author refutes the necessity of chewing coca leaf with the following arguments: "The classical description by Prescott of the Peruvian Indian performing his wearisome journeys across the Andes 'without fatigue or at least without complaint' on nothing more than a supply of coca and a handful of roasted maize at first strikes us as wonderful, and we are inclined to ascribe all the credit to the coca. But our wonder diminishes when we hear of other peoples carrying out great exertions on scanty food and without the aid of any intoxicant or narcotic. The Arab can traverse the desert for five days without any sustenance beyond water, and many mountain climbers can go on for forty-eight hours without food of any kind. The Japanese in the late war performed long and difficult marches without evidence of fatigue on a pittance of rice. In days gone by the Scottish invading armies marched day after day, swimming rivers and fighting a battle in between, on a small allowance of oatmeal. In combating fatigue, food is not so important as it was at one time supposed to be. Training and the bracing air of the mountain ranges may have nearly everything to do with the wonderful feats of endurance of the Peruvian, and all that coca does is to depress the ends of the sensory nerves in the mouth, stomach, and other parts with which it comes in contact, and so to mask for a rather longer time those feelings of fatigue and hunger which should be relieved by sleep and the intake of food. It must be allowed that the cocaine contained in the coca may act as an analgesic to the respiratory centre, and so render it less liable to be affected by the lowered atmospheric pressure of high altitudes. Here again, training may overcome even this difficulty, for horses soon become used to high altitudes, and they get no coca. The action of coca is not, as often stated, comparable to that of betel, tea, coffee, or tobacco, but rather falls into the same narcotic group as opium and alcohol.

"The curious may be interested to know the effect of training and mountain air on horses in South America. These animals soon come to breathe the rarefied air without experiencing any difficulty of respiration, and, what is more, they can endure fatigue which would kill or disable horses living under other conditions. They become 'long winded', and when brought directly down to the plains can outstrip any horse trained on the low altitude. So well is this fact known in South American horse-racing countries that the practice of 'doping', that is, bringing a horse straight from the hills to the plains and entering him for a race has to be guarded against, and all manner of tricks are tried to elude the watchfulness of the racing committees."

The chapter "Pharmacology and Therapeutics" is prefaced by the following remarks: "This paragraph will refer to cocaine alone, for coca in any of its preparations is not largely employed by the regular practitioner. A few people have expressed regret that coca in the shape of infusion or tea has not been adopted by Europeans. It is a subject for congratulation that it has not been adopted, for it would only have added another to the list of intoxicants or narcotics. Most medical men recognize that there is a real danger of patients becoming

habituated to the use of coca preparations, hence they feel chary of recommending them, more especially that the purpose for which they are prescribed can be attained by other agents".

(64) URIBE PIEDRAHITA, CÉSAR

"Esquema para un estudio de la patología indígena en Colombia" (Outline for a study of indigenous pathology in Colombia). *América Indígena* (Mexico, D.F.), 2, 67-74; 1942.

"Due to lack of nutrition, when they are obliged to work a little or to walk long distances, at times loaded like beasts of burden, the natives resort to dry coca leaves. This habit . . . is deep-rooted in the majority of our indigenous inhabitants and many of the pseudo-civilized semi-slaves who live in the southern regions near Ecuador."

The reason why the habit of chewing coca leaf with alkaline bases is so widespread among the majority of the natives in the south of Colombia can be easily explained. In reality this vice is promoted by the landholders: the coca ration is established as currency for payment of wages; a great part of the daily wage is paid in handfuls of coca leaf grown on the estates. It is also easy to explain the route taken by coca along the mountain ranges and great rivers where the autochthonous races received from their brothers from the south and from foreign masters this deplorable custom so destructive of ambition and life.

"It is very curious to note that in Ecuador this chain is broken in the provinces of Imbabura and Carchi, which are inhabited by the Otavalos. These happen to be the natives who enjoy the best economic and social conditions in Ecuador.

"Our fellow delegate, Dr. Antonio García, told us that the Otavalos are not better off because they do not chew coca, but do not consume coca because their greater economic development does not make it necessary for them to do so.

"The Indians of the departments of Naríño and Cauca use quicklime as a base. When they are very young they begin learning the use of this 'fire earth'. At first, it causes ulcers of the tongue and gums, but then calloused scars are formed, which frequently degenerate into epitheliomatous cancers of a malignant nature.

"According to our own observations, the chronic intoxication produced by cocaine is shown by general malnutrition, transitory states of excitement, intense pallor and nervous phenomena caused by lesions of the grey matter in the nerve centres. Trembling of the hands becomes so pronounced that it prevents the slightest co-ordinated movements. As the general action on nerve centres is very obvious, the will power and other psychic functions fail to such an extent as to destroy vital and intellectual force."

(65) VALDIZÁN, HERMILIO

"El cocaínismo y la raza indígena (Nota preliminar al estudio del cocaínismo en el Perú)" (Cocaine addiction and the indigenous race. Preliminary note for the study of cocaine addiction in Peru). *La Crónica Médica* (Lima), 30, 263-275; 1913.

"It is believed in Europe . . . that in the Latin American republics . . . the harmful action which the excessive use of coca exerts in this ethnic group [the natives—P.O.W.] is well known . . . There are many modern psychiatrists who, sharing the same belief, attribute to us a knowledge of cocaine intoxication which, unfortunately, we do not possess." The late author, a Peruvian psychiatrist, has written this work "in order to draw the Government's attention to . . . the factors which play a part in the undeniable degeneration of the indigenous race." He classes as such the harmful influence of coca-chewing, referring to the issue of coca "as an integral part of the wage contract" with the Indians. He dwells upon the clinical differences between cocaine addiction and coca addiction, pointing out among other things the fact that "the Indian lacks the loquacious expansiveness, the vivacity of gesture and discourse, the childish enthusiasm which are found in the cocaine addict."

He concludes: "If the degeneration of the indigenous race does not faithfully reproduce the classic picture of the degeneration characteristic of cocaine addiction, it is not possible, nevertheless, to exclude the factor of cocaine addiction [coca addiction—P.O.W.] from the etiology of such degeneration."

(66) WOLFF, P. O.

"Quelques considérations sur la coca en Amérique du Sud" (A few reflections on coca in South America). *Schweizerische Medizinische Wochenschrift*, 70, 608; 1940.

The author refers to the varying opinions which still exist concerning the medical and social effect of coca-chewing.

"It is necessary to distinguish between the well-known abuse of cocaine and the chewing of coca leaves in some countries of South America: a clear distinction should be made between cocaine addiction and coca addiction."

"Most observers stress the fact that the continued use of coca for generations, or indeed for centuries, has decreased the intellectual capacity of the inhabitants of the mountains, especially in comparison with their ancestors of the time of the Empire of the Incas."

"The danger of coca addiction is based rather upon related facts—the medico-social conditions which it both encounters and promotes, such as the lack of food, hygiene, etc. . . .

"Coca addiction has not yet been studied with the same precision as cocaine addiction; it has not been possible to go into the matter more thoroughly in view of the difficulties of undertaking among the inhabitants detailed research work, psychosomatic, biochemical, neuro-endocrinological and physiopathological, to enumerate only a few of the most necessary types of research. It would also be desirable to make comparisons in relation not only to geographical, ethnographical, social, and other conditions, but also to climatic conditions, for example, which would probably lead to hitherto unknown and perhaps unexpected results or, at least, to confirmation or verification of certain suppositions, in one direction or the other." [During the nine years which have since elapsed, valuable work, which is summarized in this bibliography, has been done on the subject.—P.O.W.]

". . . If only 'first class nutritive principles or incomparable vitamins' are sought, they are doubtless to be found elsewhere, more effective and more active. There is, indeed, no proof of the vitamin value of the leaves—the desire to defend the chewing of coca leaf, for reasons which seem scientific, especially in the field of nutrition, is at variance with the real truth. On the contrary, the coca-chewing Indians are not concerned about their food; their under-nourishment is certainly partly due to the anaesthetic effect on appetite, but also to effects similar to those of other narcotics, and, of course, to poverty. This frugality in feeding contrasts with their voraciousness when, for some reason or other, they cannot obtain 'their' leaves. To be sure, there are also some coca-chewers in higher circles, but they are less prevalent, and they take care not to chew in public.

"It is necessary to see things as they are in reality, and not as we should like them to be—that is the mistake of some authors who, with the best intentions, deal in figments of the imagination. It must be admitted that we are still far from reaching conclusions which are valid in every case."

"Speaking from a social point of view and from a protective feeling for the poor Indians who are 'continually exploited by the great landowners,' Alvarado, inspired by high moral considerations, demands that, before any decision on this local, social and racial problem is taken, complete, thorough and unprejudiced studies of a political, social and economic nature should be made; and he hopes that those who have to deal with this question in the future will keep in their hearts a trace of kindness and justice, undestroyed by the moral aridity of technicality . . . The final objective remains always the same: to free the world from the social dangers caused by narcotics."

(67) ZAPATA ORTIZ, VICENTE

"*Modificaciones psicológicas y fisiológicas producidas por la coca y la cocaína en los coqueros*" (Psychological and physiological changes caused by coca and cocaine in coca-chewers). *Revista Médica Peruana*, 17, 153-162; 1944.—*Revista de Medicina Experimental* (Lima), 3, 132-162; 1944.

"We have studied the sensory reaction time as an introduction to the influence of coca-chewing on mental activity, because it corresponds to a combination of factors, partly neuro-physiological and partly psychological, the investigation of which must precede any other studies on the action of coca on the nervous system." In this way, observations were made on "subjects accustomed to chewing coca, all of whom were detained in the *Cárcel Central de Varones* (Central Prison for Men), whose coca addiction varied in duration from five to twenty-six years prior to the date on which the observations were made. Employees of the Institute of Pharmacology were taken as witnesses.

"Among subjects not accustomed to it, cocaine slightly retards the time of sensory reaction to auditory stimuli; . . . the time taken by the Valdizán test for the study of attentiveness decreases in 88 per cent of the cases but increases the number of errors in more than 50 per cent of the cases studied.

"In habituated subjects or coca-chewers, coca and cocaine retard the time of sensory reaction to auditory stimuli. In 91 per cent of the coca-chewers studied, coca reduces the time taken by the Valdizán test, and in 63 per cent decreases the number of errors.

"Among subjects accustomed to it, coca, during the period of coca-chewing, produces an increase in temperature (which may reach sub-fever states), an increase in pulse rate, arterial pressure and tendinous reflexes; a slight increase in respiration; changes in the oculo-cardiac reflex of a parasympathicotonic nature in most cases, and of a sympatheticotonic nature in very few cases."

II. NON-MEDICAL OPINIONS

(68) AMBROSETTI, JUAN B.

Supersticiones y leyendas (Superstitions and legends). Buenos Aires, 1917.

The author, who was Director of the Ethnological Museum of Buenos Aires, gives a vivid description in this book of coca-chewing, which he calls a "detestable vice," in the form in which he saw it in the Calchaqui valleys [north-eastern Argentina—P.O.W.]. After describing the anaesthetic effect on the gastric mucous membrane and its consequences, he states that "the affective feelings are also atrophied. Among those people, persons of a jovial nature are rare exceptions; their faces are like those of statues, almost always immobile, and only on rare occasions, when they are under the influence of alcohol, do they break into intermittent, but never continued, laughter.

"A fatalistic indifference gradually takes possession of them, making all their happiness dependent on their ability to continue chewing the terrible leaves; and thus they unconditionally submit to the hardest work and privations, without trying to better their lot, without habits of thrift, with no ambition, as long as they do not lack a mouthful of coca."

Coca also plays "a great part" in all their superstitious practices.

69. ARGENTINA

Increase in the coca tax in the province of Salta (Argentina). 17 January, 1944.

The tax per kilogramme of coca or fraction thereof consumed in the territory of the province was doubled by a decision of the Ministers of the provincial Government of Salta. It was clearly stated in this decision that the said meas-

ure was taken "to safeguard the health of the working masses in the province, especially those engaged in rural work, and to endeavour to limit certain customs which are deep-rooted among them and injurious; although they cannot be suppressed entirely, they can be restricted by means within the power of the Government, such as the increase of taxes . . .", and also "taking into account the serious injury and disorders entailed by the immoderate use of coca leaf."

70. ARGENTINA

Limitation of "the maximum quantity of coca to be imported annually into the country". *Boletín Oficial* (Buenos Aires), 20 December 1945.

In the Decree of 6 December 1945, it is stated that "the magnitude of the movement and the consumption of these drugs in the country . . . a significant increase for the years 1943 and 1944 being noted . . ." has been verified. "Such an increase over the totals of preceding years shows that the habit of chewing coca leaf, deep-rooted in certain regions of the country, maintains and stimulates a current of importation which is not justified by an imperative organic need but which, on the contrary, inhibits physiological reactions such as hunger and fatigue and is therefore injurious . . . For the purpose of safeguarding public health, it is necessary to place a limit on the importation of the coca leaf, without prejudice to the subsequent adoption of other measures which will make it possible to limit these imports for the legitimate uses of the drug . . ."

(71) BÜES, C.

"*La coca en el Perú*" (Coca in Peru). *Boletín de la Dirección de Agricultura y Ganadería* (Lima), V, No. 18, 3-72; 1935.

Regarding the effect of coca-chewing, the author, who is a botanist, refers in a very general way to the observations of medical men, summarizing his opinion in the words: "For the Indian, coca is a remedy for every evil".

Nevertheless, this work contains a useful piece of information: an explanation of why the cultivation of coca in Ecuador ceased, with the result that coca-chewing also ended among the Ecuadorean Indians [so far as is known it only persists to a negligible extent—P.O.W.]. In that connexion, Dr. Italo Paviola, of the Department of Agriculture at Quito, in a letter to Dr. Bües, writes as follows: "The introduction of European plants and the more imperious necessities of modern industry made the cultivation of this plant lose the important position it had occupied in our country . . ." [We do not know whether this is the only explanation, or whether it is confirmed by other authors—P.O.W.]

(72) CARRERAS REURA, FRANCISCO

"*Breve nota sobre la coca, problema médico-social de Colombia*" (Short note on coca, a medico-social problem in Colombia). *Ciencia* (Mexico), 2, 33; 1941.

The author considers coca-chewing as "the slow suicide of some thousands of natives and the degeneration of huge sections of the country.

"To combat such an endemic social scourge . . . national laws are not sufficient; international provisions are necessary which would oblige the countries in which *Erythroxylum coca* is grown to reduce cultivation to a scale sufficient to meet the world's medical needs, all the plantations not necessary for that purpose being destroyed.

"The Conference which will draft the convention on the limitation and control of the cultivation of coca should be preceded by adequate studies, and the collection of exact statistical data to serve as a basis for decisions. The Government of Colombia has already begun that work through its technical organs."

(73) DE GARGANTA FÁBREGA, MIGUEL

"Noticia sobre la coca en el occidente colombiano" (Note on coca in western Colombia). *Revista de Historia* (Pasto, Colombia), 1, No. 2; 1942. 20 pages.

This work "on coca in western Colombia (the Departments of Nariño, Cauca and Valle del Cauca) is based to a large extent on an enquiry" which the author, a teacher at the Western Teachers' Training College at Pasto (Department of Nariño), carried out among his pupils. He considers that coca addiction in Colombia is not "such an alarming problem as in other" countries.

He ascertained that coca-chewing is not habitual although it is fairly widespread in some, but not in all, parts of the provinces mentioned; the reasons given are the usual ones, namely "doping," to react against the cold, to show manliness.

"The use of the coca leaf as a remedy is frequent in household medicine, particularly the use of "coca water" or decoction . . . , generally sweetened with unrefined brown sugar; it is used for aches (stomach-ache, principally diarrhoea, headaches, toothache etc.) and fevers; "also for poultices for cuts, bleeding etc., and for whooping cough". Coca is one of the best friends of the quack doctor.

"The problem of coca in connexion with schoolchildren is somewhat disquieting . . . Many of them instead of going home at lunch time stay and play and chew coca instead of eating." In some places, "the children sometimes do not go to school and play truant, in order to indulge in the vice of coca which they have learned from their parents. That would undoubtedly occur more often if the authorities did not punish the parents of the children who do not go to school with one or two days of hard labour."

Dr. Hernando Espinel, Director of the Silvia Health Commission, reported that "not less than 70 per cent of the native population consumes coca leaf and it is given in fairly large doses to children of school age." In Huila, "in certain towns the lamentable case occurs of children going to school taking coca leaf for food.

"The establishment of school restaurants in the poorest towns should be the first step in the campaign against coca addiction.

"The nourishment of coca-chewers is very deficient, and coca hinders its improvement. It is accompanied by the use of chicha.¹ Chewers often go to work without any lunch.

"It is heartening to note that the vice of coca is diminishing. Improved communications are very efficient in combating a custom which is unfavourably regarded in the towns . . . The Indians of Miranda often abandon the vice if they go to work in town, and especially if their masters point out to them the ugliness of this bad habit.

"Shame has contributed to reducing the use of coca. The Indians of Miranda do not chew when they are in town. At Rioblanco they throw away the coca if the mayor, the school-teacher, or the priest approaches them. Everything, then, indicates that in the Department of Cauca it is not impossible to extirpate the vice of chewing coca."

(73) ESPINOZA BRAVO, C. A.

"La coca y el cocaísmo indígena peruano: El problema de la toxicomanía indígena" (Coca and Peruvian native coca addiction: The problem of native drug addiction). *Boletín Indigenista* (Mexico), 7, No. 4; 1947. Ed. *La Reforma Médica* (Lima), 34, 107-109; 1948.

The author points out that to study the problem of coca chewing it is necessary to visit the regions of the Andes where "coca addiction" exists. The Indian, who is "polyphagetic", goes on chewing coca until he becomes "an incorrigible drug addict".

"The native drug addiction therefore weighs enormously upon the social, economic and cultural existence of Peru. Not to attempt to solve the problem of national drug addiction would

¹ An alcoholic drink generally made from maize.

be to leave unsolved this aspect also of the native problem. The goal must be liberation from his ancestral habituation to drugs . . . It is necessary to scarify and then to study closely this aspect of the problem. It is the duty of the medical experts to emphasize its importance and attack the problem . . .

"In the sierra . . . 80 per cent of the Indians and half-castes chew coca, the 'average daily consumption being fifty to sixty grammes'. Without coca, aguardiente and cigars, religious festivals and joyful or mournful family events could not be celebrated.

". . . This vice has become so rooted that it would appear indestructible in the Neo-Indian. But this does not justify the adoption of a passive attitude of complicity and conformity, the deceitful platform of politicians and demagogic intellectuals. The aggressive dynamism of a party programme should be directed towards liberating the Indian from his organic and spiritual drug addiction . . . As long as the Indian continues to be addicted to coca, aguardiente and cigars and to be the slave of fetishism, all that is done for him will be useless. A medical and social battle must be waged, without opportunism or compromise, against coca addiction and alcoholism . . . regardless of the large revenue which the exchequer . . . derives from coca.

". . . There can be no doubt that the old Indian fixed in his habits cannot now be saved. But the new Indians, the Cholos, must be freed from drug addiction . . . There should be mobile rural doctors carrying out a scientific plan of educative and prophylactic social action."

(75) FRIEDE, JUAN

"El indio en la lucha por la vida" (The Indian in the struggle for life). See No. 10.

(76) GAMIO, MANUEL

"Instituto Indigenista Interamericano" (Inter-American Indigenist Institute). *América Indígena* (Mexico, D.F.), 5, 341; 1945.

"One of the most serious preoccupations of the Inter-American Indigenist Institute is to contribute, to the best of its ability, to the campaign which was undertaken some time ago to eradicate or at least to diminish the use of harmful drugs generally consumed by Indian and half-caste groups on the continent, such as coca in various South American countries and peyote and marijuana in Mexico."

(77) GARCÉS, V. GABRIEL

"El indio ecuatoriano y la coca" (The Ecuadorean Indian and coca). *América Indígena* (Mexico, D.F.), 5, No. 4, 287-293; 1948.

In this work the author refutes Bejarano's assertion (see 8) that the chewing of coca leaf is practised in Ecuador.

In contrast with the Indian of Bolivia, Peru and Colombia, "the Indian of Ecuador does not use coca and at present perhaps does not even know of it; or, if he does know it, he consumes it only as an absolute exception and on a very small scale". The author, a noted specialist on the Ecuadorean native, has "attempted to find out the reason for such abstinence, since it appears at least strange, if not incredible" in comparison with the custom of "the Indians of neighbouring countries".

"It is unquestionable, moreover, that coca was cultivated in Ecuador in colonial times."

"The Indian in Ecuador scarcely knows coca." Only "in some parts of the province of Azuay . . . is coca used to restore lost energy . . . infusions of coca are used, coca being found wild in these districts . . . And if the Indian, who today does not know it and does not use it, discovers the secret of such a 'remedy' it is logical that in addition to addiction to alcohol and chicha, coca addiction, which today exists only in absolutely exceptional instances, will come to Ecuador."

"I think that the fact that there are no plantations grown by man is the real reason why the use of the drug is unknown . . . If he had coca in his hands and knew how to use it, he

would certainly do so. At present, without the reason being definitely known, coca is not cultivated in any part of the country. There may be some in a wild state, but even among the forest Indians of the east . . . coca is not used . . . The really strange thing is that it is certain that in colonial times coca was cultivated in Ecuadorean territory." The author does not know the reason for its being "later forgotten".

"The Ecuadorean Indian . . . still shows a physical structure appreciably superior to that of the Indians of neighbouring countries", and he is also mentally superior. "Could not this physical superiority, and its social aspects, be attributed to the authenticated fact that our Indian is still moderate in his defects and vices or that his nourishment is appreciably better than that customary in other countries?"

"The Ecuadorean Indian then has not yet, like his brothers, undergone the great test of the threat of coca addiction in its worst form: as a social vice. This is the real truth which I thought should be brought out, especially since Dr. Jorge Bejarano has made a study of coca addiction in Colombia, in which he states that this vice extends from Bolivia to Venezuela without excluding Ecuador." (See No. 109.)

Further, the author notes the very high consumption of alcohol (chicha) among the same Indians.

(78) GIRALDO JARAMILLO, GABRIEL

"*Aspectos históricos de la alimentación indígena*" (Historical aspects of native nutrition). *América Indígena* (Mexico, D.F.), 2, 52; 1942.

Speaking of the Colombian Indians during the colonial epoch, the author explains that "coca mixed with lime was in general use; instead of being a food it constituted a substitute for food. Does not the general use of coca by all the American peoples provide evidence of the wretchedness of their nutrition, which has obliged them to use substances making food less necessary and helping them to do without it?"

(79) HERNÁNDEZ PINZÓN, J.

"*Una visita a Tierradentro. Cómo viven los indios paezes*" (Visit to Tierradentro. How the Paez Indians live). *El Liberal* (Bogotá), 3 January 1944.

In the above-mentioned Colombian region, coca, "which has contributed so much to the degeneration of the Paez race, is still cultivated with complete freedom . . . Their predilection for this plant makes them care for it tenderly and fondly, perhaps better than they care for their own children. An Indian without coca has no inducement to live . . . The temptation to chew coca is so overwhelming that in order to obtain it they would even steal from those who have it".

(80) MURDOCK, G. P.

Our Primitive Contemporaries. New York, 1934. (Spanish version, Mexico, 1945.)

Among "the Witotos of the North-West Amazon . . . tobacco and coca are substitutes for intoxicating liquors . . . They are nevertheless forbidden to women".

The coca leaves "are toasted, pulverized in a mortar, and mixed with burnt clay, cassava flour and lime obtained by burning palm leaves. With a wad of this mixture in his mouth, a man can go for several days without eating, drinking or sleeping at all and can accomplish marvellous feats of resistance".

(81) OLASCOAGA, GUSTAVO

"*La coca peruana en relación con la industria nacional*" (Peruvian coca in relation to national industry). *Revista Farmacéutica Peruana*, 13, 7-15, 55; 1944.

"Coca-leaf chewing has taken strong roots in the mountainous region, where the practice has spread not only among the Indians but also among the white and half-caste population. It has been observed, however, that despite his ignorance the Indian exercises some moderation; he chews the coca leaf

only during his working hours, while going about his normal occupations and during relatively few hours of the day. The vice presents greater dangers among whites and half-castes, who indulge in coca-leaf chewing not only during the day but at night; frequently they form groups with their friends, relatives or neighbours and chew coca leaf until a late hour, on some pretext or other, while at the same time drinking aguardiente and smoking.

"A common fallacy is that the use of coca leaf increases energy; that it eliminates hunger and fatigue. When it does so it is at the expense of the individual's constitution. The temporary anaesthesia induced by the drug may blunt the appetite but when its effects wear off the addict develops a ravenous hunger. Some addicts, however, always eat enough with or without coca. If the Indian fails to eat during the day, he will do so at night, in the small hours or at dawn.

"After chewing coca leaf for a few minutes, the addict will light an enormous cigar of the strongest tobacco, that is the kind with the highest nicotine content, and blow great puffs of smoke with evident enjoyment. We have not mentioned aguardiente because it is not always available. The place generally used for the practice is a secluded nook, usually in the shade of some tree or between two rocks where they are less likely to be disturbed. The chewer experiences a sense of euphoria and animation due to the alkaloid extracted by the alkaline element; filled with enthusiasm he is ready to start work over and over again. This sense of well-being may not be entirely due to the drug; it may be caused by the large chlorophyll content of the leaves which is extracted by the chewing process. When the residue is discarded, only the ribs of the leaves remain along with cellulose residue. The colour of the addict's excretion closely resembles that of herbivorous animals.

"During the day the confirmed addict spends more time chewing the coca leaf than at work."

The author, a pharmaceutical chemist, makes the following important statements: "The Peruvian who becomes an addict believes it is the natural thing to do. He is born, grows up and lives surrounded by addicts and therefore does not find it unusual to follow the custom of his neighbours; if he did not do so he would feel ashamed and maybe he would be avoided by the members of his own family and friends on whom he depends for his subsistence.

"The inclination to chew coca leaf is due above all to backwardness and ignorance. It is found that addicts who leave their region to go to the littoral or wooded regions, where customs are different, usually abandon the vice, sometimes permanently, and find they can do without it when they return. It may thus be said that the use of the coca leaf does not become 'second nature', and that it is possible to break the habit or at least attenuate its practice."

However, a few paragraphs earlier, the author said: "Coca leaf addiction has been described as a sickness of the mountains or a vice of the Indians, without considering the possibility that it might also flourish along the littoral or in the wooded regions, or that the whites and half-castes might also be susceptible of contracting this pernicious habit.

"If the dweller on the coast or in wooded regions or an immigrant to these regions does not over-indulge in or abandons the habit, it is possibly due to the high price of the coca leaf or the different ways of life, occupations and means of relaxation offered by those regions."

(82) RUDECK, E.

"*Kokainismus durch Gebrauch von Kokablättern*" (Cocaine addiction caused by the use of coca leaf). *Pharmazeutische Zeitung* (Berlin), 72, No. 24, 354-55; No. 30, 446-47; 1927.

The author, owner of a pharmacy at Breslau (Germany), describes a case he observed personally of an addict who drank daily an infusion (or "tea") made from 60 grammes of coca

leaves; the addict showed the typical symptoms of drug addiction (state of exaltation, etc.) . . . In those days the use of coca leaves was not yet regulated by national law.

(83) SÁENZ, MOISÉS

Sobre el indio peruano y su incorporación al medio nacional (Concerning the Peruvian Indian and his incorporation into national life). Mexico, Publications of the Secretariat of Public Education, 1933.

The author, a well-known authority on native affairs, does not see much danger in the consumption of small quantities of coca leaf by the Indians, and even says: "that the vice of coca leaf chewing indulged in by the Indian is quite on a par with the vice of smoking tobacco practised by the half-caste or white man", on account of "the very small quantity of cocaine absorbed by the person who chews coca".

But he goes on: "On the other hand, the deleterious effects of the drug are often seen, particularly among elderly people: the stupefied and besotted appearance, the vague look and an apathetic attitude in general, such are the well-known symptoms of an excessive use of coca".

(84) SEMINARIO HELGUERO, GABRIEL

Cárcel (Prison). Lima, 1935

"Coca leaf chewers give no trouble when they have the means to satisfy their cravings for the drug, but when they are unable to do so, they become violent. I have seen usually quiet men cut their veins open in an attempt to commit suicide. In the middle of April 1935, there was an attempt at a riot caused by a shortage of coca leaf".

(85) SAFFORD, W. E.

"Narcotic Plants and Stimulants of the Ancient Americas," *Annual Report of the Smithsonian Institution for 1916*. Washington, 1917, pp. 387-424 ("Coca, the Source of Cocaine", pp. 409-411). ". . . when abused it is a terrible curse".

In North Brazil, where it is also extensively used under the name *ipadú*, the leaves are ground to a fine powder. Spruce, who saw the process of preparing the leaves near the mouth of

the Río Negro in 1851, gives an account of it which is reproduced.

The roasted leaves are powdered with a pestle; a small quantity of tapioca is mixed with it to give it consistency, and usually pounded ashes are added. Spruce tried it, but without feeling any remarkable effect.

(86) VON TSCHUDI, J. J.

Reiseskizzen aus den Jahren 1832-1842 (Travel Sketches 1832-1842). Vol. 2. St. Gall, 1846.

Reisen durch Südamerika (Travels in South America). Vol. 5. Leipzig, 1869.

The author, a naturalist but not a medical man, published these accounts of his scientific travels shortly after the appearance of Pöppig's book (see 51). He gives an interesting and detailed description of the customs of Indians when chewing coca.

"My opinion on coca, after careful observation of its effects extending over a period of several years, is, as mentioned above, that if used in moderation it is no way harmful to health and that without it the Peruvian Indian, with his meagre indigestible diet, would neither enjoy such good health nor be so capable of constant and heavy physical work as is now the case . . . Coca-chewing is no greater vice than drinking wine; only excess marks both these habits as vices. The senseless drunkard is just as despicable as the uncannily stimulated, unnaturally excited chewer.

"All coca-chewers have an exceedingly unpleasant odour, evil-smelling breath, pallid lips and gums, green, stumpy teeth and a horrible blackish rim around the corners of the mouth. Coca-chewing addicts, the so-called *coqueros*, are immediately recognizable by their unsteady swaying gait, their loose greyish-yellow skin, their sunken lustreless eyes surrounded by deep violet-brown circles, their trembling lips and disjointed speech and their dull apathetic manner. In character they are distrustful, irresolute, deceitful and malicious; they are already old men when they have hardly reached full maturity, and if they do reach old age, they inevitably become imbeciles because of their uncontrollable addiction."

PART TWO

Publications stressing the non-harmful effects of chewing the coca leaf

I. MEDICAL OPINIONS

(87) CARISES MOLINA, FERNANDO

"La acción antifatigante de la cocaína y la habituación a la coca en el Perú" (The anti-fatigue effects of cocaine and coca leaf addiction in Peru). *Anales de la Facultad de Medicina* (Lima), 29, No. 4, 316-367; 1946 (published in 1948).

This work was written at the request of Professor Monge (see No. 91) who wrote the preface.

With reference to the "concept of fatigue", the author says that "in view of the environmental conditions of life in the Andes, it is necessary to investigate closely and classify the kinds of industrial work and make a study of the various types of fatigue. It is rash to make deductions on the basis of the elements of orthodox physiology at sea level. The Andean is a man whose physiology is so different that 'all pre-conceptions must be forgotten and comparisons avoided in order to be able to analyse with an open mind the mysteries of his behaviour' (Monge, 1946)."

He then deals with "the fatigue of the central nervous system, . . . the neuro-muscular plate, . . . the muscular tissues and the recuperative systems" and discusses at length "cocaine as a pharmacological regulator of the neuro-humoral mechanisms", with an analysis of the various factors which con-

tribute to the anti-fatigue action of cocaine. "As we have seen, the action of adrenalin in producing hyperglucemia is one of the mechanisms by which the body combats fatigue. Improved transmission of the neuro-muscular plate, redistribution of the reserves of glucides, action on the central nervous system, its influence on the circulatory system and in general the mobilization of all the anti-fatigue functions of adrenalin give cocaine the properties of an ideal substance for overcoming fatigue, as has been confirmed by a large number of authors with regard to coca and cocaine. The more negative aspect of the action of cocaine on metabolism is constituted by its effect on the gaseous intermediary, which unfortunately has not received the attention it deserves in view of the interesting problems it raises . . . Especially in connexion with the problem of coca, the action of cocaine on the gaseous interchange at sea level and at high altitudes, during periods of repose and periods of activity, should be more thoroughly investigated.

"There is a tendency to speak of fatigue as a single entity without considering the many factors involved. Each one of those factors can have different causes and effects . . . It is a proven fact that cocaine produces a recovery from fatigue at almost all the stages at which fatigue occurs. The exact manner in which that action is achieved should be carefully investigated before it is rejected as an insufficient reason for permitting coca chewing by the inhabitants of our uplands."

Speaking of the pharmacological aspect, the author points out that "in many of the attacks directed against the coca habit in Peru, the factor of concentration has been forgotten or at least neglected. We are referring to concentration and not to dose. The concentration of a drug in the tissues in which it acts depends not only on the dose but also on the method of administration, on the ability of the entire organism to overcome it more or less rapidly and on its capacity of absorption and elimination. Those elements are of primary importance in considering a problem like that of the coca habit in Peru, and disregard of those elements might lead to conclusions which are completely contrary to the truth."

He goes on to refer to "facts . . . sufficient to justify the rejection of all the assertions regarding the toxicity of coca based on the knowledge of the toxicity of cocaine administered parenterally to an intact individual."

"Another equally important factor is the condition of the drug when administered. Even when cocaine is taken orally, its ingestion by means of a gelatin capsule or a one per cent water solution (Gutiérrez Noriega), cannot be accurately compared with ingestion in the juice of the plant mixed with ash, with the alkaloid liberated or not, in an unknown concentration and certainly absorbed in a form entirely different from chemically pure cocaine hydrochloride."

"It is also of great interest to know the rate of administration. Very often in speaking of the dose of alkaloid taken by our coca-chewers, there is a tendency to forget that the quantity involved is distributed in a series of small doses throughout the entire day. Gutiérrez Noriega and Zapata Ortiz (1944)^a have proved that even highly lethal doses of cocaine administered in small doses spread over six or seven hours do not produce very great toxic effects.

"It is therefore essential to determine accurately the percentage of cocaine which reaches the blood and the tissues when coca is chewed. The quantity and the rate of absorption and assimilation in the blood may be very different from what is expected on the basis of mere speculations and deductions. As long as that factor is unknown, it is dangerous to speak of the toxicity of the doses of cocaine ingested by the coca chewer in the Andes."

He stresses "the importance of blood pH in the destruction of cocaine", which "increases in importance when considering . . . studies . . . showing that the injection of alkaline solutions reduces the toxic effect of cocaine on the heart, while acidity increases that effect . . . On the other hand the greater toxic effect of cocaine on domestic animals with acid diets has been proved. We mention those factors in order to suggest greater caution in interpreting the effects of coca or cocaine in the conditions of life at high altitudes which so greatly influence the blood pH (Monge, 1943)."

"Another important factor which deserves to be considered is the possible racial variation in resistance to drugs, which is highly probable especially in the case of cocaine. The extreme variability of the toxicity of cocaine in various species is known . . . The possibilities of variation among species and among individuals rather indicates the possibility of racial resistance, which has not been adequately investigated but which, in the case of the native of the Andes, is extremely likely in view of the pharmacological characteristics of his vegetative nervous system which were already envisaged in the investigations of" Monge and Pesce, Asto Salazar and the author himself.

"Thus we come to the very difficult problem of arriving at a judgment regarding coca in Peru. Either it is a dangerous habit, an element of racial degeneration and a real vice which makes the chewer comparable to a cocaine addict, or coca is essential to life at high altitudes. In that case it would con-

tinue to be the 'divine plant' of the Andes. The effects of the plant on the body would justify or condemn its daily use by many millions of human beings.

"When, on the basis of the facts given in this general review we try to sum up our current knowledge of coca (not of cocaine), we realize our complete inability to reach a definite conclusion on this difficult problem. Accordingly on this occasion we shall merely confine ourselves to emphasizing a number of facts which are necessary to forming a judgment and which indicate the necessity of proceeding more cautiously in whatever decision is taken in connexion with a habit so prevalent among the population of the Andes."

Regarding the relatively easy suspension of the administration of cocaine to laboratory animals, he considers that "there exists a psychological rather than a physiological dependence."

Those experimental "facts, applied to the problem of coca, explain why a majority of the indigenous population can stop taking coca with relative ease when they go down to the littoral permanently or when they change their type of work."

"On the other hand, there should be a scientific discussion of the opinion that coca is necessary to life at high altitudes. Without discussion, Gutiérrez Noriega (1946) labels that opinion as erroneous with the statement that it 'completely lacks scientific foundation'. We have seen that there is quite a possibility that cocaine has a marked influence on the gaseous interchange, and that the manner in which it counteracts fatigue is explained by the correction of certain changes of metabolism in which anoxia can play a very important part." To confirm his idea, the author further refers to several authors whom he quotes as authorities but at the same time he significantly defends them although they have not been attacked, and explains that their "scientific value cannot be denied only because they wrote a long time ago or because their basis is observation rather than experimentation."

[With respect to these authors, we have used the specific criteria which we had already adopted for classifying certain of their works.—P.O.W.]

The author asserts that "a great majority of the indigenous inhabitants stop using coca when they go to live permanently at low altitudes." That conclusion does not seem to be in accord with what he says a few lines farther on: "The assertions of Gutiérrez Noriega (1944) on the spread of the habit in certain coastal regions and in the Amazon forests are explained by the constant nomadic life to which Monge (1945) draws attention, and they constitute mere exceptions to a general rule which cannot be rejected without statistical proof."

The author stresses the need for "differentiating between the chewers in prisons in the coast regions and the chewer in the Andes", since they differ psychologically.

"All these facts compel us to be extremely wary in coming to decisions on the coca problem, and they are certainly a condemnation of those people who are over-hasty in openly attacking our indigenous inhabitants and describing them as vicious and degenerate." In this connexion he mentions authors like Giménez, Marroquín, Ricketts, L. N. Sáenz (whose works have been summarized in this annotated bibliography). He goes on to say that "as long as there are no definite proofs condemning the use of coca by the inhabitants of the uplands of the Andes, to speak of vice, degeneration and control legislation is simply to speak without any scientific basis, and merely leads to the superficial judgment, the unreasonable assertion that the chewers are vulgar cocaine addicts". The author adds that this is "a completely impartial point of view", and he compares the chewer to the "hardened smoker", saying that "it is really difficult to differentiate between them". He adds that, while "coca may at least have some good qualities, so far it has been impossible to find a single pharmacological quality in tobacco to

^a *Revista de Medicina Experimental* (Lima), 3, No. 4, 279-306; 1944.

^b Gutiérrez Noriega denies that they are exceptions. See bibliography of this author.—P.O.W.

justify the tobacco habit". This comparison [which we do not consider conclusive—P.O.W.] is followed by other considerations of a polemical nature.

The author concludes with the recommendation that "measures for eradicating this habit should not and cannot be taken until there is completely irrefutable evidence that coca, as it is being consumed (not the heavy doses of cocaine administered parenterally), is toxic and produces a really harmful habit involving dangers that might justify the adoption of governmental measures which would certainly be a heavy drain on the National Treasury and which would unbalance the economic systems of certain Departments of Peru and other countries."

(88) CORNEJO ARIAS, J.

"*Frontera norte—inconvenientes y ventajas para actuar en ella*" (Disadvantages and advantages of operating on the northern frontier). *Revista de los Servicios de Ejército* (Argentina) IV, No. 44, 145; 1941.

In order to "avoid *puna*" (mountain sickness), the author recommends "taking an infusion of coca leaf after meals or chewing the leaves in the case of those who do not dislike doing this. This is a controversial subject and a draft law was even submitted to forbid its sale. The authors of this project were unaware of the physiological needs of the body at high altitudes, and perhaps confused chewers with cocaine addicts.

"The *coca*²⁰ and, in general, people living at high altitudes use coca empirically for the feeling of well-being it produces and in order to reduce their appetites; this allows them to do work, which not infrequently is heavy, with ease and on a meagre diet."

To treat mountain sickness, he recommends, in addition to heart stimulants (*coramina*) "an infusion of coca or chewing the leaf. I have had occasion to see people suffering from mountain sickness who improved merely by using it".

(89) MANTEGAZZA, P.

Sulle virtù igieniche e medicinali della coca. Autoosservazione (Regarding the hygienic and medicinal virtues of coca. Self-observation). Milan, 1859.

The author lived several years in South America as physician. The older reports by Pöppig (see No. 51), von Tschudi (see No. 86) and others were known to him. His self-experiments are well known. Taking three times a day about 3.24 g. of coca leaves, he observed some burning in the mouth, thirst, and increased peristalsis, from time to time a prickling sensation of the skin; finally an erythema pityriasiforme on the eyelids developed. Afterwards he used an infusion of the leaves, observing a fever-like sensation (without a notable rise of temperature), buzzing in the ears, strong palpitations of the heart and a pulse of 134 (instead of 70). Now the first psychic symptoms appeared, a sensation of well-being, of increased corporal strength and agility. The author stresses that his mind remained always clear. The sleep was profound and full of peculiar dreams.

These observations are mentioned because self-observations of physicians have some general interest.

His recommendations, however, of the coca leaves as food which spares other nourishment [the same is said of alcohol—P.O.W.] and as a restorative remedy have not been accepted in medicine.

He himself provides the criticism called for by his observations when he says—"God is unjust because he has made man unable to spend his whole time chewing coca leaves. I would prefer 10 years of life with coca to 2,000 centuries of life without it".

²⁰ Indian of that region.

(90) MERZBACHER

"*Über Koka und Kokakauer. Reiseerinnerungen aus Südamerika*" (On coca and coca chewers. Memoirs of travel in South America). *Muenchener Medizinische Wochenschrift*, 1929, 2016-2019.

The author, a German neurologist resident in Buenos Aires, relates some of his impressions when travelling in north-west Argentina and on the Bolivian plateau.

Not having encountered any chewers at Buenos Aires, he concludes that "the vice is due to accidental causes and it can be dropped when those causes are removed".

He mentions some casual observations made during his travels. For instance, he speaks of a Bolivian who had been chewing for fifteen years and who told him: "When I give up coca, I feel sad and have no desire to work; my body is weary. When I take it, I feel full of enthusiasm and energy".

He mentions another case of a Bolivian on the Argentine-Bolivian frontier who told him that he had been chewing for fifteen years and consumed 100 grammes of coca leaf daily. This Bolivian told him that "when he gave up chewing coca (and that happened when his supply, money or credit ran out) he felt depressed, a desire to vomit and his sleep was inadequate. When he chewed coca he became merry and had much more 'courage'. When he abstained from coca he saw the mountains moving in a peculiar way and in all sorts of colours". This man's wife had been chewing since childhood. "In the morning she begins as soon as she awakes and only stops in the evening when she falls asleep. She lost courage when she did not chew. She then experienced a pitiful sense of weakness in the region of her stomach. She saw further and better and did not grow tired as long as she chewed coca. She had four children. When giving birth she had used more coca than she generally did; that made the labour easier and she did not feel the pain." [In these clinical case-histories there appear to be descriptions of the effects of abstinence, but they are not apparently recognized as such.—P.O.W.]

The author says that he himself experienced the beneficial effects of occasionally chewing coca leaf as a remedy against mountain sickness.

The author says, "I cannot go so far as to say that constant indulgence in coca produces harmful effects. All I know is that I have no knowledge of any acute morbid phenomena either from my own observations or from the statements of doctors from the areas where the coca-chewers live.

"I should be inclined to regard the apathy as a racial characteristic and not as a toxic effect; it is to be found also in the case of young persons who have not yet chewed coca or who have just begun to do so.

"My observations and personal experiences lead me to recommend coca (prepared as an infusion, tablets, lozenges or chewing gum) to cure smokers and drunkards of their habits and to overcome mountain sickness." [Such conclusions show the value of the author's assertions.—P.O.W.]

(91) MONGE, CARLOS

"*El problema de la coca en el Perú*" (The coca problem in Peru). *Anales de la Facultad de Medicina* (Lima), 29, No. 4, 311-315; 1946 (published in 1948).

The author, professor of clinical medicine in the Faculty of Medicine of Lima and Director of the Institute of Andean Biology, states his views on the coca problem in a prologue to the work of his colleague Cabieses Molina (see No. 87).

The author begins by observing that "there has been much discussion and little investigation of coca-chewing on the plateaux of America. Some look on coca as the 'divine plant' which sustains life at high altitudes while others see in it the cause of the degeneration of the race. The Institute of Andean Biology is now dealing with the matter from a strictly scientific point of view". After surveying the chemical research

being carried out, the author says that he always "felt that to tackle the problem it was absolutely essential first to understand the physiology of Andean man, a closed book prior to the investigations of the Peruvian Medical School, and a subject which has been ignored by almost all the investigators who have dealt with coca-chewing".

"The first results showed a great deviation of physiological and pharmacological reactions from normal reactions at sea level" and "the results obtained were of such significance that they confirmed the theory that responses to drugs in an oxygen-deficient atmosphere are quite different from those at sea level. It is therefore logical to suppose that the response to coca, in the form of coca-chewing, and to the alkaloids absorbed must also take a special form in the physiological processes of adaptation and acclimatization at high altitudes. In short, it must be supposed that when man is subject not to 152 mm. pressure of atmospheric oxygen, but to one of 100 or 75 mm. as happens in the inhabited high mountain regions, pharmacological reactions must differ in the same way as the mechanisms of physiological compensation differ."

The author feels that he "is bound to accept the categorical results of his clinical and social observations on the basis of which, on a much earlier occasion, he stated his doubts regarding the harmful effects of coca and which incline him to accept the drug as harmless and necessary in the extreme living conditions at high altitudes. The following considerations support this view.

"Coca-chewers do not show the characteristic signs of drug addiction—habituation to the drug, craving for it and morbid symptoms of the kind found in cocaine addiction. There is in fact a direct relation between altitude and the habit of coca-chewing. It may be stated that between 12,000 and 15,000 feet above sea level all Andeans chew coca. Between 8,000 and 12,000 feet, the number of coca-chewers falls off considerably; below that altitude, and particularly at sea level, the subject gives up coca-chewing entirely. Only a very small number retain it. The greater the effort the subject has to make at high altitudes and the less food he has, the more he chews as if the drug reinforced his sources of energy to ward off fatigue. While a drug addict is at rest when he takes the drug, the coca-chewer takes it in order to work . . . Every year approximately 10,000 men from the plateaux of the Andes enter the army and immediately give up the habit of coca-chewing with no abstinence symptoms whatsoever. There is neither habituation nor craving and the clinical symptoms which are so marked a feature of cocaine addiction are completely absent; in general, the coca-chewer gives up his habit on feast days. Observations based on a superficial physical or psychological knowledge of the individual cannot be attributed to coca-chewing in the absence of previous study of his physiology and psychology.

"The Andean is a being physiologically and chemically different from the dweller on the coast. He lives at heights up to 17,000 feet in an atmosphere with half the amount of oxygen available at sea level. Nevertheless he behaves like an athlete . . . The investigations of Monge, Pesce, Asto Salazar and Cabieses have shown that the tone of his vegetative nervous system is high and quite different from that of man at sea level. In these circumstances, it is to be assumed that certain chemical substances act in a manner different from that which occurs in the lowlands. Thus, for example, Andeans can take intravenous doses of atropine three times greater than can individuals on the littoral without showing any symptoms of intolerance. It is therefore to be presumed that the alkaloid derived from coca acts on the organism in a hitherto unknown and perhaps useful way, since the Andean is a climato-physiological variety of the human race.

"The coca-chewer chews approximately 60 grammes of leaf a day; the content cannot be stated with certainty but is probably 50 milligrammes . . . Oral ingestion has nothing in common with the effects of the drug when injected [which means that the effects differ with the method of administration—

P.O.W.] . . . A pH of 7.45 to 7.5 destroys the alkaloid without the need of special fermentation. Monge has demonstrated that the blood pH of Andeans on the plateaux is at the upper limit of alkalinity and reaches these figures, which might help to destroy the alkaloid."

"Supra-lethal doses administered slowly over a period of some hours do not produce great toxic effects (Gutiérrez Noriega). In coca-chewing the period of mastication is very long and lasts some hours. We therefore do not know how much cocaine is absorbed by the organism, and everything points to the supposition that it is largely destroyed.

"There are two American indigenous groups whose individual and social life is identical as regards work, output, customs, virtues and defects, namely, the indigenous inhabitants of the Ecuadorean plateau on the one hand and the populations of the Peruvian and Bolivian plateaux on the other. Nevertheless, in Ecuador there is no coca-chewing." [The statement that the Ecuadorean Indians do not chew coca, which is confirmed by other authors—see No. 109—might equally be interpreted as evidence that coca-chewing is not necessary at high altitudes.—P.O.W.]

"In short, it may be concluded that the habit of coca-chewing does not occasion clinically established diseases and does not produce the normal signs of drug addiction. Rather is it probable that it acts as a pharmacological agent which stimulates the humoral reactions and increases the output of the individual. The latter is a working hypothesis . . ."

(92) MORTIMER, W. GOLDEN

Peru. History of Coca. "The Divine Plant" of the Incas. New York, 1901. 576 pages.

This work contains many general data concerning the conditions of life for the Indian in Peru, other general considerations and special items on coca (history, botany, production, chemistry) and its effects upon muscular energy, the nervous system, etc., on the "adaptation of coca to voice production", "the dietetic influence of coca", etc. The best parts of the book are the historical data and the bibliography, which is extensive. The discussions of medical questions and of the effect of coca on the human organism are partly pseudo-scientific, partly wrong. Among other things Mortimer expresses the curious theory that the Indian consumes the coca not for its cocaine content but for the volatile alkaloids which it contains! It must be said, however, in favour of the author that the knowledge of drug addiction some fifty years ago was neither very profound nor very precise, and that concepts at that time were still lacking the scientific basis which for us is a matter of course. [On the whole it is not a reliable book which therefore can easily be passed over.—P.O.W.]

Some characteristic passages may be quoted:

Page xiii: "As to the value of coca, there cannot be the slightest doubt. As to its utter harmlessness there can be no question."

Page xiv: "It will be shown by ample testimony that coca is not only a substance innocent as is tea or coffee—which are commonly accepted popular necessities—but that coca is vastly superior to these substances, and more worthy of general use because of its depurative action on the blood, as well as through its property of provoking a chemico-physiological change in the tissues whereby the nerves and muscles are rendered more capable for their work."

Page 424: "The action of cocaine has been placed midway between morphine and caffeine."

Page 428: "Prominent in the application of coca is its antagonism to the alcohol and opium habit."

Page 430: "The cases of cocaine poisoning and addiction often sensationally reported are even open to grave doubt."

To sum up, it may be said that the author is very much in favour of the use of coca, which according to him is not harmful at all. He is carrying on a controversy with the observations of Pöppig (see No. 51).

On the other hand Mortimer is highly in favour of Mariani (see No. 96) to whom his book is dedicated, as to "the first to render coca available to the world".

In the chapter "The dietetic influence of coca" Mortimer refers, with regard to physicians who refuse to prescribe coca owing to the danger of habituation involved, to "hesitancy . . . united with a preformed prejudice without the weight of scientific evidence" (p. 467). Some pages later (p. 479) he says: "The probability is that coca through its nitrogenous influence so affects metabolism as to enable the organism to utilize substances which might otherwise pass off as waste". And summing up, he adds on page 488, "that coca is not only theoretically but practically a food".

(93) SAMPSON

Die Koka-Pflanze, ihre Geschichte, hervorragenden Eigenschaften und darauf basierende Anwendung bei Krankheiten der Athmungs- und Verdauungs-Organen, Störungen des Nervensystems und allgemeinen wie speciellen Schwächeständen (The coca shrub, its history, its remarkable qualities and its application, on the basis of such qualities, to diseases of the respiratory and digestive organs, disorders of the nervous system and general and special debility). 15th ed. Stuttgart, 1876. Pamphlet of 24 pages.

The author claims to be Professor at New York University, honorary member of the Faculty of Lima, physician in New York, Huánuco (Peru), Brunswick (Germany) and Florence (Italy), etc.

We mention this pamphlet because it is sometimes quoted in bibliographies or even referred to by authors. In fact, it is a commercial and therefore very favourable recommendation of three sorts of pills, made from a coca extract according to the author's prescription (secret, of course) and sold only by one pharmacy. The composition of the pill is not given. There is also a coca-spirit and a coca-wine.

The pills are a "real panacea against all diseases of the respiratory organs", "specific for all diseases of the digestive tract", general asthenia, and particularly for sexual troubles.

II. NON-MEDICAL OPINIONS

(94) DOMÍNGUEZ, JUAN A.

"La coca. Erythroxyton Coca Lam. La coca como factor dinamogénico de uso habitual en el altiplano argentino-chileno-boliviano. El cocaísmo americano. El cocaínismo europeo" (Coca. Erythroxyton Coca Lam. Coca as a dynamogenic factor in habitual use on the Argentine-Chilean-Bolivian plateau. American coca addiction. European cocaine addiction). *Proceedings of the Botanical and Pharmacological Institute* (Faculty of Medical Science of Buenos Aires), No. 47. Buenos Aires, 1930. 16 pages. Also published in *El Hospital Argentino*, 1, 698-705; 1931.

The author, now deceased, was a botanist and professor at Buenos Aires University.

For the purposes of this annotated bibliography, the most important part of this paper which was submitted to the National Academy of Medicine of Buenos Aires (meeting of 16 November 1928), is the last chapter entitled "Coca, a dynamogenic factor on the high plateau".

"The number of persons who chew coca may be estimated at six or seven million.

"The native chews coca, as he does everything, deliberately and systematically, but it is beyond doubt that while the force of habit plays a great part in his attachment to coca, coca-chewing is also a form of worship for him, a mystical trib-

ute, one might say an offering to the spirit of his ancestors and the only custom which he has preserved intact through more than three centuries of slavery." Later the author refers "to the undeniable benefits which the Indian derives from coca and which, because of the inhospitable environment in which he lives, he cannot give up". In coca-chewing he finds "the only distraction which breaks the monotony of his unhappy existence".

According to Domínguez "the coca-chewer selects his coca with the same care as a good smoker selects his tobacco; he recognizes coca, which is bitter, strong, rich in alkaloids and especially in cocaine and deficient in aromatic elements, and rejects it in favour of sweet coca with less alkaloids but richer in aromatic elements and therefore in hygrine".

He then stresses the fact that "coca-chewing in suitable doses is highly beneficial to the maintenance of life at high altitudes since, working as a cardiotonic, it increases the strength of the cardiac contractions and at the same time acts as a genuine stimulant to respiration, increasing the intensity and amplitude of the respiratory movements and thus permitting better oxygenation of the arterial blood whose oxygen content increases, while at the same time it increases muscular energy and by general excitation intensifies the organic interchange, increasing the rate of elimination of total nitrogen and urinary chlorides, sulphates and phosphates at the expense of the body's reserves; the foregoing has recently been confirmed by Dr. Morera's investigations into the basal metabolism of coca-chewers in Salta and Jujuy . . ."

"It is because of these general effects . . . that the sensation of well-being and tranquility (never the euphoria or excitation of cocaine) is quickly attained . . ."

"Of all the properties of coca, the most difficult to explain is that of reducing the need for food to a marked extent without adversely affecting the resistance of the body."

Although the author is in favour of coca-chewing, he admits the existence of "obviously inadequate nutrition".

"Cocaine addiction is a vice imported from Europe. Coca-chewing is a habit imposed by nature to overcome the difficulties of life at high altitudes, a habit which has not yet been scientifically studied, though such a study must be undertaken because, besides being one of the most interesting problems set us by primitive man in America, it is today a social problem since, while coca-chewing may be justified on the high plateau because of environmental conditions, we do not know whether, if it spreads to the Argentine plains, it will not later bring in its train disadvantages which must be obviated."

(95) FERNÁNDEZ, NICANOR T.

La coca boliviana. Maravillosas propiedades y cualidades de la coca. Opiniones de prestigiosos médicos y naturalistas acerca de la planta sagrada de los incas del Perú (Bolivian coca. Marvellous properties and qualities of coca. Opinion of famous medical experts and naturalists concerning the divine shrub of the Incas of Peru). Ed. *Americana*, La Paz. 1932. 47 pages.

This pamphlet was issued by the Society of Landowners of Yungas (see No. 97) in defense of coca cultivation and trade at a time when the League of Nations "aimed to limit coca production". The booklet shows the benefits derived from coca, particularly by the workers, and is "intended for the promotion of coca consumption and the defence of its production, menaced without any reason". Among other things it states that it is a sincere and humanitarian wish to diffuse the use of the coca leaves for the benefit of all persons who cannot afford the services of physicians or pay for the expensive drugs and proprietary medicines, and as a remedy for many physical ailments.

It is stated furthermore that the control and limitation of the coca industry would injure the Bolivian economic system,

and this without any justification. It is denied that chewing coca leaves has been harmful to the native population, and any comparison with the effect of cocaine is rejected.

(96) MARIANI, ANGELO

Coca and Its Therapeutic Application. New York, 1892. Pamphlet of 78 pages.

This booklet is the translation of a French pamphlet, published under the same title in Paris, and, apart from some general considerations—very favourable to coca of course—it consists in the main of propaganda for “Vin Mariani”, i.e., coca wine. It is only mentioned here to clear up the situation of its author in order to avoid misunderstandings. Mariani was a clever businessman and nothing else, producing in Paris an elixir, wine and other coca preparations, thus combining the effects of coca and alcohol. In his day the damage done by coca was not so definitely known as afterwards. In 1888 he had written a monograph on coca which contributed much to render the plant popular.

(96 bis) MORALES, JOSÉ AGUSTÍN

El oro verde de las Yungas (Libro de propaganda industrial) (The green gold of the Yungas (a book of industrial propaganda)). La Paz, 1938. 210 pages.

As its subtitle indicates, the purpose of this book is purely commercial. It describes different stages in the production of the coca leaf, preparations which can be made from it, etc. It also sets out a wide range of opinions on coca leaf.

(97) SOCIETY OF LANDOWNERS OF YUNGAS

La coca de Yungas (Bolivia), su origen, situación internacional y valor alimenticio (The coca of Yungas (Bolivia), its origin, industrial situation and food value). La Paz (Bolivia), 1948. Pamphlet of 23 pages.

The pamphlet consists of a petition addressed by the President of the Society to the Minister for External Relations of Bolivia and a reprint of an article published by Julio C. Albornoz in *La Razón* of La Paz (16 February 1947).

In the preface it is stated that “on the basis of mere prejudice, Yungas coca leaves have been classified as drugs dangerous to health”, whereas “these prejudices are belied by the traditional vigour of the Agmará race and its maintenance throughout the centuries on a frugal diet based on coca leaves; and by the almost perfect health of the Indian farmer and worker who chews coca . . . Coca is not a vice.”

The pamphlet reproduces a petition [dated 14 January 1948—P.O.W.] to the Government requesting that representations be made to the Narcotics Congress to secure the removal of Yungas coca from the list of narcotic drugs. This document contains an analysis made by an unofficial United States laboratory. According to the analysis, Yungas coca leaves contain astonishing vitamin factors, and should be brought into universal consumption at the present time when nutrition is one of the most pressing problems of mankind.

Further, the Society of Landowners of Yungas has asked that an international scientific mission composed of botanical and dietetic experts be invited to carry these important investigations still further, “since it is possible that our leaf is a special variety of erythroxyton from which cocaine is extracted and not a species which has yet to be studied and classified”.

The text of the petition requests the submission to the United Nations of a “complete study of Bolivian coca leaf, which is now in absolute disrepute, an unjust situation, prejudicial to its introduction to the international market, which was created by the ill-considered action and lack of knowledge of the subject by our diplomatic representatives to the League of Nations, who allowed Bolivian coca to be classified as a narcotic at the Second International Opium Conference at Geneva in 1925, so that it is subject to the same restrictions and regulations as opium, morphine, cocaine, diacetylmorphine, ecgonine, betel, Indian hemp, etc.”

It is then requested that the Bolivian delegation “make a concrete proposal requesting the removal of Bolivian coca from the items enumerated in the lists of the Second International Opium Conference.”

“The organization I represent feels bound to observe, first, that Bolivian coca has not a high alkaloid content, like the similar products of other countries (Peru, Netherlands East Indies etc.) which were for that reason described as crude cocaine.”

“In the second place, we observe that the leaves of Bolivian coca are not harmful to the human organism, still less do they act as narcotics, since the amount of cocaine that might be ingested by a coca-chewer in a year of daily coca chewing would not amount to one gramme and it is logical to suppose that the portion ingested in one day is easily eliminated by our organic defences.

“We therefore firmly believe that Bolivian coca is in the nature of a food [in capitals in the original—P.O.W.] and assuredly one of the most complete foods. In contrast with the days when our own countrymen and foreigners ridiculed coca and anathematized it with unscientific arguments, we are now in a position to discuss the matter with them scientifically, thanks to the evidence of complete chemical analyses of Bolivian coca, and to the detailed observation of the way of life of our mining and agricultural workers, in relation to coca leaves and coca-chewing.”

The pamphlet also states that the Bolivian leaf is “superior to its Peruvian counterpart in nutritional value.”

In 1947, the Society of Landowners of Yungas, “through our Embassy in Washington, asked for a complete analysis of the food values of the leaf from one of the most distinguished laboratories of the United States, [private—P.O.W.] whose name we cannot disclose . . . The results were excellent, and Bolivian coca was shown to contain sufficient quantities of vitamins for human nutrition. The laboratory mentions in its report that it contains as much vitamin A, riboflavin and thiamine as are to be found in other products from which such vitamins are derived” [No figures or more exact details are given.—P.O.W.].

The President of the Society, who signs the memorandum, states that “the analysis of this distinguished laboratory . . . shows the fundamental error in which we have persisted and restores the prestige of this age-old leaf, removing a slur from our noble product and rehabilitating it in the eyes of the entire world. It will thus be possible to generalize the use of coca, the cultivation of which is the basis of the life and progress of the flourishing townships of Yungas and of the whole Department of La Paz.

“Another aspect which cannot be ignored is the great contribution which it makes to the national treasury in the form of foreign currencies, which would be further increased by new exports to the United States, Europe and other countries whose populations are suffering from hunger.”

The pamphlet then mentions technical and other works which admit “the advantages offered by coca”.

“Accordingly”, the petition concludes, it is hoped that “a specific proposal will be made to remove Bolivian coca from the odious category of narcotic drugs”.

The article by Mr. Albornoz supports the purposes of the pamphlet. Albornoz bases himself largely on Mortimer's book (see No. 92). In connexion with the resistance which coca encounters (“the accumulation of prejudices and the barrier of incomprehension”), the author of the article recalls the resistance to the introduction of the potato in France, and similar events.

(98) WEDDELL, H. A.

Notice sur la coca, sa culture, sa préparation, son emploi et ses propriétés (Note on coca, its cultivation, preparation, utilization and properties). Memorandum by the Société impériale et centrale d'agriculture. Part I. Paris, 1853.—*Voyage dans le nord de la Bolivie* (Journey in northern Bolivia). Paris, 1853.

Weddell, a French botanist, who took part in a scientific expedition in 1845, held generally favourable views regarding the effect of coca and believed that the leaves contained nutritive elements (significant quantity of nitrogen, etc.).

During his travels he observed that while during the day his Indian peons contented themselves with coca-chewing, when they stopped for the night they ate like men who had been fasting, sometimes, like himself, for two days.

APPENDIX

Publications on other aspects of the chewing of the coca leaf

(99) Relatively little is known about coca-chewing in some parts of Brazil. In his book *Phantastica* (Berlin, 1927) L. Lewin [who is not, however, regarded as authoritative—P.O.W.] states: "The half-caste and Indian women of the Upper Amazon are almost all addicted to the use of *ypadú*, as coca is called there. In north-western Brazil the Indians consume incredible amounts of coca." The author does not indicate the bibliographical sources of his information.

See also Nos. 25, 80, 85, 115 and 119.

(100) CHALMETA, A.

"Las hojas de coca del Perú en nuestra farmacopea" (The Peruvian coca leaf in our pharmacopeia). *La Farmacia Moderna* (Madrid), 10 and 25 November 1932.

The author, who holds a chair in the Faculty of Pharmacy of Madrid, established analytically that "the coca leaf examined had an alkaloid content of:

| | <i>Alkaloids per cent</i> |
|-----------------|-------------------------------|
| "Bolivia | 0.76 |
| "Trujillo | 0.41 |
| "Java | 1.79" |

He also noted the "high cocaine content of alkaloids of coca of the Bolivian type, and the greater proportion of secondary alkaloids in the other commercial types". Elsewhere he refers to the "higher cocaine content" of coca of the Bolivian type. (See No. 97 for a contrary opinion.)

He also noted "the increase of anaesthetic power in proportion to the alkalinity of the liquid".

(101) CHALMETA, A. AND CHALMETA, C.

"Les feuilles de coca dans les Pharmacopées" (The coca leaf in the pharmacopeia). *Bulletin des sciences pharmacologiques*, 40, 193-208; 1938.

The same work in French.

(102) CHRISTISON, SIR ROBERT

"The Effects of Cuca or Coca: The Leaves of Erythroxyton Coca." *British Medical Journal*, 29 April 1876, p. 527.

The author refers to experiments on two medical students who, after having been much tired by walking exercises, were relieved of all feeling of fatigue by drinking an infusion of the dried leaves made alkaline with sodium carbonate.

He himself, when 78 years old, ascended a mountain (some 2,900 feet to climb); instead of lunching, he chewed 40 grains (2.6 grammes) of coca leaves, and on the way down, 10 more grains (0.65 grammes). He reached home in the evening, free from all sensations of hunger or fatigue. He repeated the experiment under similar conditions and with analogous result. He felt no ill after-effects from the drug.

(103) CIUFFARDI T., EMILIO

"Dosis de alcaloides que ingieren los habitados a la coca" (The alkaloid dose ingested by coca addicts). *Revista de Farmacología y Medicina Experimental* (Lima), 1, 81-99; 1948.

This study seems to be the first of its kind to have been systematically carried out "on the balls of coca chewed by habitual coca-chewers in order to determine the quantity of alkaloids they extracted or ingested". So far, "as regards the doses ingested, only estimates have been made, taking into account the quantity of leaves chewed during the day or in each period of chewing". (See for example, Nos. 54 and 59.)

"The balls were obtained in two expeditions to the province of Huancayo." In most cases (33 out of 36), each individual was allowed to "chew what he normally chewed under ordinary conditions"; "in these conditions, the average time per experiment was three to four hours depending on the subject."

"The dosage of alkaloids in the coca balls . . . indicates that there are great individual variations."

"The average amount of coca consumed during a period of chewing was 34 grammes of leaves; the average amount of alkaloids ingested during the same period was 178.9 milligrammes." "The majority ingest doses varying between 3 and 4 milligrammes per kilo of weight, which is not an excessive dose bearing in mind the doses tolerated without serious consequences by persons not accustomed to them."

The average "percentage of extraction", i.e., the quantity extracted by the coca-chewer during the *cocada*, varies with the individual between 66.6 and 98.9 per cent of the total alkaloid content of the leaves, the average being 85.21 per cent.

"The quantity of alkaloids extracted or ingested by the coca-chewer per unit of time is not constant and regular, even in the course of the same *cocada*. The degree of extraction depends . . . on the energy and speed with which the chewer chews his ball and the regularity of the process. Generally speaking, mastication is not regular and depends on many factors."

"The length of habituation does not seem to affect the quantity of alkaloids ingested in one *cocada* or the percentage of extraction."

"The investigations carried out show that the great majority of cases observed ingested more than 80 mgr. of alkaloids from the coca; in 9 cases or 27.27 per cent, between 240 and 400 mgr. were ingested. Bearing in mind that these amounts relate to one *cocada*, and in view of the fact that in some cases there are as many as four *cocadas* a day, it may be estimated that the subjects normally ingest more than one gramme of alkaloids a day, and that of this amount at least 80 per cent is cocaine. Further, on the basis of average ingestion—178.9 mgr. of alkaloids per *cocada*—and assuming that only one *cocada* is taken a day, the dose is very large and may, if chronic, cause serious harm to the organism."

"Using *Ilipta* and his saliva, the Indian actually extracts the alkaloids chemically at an average rate of more than 80 per cent (85.21 per cent)."

(104) CIUFFARDI T., EMILIO

"Dosis de alcaloides que ingieren los habitados a la coca. Nuevas observaciones" (The alkaloid dose ingested by coca addicts. New observations). *Revista de Farmacología y Medicina Experimental* (Lima), 1, 216-231; 1948.

The article describes further investigations of the kind described under the preceding number on 64 coca-chewers, also in Huancayo.

"On an average, more than 86 per cent of the alkaloids contained in the coca leaf are extracted during a *cocada* or period of coca-chewing. The amount of alkaloids extracted per *cocada* varies between 80 and 174 milligrammes, the average being 140 milligrammes. Of those doses, 64 milligrammes and 139 milligrammes are cocaine, the arithmetic average being 112 milligrammes."

"Each coca-chewer ingests during each *cocada* from 1.61 to 5.65 milligrammes per kilogramme. The average amount ingested is 3 milligrammes of alkaloid per kilo of weight.

"The age of the coca-chewer, the length of habituation and the length of the *cocada* have little bearing on the alkaloids extracted and the dose ingested. Generally, extraction is more complete in older subjects who have used coca longer, as they take more time over each *cocada*. Nevertheless the younger subjects who have been addicted for a shorter time ingest higher doses of alkaloids in relation to their weight.

"Part of the coca ball is swallowed by the addicts which in some cases represents 70 per cent of the weight of the coca chewed. Subjects who ingest smaller quantities of alkaloids swallow larger quantities of leaves."

(105) CRUZ SÁNCHEZ, GUILLERMO and GUILLÉN, ANGEL

"*Estudio químico de las sustancias alcalinas auxiliares del cocaísmo*" (Chemical study of the auxiliary alkaline substances in coca-chewing). *Revista de Farmacología y Medicina Experimental* (Lima), 1, 209-215, 1948.

"Subjects accustomed to coca masticate the leaves of this plant with alkaline substances whose composition varies with the regions where coca-chewing is practised. Generally speaking, these substances fall into two main groups—substances formed by plant ashes and substances formed by quicklime."

The authors carried out a chemical analysis of the alkaline substances used in coca-chewing with the following results:

"*Tocra* (ashes of quinoa, cañihua and other edible plants) contains potassium, calcium, sodium, magnesium and phosphorus. Iron, antimony, sulphates and carbonates are also found in very small quantities. The pH of the *tocra* solutions varies between 10.6 and 11.5 and their alkalinity between 5 and 27.3 per cent. A 3 per cent solution of *tocra* increases the solubility of basic cocaine in water. The destructive effect of *tocra* solutions on basic cocaine is of a very small importance practically since it varies between 2.5 to 5.5 per cent in a half-hour period at body temperature.

"The duration of a *cocada* varies between 30 and 120 minutes. During this time the subject adds new leaves and renews his coca ball. As soon as the leaves enter the buccal cavity, they are chewed and the process of extraction begins. This means that the alkaloids extracted remain in the alkaline solution formed by saliva and *tocra* in the mouth for only a few minutes, and then pass to the stomach where the cocaine is probably transformed into a hydrochloride on being mixed with the gastric juices. In the duodenum it must revert to the basic state and be immediately absorbed in that form. In any case, from its extraction in the mouth until its absorption in the intestine, a period of not more than one to two hours can elapse, for which reason we consider that the destructive influence of the *tocra* alkalines is of little practical importance since it would not amount to 10 per cent."

(106) DIXON, W. E.

"The Drug Habit." *British Medical Journal*, 31 March 1923.

Dixon, late Professor of Pharmacology at Cambridge, refers in a general way to the coca habit. The following indication is worthy of notice: "Travellers assert that by chewing this leaf they are able to perform long and rapid journeys with less fatigue and without feeling the pangs of hunger and thirst.

Experiments in the laboratory, using the ergograph, suggest that these effects are due to cocaine, but experiments by Europeans in the Alps have not been very successful."

(107) DIXON, W. E.

"Cocaine Addiction." *British Journal of Inebriety*, January 1925.

Only some introductory remarks on the known stimulating effects of coca leaves.

(108) DIXON, W. E.

"A Clinical Address on Drug Addiction." *Canadian Supplement to the British Medical Journal*, 30 August 1930. Also in *Canadian Medical Association Journal*, 23, 747-756; 1930.

In this paper the author repeats his earlier observations (1923; see 106), but adds that attempts by Europeans, also elsewhere than in the Alps, to obtain the known stimulating effects, have not been successful. [However, Dixon did not mention the paper by Christison, No. 102.—P.O.W.]

109. ECUADOR

Information supplied by Dr. Virgilio Paredes Borja, Professor at the Faculty of Medicine of Quito (personal communication dated 10 November 1948). "To the best of my knowledge, coca-chewing is not practised in Ecuador." "In reply to my request for information the Directorate of Health of the Central Zone said that it had no data regarding coca-chewers."

This report confirms Nos. 64, 71 and 77.

(110) HARTWICH, C.

Die menschlichen Genussmittel (Human stimulants). Leipzig, 1911.

The chapter on coca contains excellent general information.

(111) HELFRITZ, H.

"*Cultivo de la coca en las yungas bolivianas*" (Cultivation of coca in the Bolivian Yungas). *La Farmacia Chilena*, 18, 293-95; 1944.

"Coca, Erythroxyton coca . . . grows preferably in the deep ravines of the tropical forests in the rainy zone on the eastern slopes of the Andes of Peru and Bolivia. These deep ravines with their precipitous sides falling thousands of metres towards the plains are called Yungas in Bolivia and are without parallel in nature . . . The rocky sides of the Yungas are so steep and narrow that it is impossible to estimate their enormous depth at first sight. In some places, where the ravines are broader, the slopes are bare. Here and there in the dark tangle of the Yungas woods appear clear patches, looking as though they had been shaved. It is there that are found the terraces of coca plantations set out in neat rows . . .

"Coca must still be regarded as the principal product of the Yungas. Its cultivation is so profitable that the Yungueño plants coca wherever the terrain allows . . . A plantation may be harvested for fifteen years, after which the plants have to be replaced. Each planting produces three to four crops a year.

"As the plantations almost invariably have shrubs of various ages, coca can in fact be harvested for practically the whole year without interruption."

"About 10 million South American Indians consume coca and are so addicted to its use that in many farms and estates wages are paid partly in coca. Of the inhabitants of Peru, 75 per cent chew coca, and in Bolivia the percentage may be even higher."

(112) HERNÁNDEZ, J. F. A.

"*Narcomanías*" (Drug addictions). *La Farmacia Chilena*, 20, 205-216, 253-256; 1946.

The author, who is Chief of the Central Inspectorate of Pharmacies and Control of Medicinal Products, is also responsible for the control of narcotics in Chile.

"In earlier years, the authorities were concerned with the enormous consumption of coca leaves in the nitrate deposits where the Peruvian, and to a smaller extent the Chilean, workers used to consume the drug from force of habit, chewing approximately 2 kilogrammes a month per head. Special measures taken by the Directorate-General of Health reduced the consumption of coca as far as possible to the amount required for the exclusive needs of the thousands of Bolivian and Peruvian workers then employed in the nitrate industry, which was at that time booming. During recent years, the mechanization of the industry has displaced many of the workers, so that the coca problem has ceased to exist in the pampas; the consumption of not more than 200 kilogrammes of coca is permitted to reduce the fatigue of workers in the sulphur industry in the northern Andes."

(113) HERRERA, F. L.

Estudios sobre la flora del Departamento del Cuzco (Studies of the flora of the Department of Cuzco). 1933. (Quoted by Marroquín, No. 44.)

"I can assert without hesitation that the coca leaf enters into every phase of the Indian's life. He consumes coca in substantial quantities for pleasure and to reduce the fatigue of his daily labour. It is the drug *par excellence* against all bodily ills, the symbol of friendship, his consolation in sorrow, the expression of joy, the indispensable ingredient of any superstitious ceremony, in short the universal panacea."

(114) JACOB, C.

"Die peripheren Wirkungen des Kokains und ihre Bedeutung für die Erklärung des Kokakauens der Indianer" (The peripheral effects of cocaine and their significance in explaining the coca-chewing habit of the Indians). *Archiv für experimentelle Pathologie und Pharmakologie*, 159, 495-515; 1931.

"In experiments on animals and on men, large doses of cocaine (50-150 mg.) have, as in the case of morphine and alcohol, produced signs of central excitation and paralysis; a state of intoxication similar to morphine euphoria occurs."

"It has also been found that in the case of marked physical fatigue and exhaustion, small 5-15 mg. doses, provided they are taken orally, are sufficient to restore full functional capacity rapidly. After such small internal doses, however, normal, unfatigued men show only the usual local effects without the corresponding central general effects; in the case of fatigued and exhausted persons, the resulting restoration of functional capacity does not appear to be simply attributable to direct central excitation or paralysis as in the case of morphine and alcohol. A satisfactory explanation of this interesting and valuable effect of cocaine has therefore yet to be found."

The author advances a new pharmacological theory dealing with the influence of cocaine on the sensitive nerve ends and the circulatory system. He writes:

"Here the increased efficiency of muscular sense in normal men, even after the relatively small doses of cocaine with which we are concerned, is not to be attributed, as in the case of alcohol, to the central paralysis of the psycho-motor innervation apparatus but to paralysis of the ends of the sensitive muscle nerves."

"It is certain . . . that the circulatory system can be influenced substantially by cocaine in very small quantities through excitation of the peripheral parts."

"The question is therefore whether, in the case of exhaustion, the state of the circulation is such that these effects, even if they are at first only small after doses of cocaine, are still of importance in the restoration of the disturbed functions."

"After the cocaine has passed into the blood, its effects will make themselves felt principally on the vessel walls, first in the regions of the stomach and the intestine and then in those of the muscles and skin which, as we saw, became most tired. The vessels contract although perhaps only slightly at first."

Owing to this generally small vascular contraction of the arteries—which can, however, be considerably strengthened by the increasing adrenaline content of the blood caused by muscular effort, the adrenaline being formed by the body itself and secreted in the vessels—the blood supply to the brain again becomes satisfactory and there is thus an improvement of the psycho-motor function of the brain and an improvement of the tone of the vascular centre. This in turn implies a further improvement of the distribution of the blood in the lungs as the blood pressure and circulation increase with a corresponding improvement in the oxygen supply of the blood. As a result, the breaking down of metabolic products returns to normal. The H-ion concentration decreases and the protoplasm molecules break up and pass into a more dispersed phase. Their de-oxidizable side-chains are again available to supply energy, and the muscles are thus enabled to carry out their functions. This is also true of the muscles of the heart. Better circulation can now be maintained and this is substantially accelerated by the fact that the functioning of the heart itself is directly improved by cocaine."

The author goes on to give many pharmacological details.

(115) PÉREZ DE BARRADAS, JOSÉ

"Antigüedad del uso de la coca en Colombia" (Antiquity of the coca habit in Colombia). *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales*, 3, 323-326; 1940.

The author, who is Director of the National Anthropological Museum of Madrid, spent some years in Colombia carrying out scientific investigations. He says that "the habit of chewing coca leaves is common among the inhabitants of the temperate mountain regions of Colombia".

"In San Agustín, in the southern part of the Department of Huila, near the sources of the Magdalena river, which crosses the Republic of Colombia from south to north, the Indian population chews coca. As I spent nine months in the district (March-December 1937) supervising archaeological excavations, I had an opportunity to make personal observations. Moreover, some of the giant stone statues (on the lower Magdalena there are about 300 of sizes varying between 50 centimetres and 4 metres) have bulges in their cheeks which have been thought . . . to be balls of coca . . ."

"In these parts coca is grown round each house or 'rancho' to meet the requirements of the owner. There are no special coca fields . . . On market days coca was sold as one of the necessities of life, as was *mambe* (alkaline ashes for mixing with the coca leaves). My peons used to spend approximately one-eighth of their weekly wages on coca."

"My peons, who used to chew coca, did so after meals and whenever a major physical effort was necessary. They used it, they said, because it gives strength and also because it kills hunger. The ball of coca formed a bulge in one of their cheeks and produced dark-coloured saliva. When they chewed coca, most of them did so surreptitiously, as the habit is not looked on with favour."

The author makes some important historical remarks on coca. "Its original home was the hot valleys of Peru" and "the use of coca spread as far as Nicaragua".

"I do not know whether a date, even an approximate one, has been given for the first use of coca, although in the light of what is presumed from the statues of San Agustín it must have been at the beginning of our era."

"It is an interesting fact that in the Amazon valley coca is known only to the Boro and Huitoto Indians, who do not chew the leaves but powder them and take them like snuff. This indicates that its introduction is more recent." (See also No. 99.)

(116) RAIMONDI, ANTONIO

El Perú. Lima, 1874. Vol. 1, p. 69.

"The *cocada* is a very original example of the measurement of distances and is used by the Indians in some parts of Peru . . . The effects produced by chewing coca leaves last for a limited length of time; if the coca ball (*acullico*) which the Indians keep in their mouth is not replaced by new leaves, the excitation passes and their strength also declines. The period of time during which the excitation lasts or, more accurately, the distance which can be covered during this period, is what the Indian porters call a *cocada*."

"From the above it will be seen that the *cocada* is a measure of time and not of distance, as often happens in the case of the league; as a result, the distance covered will vary considerably, according to whether the ground is flat and free from obstacles or rugged with ascents and descents.

"The observations I have been able to make during my travels show that the excitation begins some minutes (8 to 10) after the introduction of the coca leaves in the mouth and lasts, if no new leaves are added, from 35 to 40 minutes. The *cocada* is therefore a measure of time varying from 33 to 40 minutes, during which, at the speed he walks with a load, the Indian covers 3 kilometres over flat ground and not more than 2 kilometres uphill."

(117) SOUKUP, V.

Contribución al estudio de la flora peruana—Departamento de Puno. (Contribution to the study of Peruvian flora—Department of Puno). (Quoted by Marroquín, No. 44.)

"Apart from reducing the sensation of hunger, it prevents the discomfort felt in breathing when climbing the high summits of our cordilleras; it is this which enables the Indians to withstand enormous fatigue on the march. Coca leaves, partly chewed or whole, are applied to the temples for headache and *el aire* (mountain sickness?) (Puno, Arequipa); coca is chewed with *llipta* (alkaline ashes) for stomachache (Huancayo); an infusion is used for colic and diarrhoea; an infusion is rubbed on for chilblains (Ambo); chewed coca is applied as a remedy for rheumatic pains (Arequipa); coca is chewed to keep one awake. As a tonic, coca is used in doses of three to five grammes; if this dose is exceeded, the effects are stimulating, and if the dose is increased to fifty or sixty grammes, a genuine inebriety is produced." [The names in brackets are Peruvian provinces.—P.O.W.]

(118) VARGAS MACHUCA, RAMÓN

Antagonismo y sinergismo entre la cocaína y el cloruro de calcio (Antagonism and synergism between cocaine and calcium chloride). *Revista de Medicina Experimental* (Lima), 3, 216-231; 1944.

"The study of changes in the pharmacodynamic effects of cocaine through the action of calcium is of three-fold interest;" however, here we are concerned only with the fact that "subjects accustomed to the use of coca chew its leaves with calcium salts. Does the calcium ion have any influence on the chronic intoxication and acute effects of the drug?"

According to experiments carried out on dogs in the Institute of Pharmacology of the Faculty of Medicine of Lima, "cocaine and calcium act as synergists and raise the arterial pressure; the synergism is reciprocal and additional; both increase the frequency of respiration and decrease its amplitude.

"Cocaine . . . diminishes the senecarotid reflex by a mechanism which is still not fully understood, while calcium intensifies it, possibly by central action on the bulb and peripheral action on the sympathetic terminations. This stimulating effect of the calcium counteracts the depression of the reflex by the cocaine."

These pharmacological experiments might be of importance in the future in providing a scientific explanation of the effect exercised by the addition of shells and other materials containing calcium; the author also indicates that "a great number of questions connected with the pharmacodynamics of calcium and cocaine remain to be studied. The question whether the synergism and antagonism we have just described is also applicable to human beings, especially to persons who have contracted the coca habit, is a problem which can only be revealed by further investigations."

(119) WALGER, THEODOR

Die Coca. Ihre Geschichte, geographische Verbreitung und wirtschaftliche Bedeutung (Coca. Its history, geographical distribution and economic significance). Supplements to the *Tropenflanzer*, XVII, 1-76; 1917.

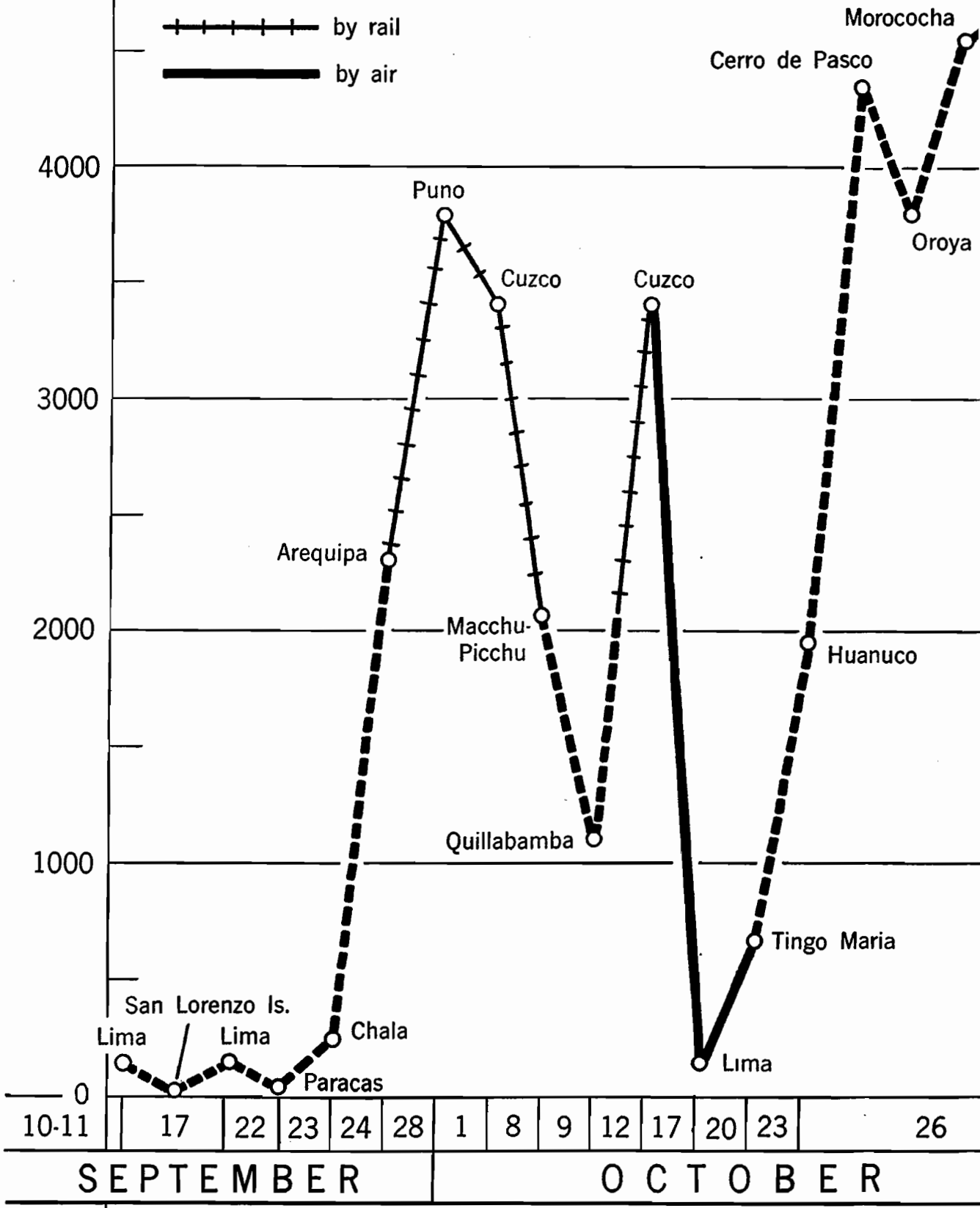
The author confirms that coca is found and used in certain regions of Brazil, under the name *ypadú*. Most probably it is not an old habit as in Bolivia and Peru, but an acquisition of the last, or the last two, centuries. Some tribes are described as passionate coca-chewers.

ANNEX III
Itinerary and Maps

Metres

5000

- by road
- +--+ by rail
- by air



New York-Lima by air

PERU

Feet

16,404

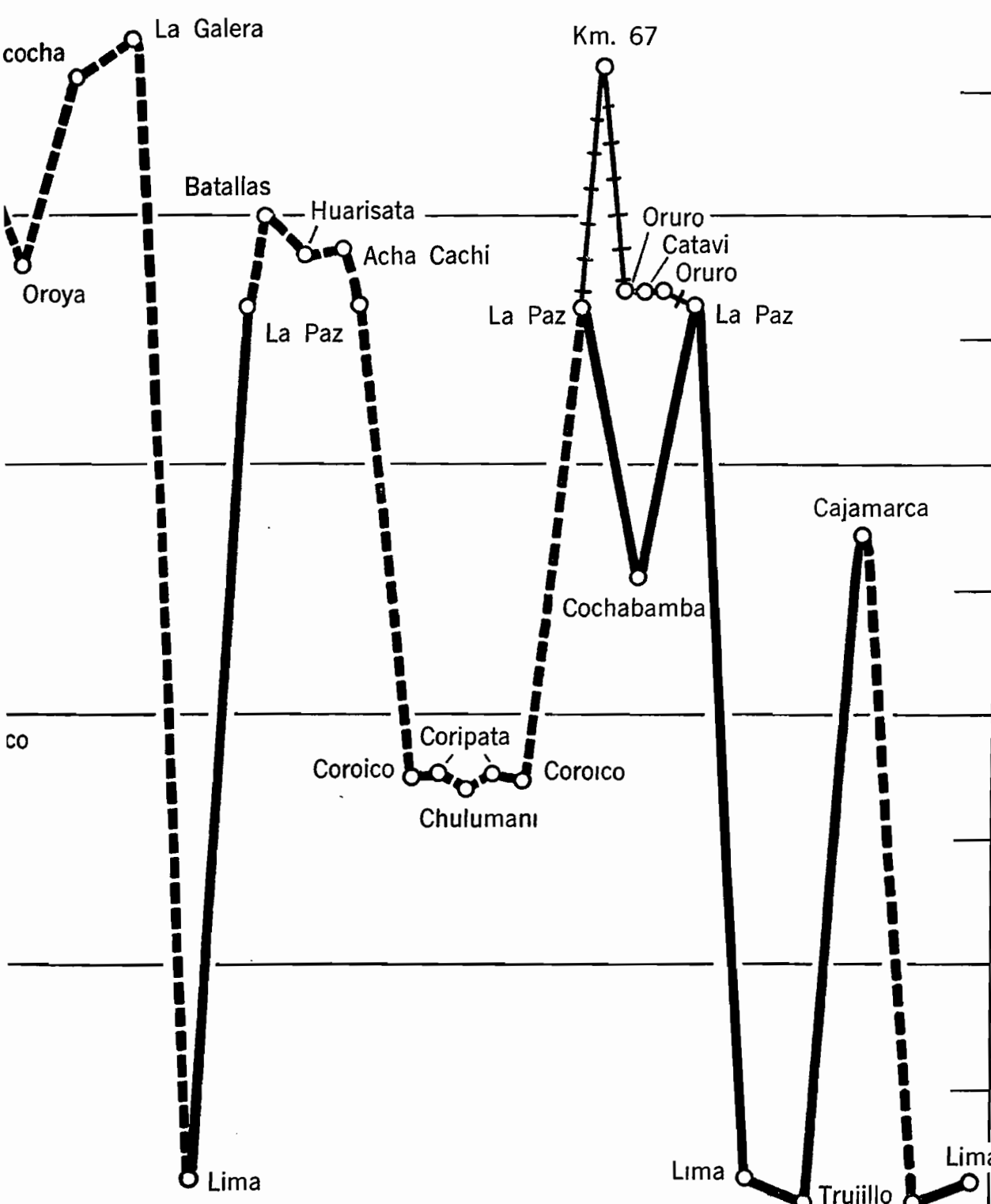
13,123

9843

6562

3281

0



26

1

8

9

10

11

12

15

18

21

24

25

26

27

3-4

NOVEMBER

DEC.

BOLIVIA

PERU

Lima-
New York
by air

ANNEX IV

| | |
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A. Letters from the Governments of Peru and Bolivia

LETTER DATED 14 JANUARY 1950 FROM THE MINISTER OF FOREIGN AFFAIRS OF PERU TO THE SECRETARY-GENERAL OF THE UNITED NATIONS

Lima, 14 January 1950

I have the honour to acknowledge receipt of your letter of 21 December 1949 in which you express your gratitude for the facilities accorded by the Government of Peru to the United Nations Commission of Enquiry on the Coca Leaf.

In reply, I am glad to inform you that Peru, conscious of the importance of the Commission's task, spared no effort to offer it all the facilities necessary for the proper discharge of its functions.

The Government and the special commissions set up to collaborate with the Commission were very satisfied with its work. The members of the Commission displayed at all times their great competence and qualifications for the inquiry into the effects of the coca leaf. During their brief stay in Peru the experts and the representatives of the United Nations Secretariat earned the friendly feeling and high regard of Peruvian official and technical circles by their self-sacrificing work in the interests of science and hence of mankind.

I would thank you once again, in the name of the Peruvian authorities, for the effective collaboration of the United Nations Secretariat in so important a matter and would request you to convey the special thanks and gratitude of the Peruvian Government to the experts and representatives of the Secretariat of whom the Commission was composed.

(Signed) Ernesto RODRÍGUEZ
Minister of Foreign Affairs

LETTER DATED 24 JANUARY 1950 FROM THE PERMANENT REPRESENTATIVE OF BOLIVIA TO THE SECRETARY-GENERAL OF THE UNITED NATIONS

New York, 24 January 1950

In accordance with the instructions of my Government, I have pleasure in informing you that the United Nations Commission sent to Bolivia to inquire into the biological effects of chewing the coca leaf made a deep impression by its zeal, scientific approach and understanding of its responsibility, and it is hoped, accordingly, that its report will be a valuable contribution to the technical assistance which the United Nations is furthering, to the great benefit of Member States.

It gives me great pleasure to make special mention of the work of Mr. Howard B. Fonda, Chairman of the Commission, of the other scientists on the Commission and of the able members of the Secretariat who attended.

(Signed) Eduardo ANZE MATIENZO
Ambassador, Permanent Representative of Bolivia

B. New legislation on the coca leaf

1. PERU

Legislative Decree No. 11046 (establishing the Coca Monopoly)

The President of the Military Committee (*Junta Militar*) of Government

Whereas

The Military Committee (*Junta Militar*) of Government has adopted the following legislative decree:

The Military Committee (Junta Militar) of Government, Considering:

That Peru is a signatory to international conventions for limiting the consumption of narcotic drugs;

That it is therefore essential to establish provisions to enforce compliance with the said conventions;

That moreover it is the duty of the State, in the interest of human welfare and for compelling national reasons, to consider the problem of coca-leaf chewing in Peru with a view to limiting immediately and, later, eradicating this very general custom in the interests of the native population;

That it is also the duty of the State to protect the national heritage, represented by investments in the cultivation of this valuable plant, the use of which for scientific purposes is of great benefit to humanity;

In the exercise of the powers vested in it

Hereby decrees as follows:

Article 1. The Coca Monopoly is hereby established in the territory of the Republic.

Article 2. The Monopoly shall control the sowing, cultivation, harvesting, distribution, consumption and export of coca. In conformity with the Supreme Decree of 8 June 1948 the Ministry of Public Health and Social Welfare shall remain responsible for the industrialization of coca for medical purposes.

Article 3. The Ministry of Finance shall, by special decree, designate the areas of the national territory in which the coca leaf may be cultivated; and shall establish the time-limits within which stocks of coca suitable for consumption must be declared, for the purpose of the acquisition of these stocks by the Monopoly at prices to be fixed by the said Ministry.

Article 4. The Tax Collection Department of the *Caja de Depósitos y Consignaciones* shall be responsible for the administration of the Coca Monopoly.

Article 5. The Ministry of Finance is authorized to make the relevant regulations, which shall cover the following matters: (a) the establishment of a single price for coca, which shall include all the local and State taxes at present in force; (b) the apportionment of the revenue obtained from this source among the various bodies which benefit from these taxes; (c) the preparation of a cadastral survey of the plantations in the producing areas; (d) the penalties applicable for infringements of this Decree and its regulations; (e) the estimate of the expenses required for the operation of the Monopoly.

Article 6. The revenue obtained from the operation of the Monopoly shall be employed principally for the building of barracks for the army.

Given at Government House, Lima, 13 June 1949.

[Signatures follow]

Coca Monopoly—Supreme Decree [Regulations]

Whereas it is necessary to make regulations for the application of Legislative Decree No. 11046 concerning the Coca Monopoly,

Now therefore the President of the Military Committee (Junta Militar) of Government hereby decrees as follows:

The Coca Monopoly established by Legislative Decree No. 11046 shall be governed by the following regulations:

1. The following shall be the only areas in which the cultivation of coca is authorized in the Republic: In the Department of Apurímac: San Jerónimo and Huascatay. In the Department of Ancash: Cabana. In the Department of Amazonas: Chachapoyas, Tingo, Tocabamba, Izuquia, Colcamar, Ocumal, Ocai, Cogón, La Ramada, San Rafael and San Lucas. In the Department of Ayacucho: Ayna, Apulema, Huanta, Sillacocha, Vizcátan, Cabildopampa, Cuchicanca, Chungui, Magdalena, Sachapunco and Sacharacay. In the Department of Cuzco: Calca, Pucartambo, Pumacocha, Tinac, Lirihuyoc, Urubambá, Quillabamba, Chaullay, Ocollopani, Macupicchu and Queñeouna. In the Department of Cajamarca: Bolívar Cajabamba, Cascas, Celendín, San Marcos. In the Department of Huánuco: La Parroquia, El Valle, Acomayo, Huacrachuco, La Esperanza, Santo Domingo, Monzón, Aguellín, Tazo Grande, Tazo Chico, Chipaquito Garita Maravillas, Panao and Tingo María. In the Department of Junín: Andamarca, Satipo, La Merced, Huanca-bamba, Oxapampa. In the Department of La Libertad: Pedregal, Otuzco, Huamachuco, Tayabamba, Chiclín. In the Department of Puno: Limbani, Macusani, Amacusani, Patambuco Sandía. In the Department of San Martín: Uchiza.

When circumstances justify it and subject to a report from the Monopoly, the Ministry of Finance may, by resolution, authorize the cultivation of coca in other areas.

2. Individuals or bodies corporate that engage in the cultivation of or trade in coca must register with and comply with the formalities prescribed by the Monopoly; if they fail to do so they may not lawfully continue their activities. The time-limit for this registration shall be sixty days from the date of this Decree.

3. The individuals or bodies corporate that engage in the cultivation of coca shall be required to keep books in which shall be entered all particulars relating to the crops, harvest, production and sale, suitably classified; the said books shall be supplied by the Monopoly at cost. New crops may not be sown nor existing ones extended or renewed and unsuccessful plantations may not be destroyed unless notice, supported by a statement of the reasons, is first given to the Monopoly so that the change may be recorded in the registers.

4. The Monopoly shall in due course prepare a cadastral survey of the plantations in the producing areas and shall carry out and lay before the Ministry of Finance the related technical studies so that the said Ministry may appoint the date on which the Monopoly system shall be put into full operation; pending such appointment coca leaf allocated for consumption shall be liable to a single tax of forty centavos per kilogramme, with the exception of that produced in the Department of Cuzco which shall be taxable at the rate of sixty centavos per kilogramme.

5. The rates prescribed in the preceding article shall be inclusive of all the State and local charges to which coca was hitherto liable in the Republic; the Monopoly shall submit to the Ministry of Finance, for its approval, the system of compensation to be applied to enable the former beneficiaries of the revenue from the local taxes hereby abolished, to continue to receive the income due to them, on the basis of the average tax yield for the years 1947-1948.

6. The foregoing article, in abolishing the charges there referred to, shall also operate to abolish the local excise tax (including the municipal wine tax) instituted by the provision to which the said article relates, even if such taxes do not expressly apply to coca.

7. The Monopoly shall take steps to recover from the stock at present delivered for consumption the amount whereby the revenue collected under the rates prescribed in article 4 of this Decree is lower than the revenue which would have been produced by the said stocks under the system hitherto in force.

8. The tax shall be deemed to be due as from the time when the coca is ready to be released for consumption; for this purpose the Monopoly shall make periodical inventories of the coca at the producing centres, the owners or carriers being responsible for any discrepancies which are found to exist and for which no satisfactory explanation is given.

9. Coca may not be transported from production to consumption centres save by public highway and during official working hours; it must in all cases be covered by a certificate of payment, a transfer sheet, a free transit sheet or a certificate of payment of tax, in the form to be prescribed by the Monopoly.

10. Stocks delivered to warehouses for consumption must be covered by the respective certificates of payment, on which any sales made shall then be noted, these sales in their turn being covered either by a free transit sheet or an invoice, according to whether the amount sold is intended for local purposes or for dispatch elsewhere.

11. The said warehouses shall keep a ledger in which they shall enter their operations in the form prescribed by the Monopoly.

12. Establishments engaged in the sale of coca must display at their entrances a special doorplate, to be supplied at cost by the Monopoly, indicating whether they are warehouses or wholesale or retail establishments.

13. As from the date of this Decree the Monopoly shall alone be authorized to export coca produced in the country, subject to prior approval by the Ministry of Finance. Export contracts concluded by private parties before 31 May 1949 will be recognized and authorized by the Monopoly, provided that the parties concerned, within fifteen days from the date of this Decree, submit to the Monopoly the documents attesting the legality of the transaction.

14. Any individual or body corporate that contravenes the provisions governing the operation of the Coca Monopoly shall be liable to the following penalties:

(a) Seizure of all crops grown without the prior permission of the Monopoly;

(b) Seizure of coca transported by non-authorized routes or at night or unaccompanied by the requisite documents;

(c) Seizure of coca found in warehouses or commercial establishments without the certificate of payment of tax or respective sheet;

(d) For transporting the coca without paying the tax due, payment of three times the amount of the tax;

(e) A fine varying from 100 to 5,000 sols according to the sum due and the value of the transaction, in all cases not expressly provided for.

15. Special magistrates appointed to deal with seizures shall be responsible for the application of the penalties set forth in the preceding article; to the extent to which they are applicable, the provisions of the regulations concerning alcoholic beverages, including those relating to the proportion payable to informers whose information leads to the apprehension of the

16. The Monopoly is empowered to prescribe such control measures as it deems necessary for the better execution of Legislative Decree No. 11046 and of the present Regulations.

Given at Government House, Lima, 2 August 1949.

[Signature follows]

Supreme Decree [on exports]

Whereas by Legislative Decree No. 11046 of 13 June 1949 the Coca Monopoly was instituted in the territory of the Republic, the relevant regulations having been enacted by Supreme Decree of 2 August 1949 issued by the Ministry of Finance and Commerce;

And whereas the export of coca leaf is subject to an international control system which requires the application of a system of official import certificates and export authorizations, to be issued by the competent authorities responsible, in pursuance of the relevant conventions, for issuing the said certificates and authorizations which are recognized by the international bodies;

And whereas the Ministry of Public Health and Social Welfare (Department of Narcotics), in pursuance of the above-mentioned conventions, is the authority responsible for furnishing to the organs of international control divers statistical information relating to the production, consumption, export, stocks, etc., of coca leaf;

And whereas the Coca Monopoly should co-operate with the said Ministry to ensure that the said statistical information is supplied in the most exact and complete form;

Now therefore the President of the Military Committee (Junta Militar) Government

Hereby decrees as follows:

1. The export of coca leaf shall continue to be subject to the system of international control of narcotic drugs; and accordingly coca leaf shall be exported through the Coca Monopoly, subject to official export certificates first had and obtained from the Ministry of Public Health and Social Welfare (Department of Narcotics), which shall issue them on production of the official import certificates issued by the competent authorities of the importing countries.

2. It is the duty of the Coca Monopoly to supply the Ministry of Public Health and Social Welfare with detailed reports concerning the cultivation, harvest, production, consumption and stocks of coca leaf.

3. The head of the Department of Narcotics, in his capacity as the Peruvian representative on the United Nations Commission on Narcotic Drugs, is appointed to represent the Ministry of Public Health and Social Welfare in its dealings with the Tax Collection Department of the *Caja de Depósitos y Consignaciones* on matters concerning coca and the Coca Monopoly.

Given at Government House, Lima, 25 August 1949.

[Signatures follow]

Peruvian Coca Leaf Commission

Supreme Resolution No. 122
Ministry of Justice and Labour

Whereas it is desirable to co-ordinate all research undertaken in Peru into the problem of coca, and to establish for that purpose a body of scientists which will also, when the occasion arises, co-operate with the Commission appointed for similar purposes by the United Nations; and

These purposes being approved;

It is hereby resolved as follows:

To appoint a Commission under the chairmanship of Dr. Carlos Monge, having as its members Dr. Fortunato Carranza,

Mr. Alberto Leon (engineer), Mr. Juvenal Monge (engineer), Dr. Enrique Encinas, Dr. Alberto Guzmán Barrón, Dr. Humberto Aste, Dr. Manuel Sánchez Palacios and Dr. Jorge Castañeda, which Commission shall be responsible for:

(a) Conducting a general study of the problem of coca in Peru;

(b) Co-operating with the Commission appointed by the United Nations to undertake such studies in countries where the problem exists;

(c) Co-ordinating its activities with those of foreign agencies established for the same purpose.

The Commission may invite opinions from Peruvian or foreign scientists who have studied this problem, and shall be authorized to obtain from the Departments of the Public Administration any technical, statistical or other data necessary for the satisfactory performance of its duties.

Lima, 7 September 1949

At a subsequent date (14 December 1949) Mr. Carlos Avalos, Head of the Narcotics Department (Ministry of Public Health), and Mr. Andrés Lindow, Administrator of the Coca Monopoly, were also appointed to the Commission.

2. BOLIVIA

Bolivian Coca Leaf Commission
Presidency of the Republic

Whereas:

The United Nations Commission of Enquiry into the biological effects of the chewing of the coca leaf is shortly to be set up in Bolivia and will require the co-operation of the Bolivian scientists and persons who have carried out research into this subject; and

Whereas:

The success of the said Commission is of national interest and accordingly the Government should organize a body of collaborators to give guidance and assistance in its work;

Hereby decrees as follows:

Article 1. A National Coca Leaf Commission is hereby set up to co-operate with the United Nations Commission in inquiries into the effects of the chewing of the coca leaf and shall be composed as follows: Chairman of the Commission, Dr. Alfredo Quiroga C., Director of the National Department of Nutrition; Members: Dr. Raimundo Manríquez, Head of the Bromatological Laboratory of the Ministry of Health; Ing. Raúl Pérez Alcalá, representative of the Ministry of Agriculture; Ing. Guillermo Guevara, representative of the *Corporación Boliviana de Fomento*; Dr. Martín Cárdenas, botanist, Professor at the San Simón University at Cochabamba; and Messrs. Juan Granier Chirveches, Abel Solís S., José Crespo Gutiérrez, Jorge Cusicanqui and Alfonso Zalles V., Professor at the School of Biochemistry and Pharmacy of the San Andrés University at La Paz.¹

Article 2. The principal duties of the Commission shall be:

(a) To make a full study of the coca leaf and of the coca-leaf problem in Bolivia.

(b) To co-operate with the Commission appointed by the United Nations.

(c) To co-ordinate agreements with similar bodies in other countries.

For these purposes it may request Bolivian or foreign scientists, who have carried out studies of the coca leaf and its effects, to co-operate and provide information, and may also

¹ The following were appointed subsequently: Dr. Remberto Capriles; Dr. Luis Solís; Dr. Serapio Mandueño and Dr. Rodolfo López-Kruger.

apply to the fiscal departments for any technical, statistical or other data required for the successful performance of its duties.

Article 3. The expenses incurred in the organization and operation of the said Commission shall be defrayed by the Coca Leaf Customs Administration and shall be charged under the heading of Administrative Expenses for so long as the Commission is exercising its functions.

The Minister for Foreign Affairs and Public Worship, the Minister of Agriculture, the Minister of Stock-breeding and Commerce, the Minister of Hygiene and Public Health and the Minister of Finance and National Economy shall be responsible for giving effect to the present Decree.

[Signatures follow]

3. ARGENTINA

Argentinian Coca Leaf Commission
Ministry of Public Health
Order No. 23,134, 25 February 1950

Whereas:

Coca-leaf chewing, a habit which has been established for centuries in our country, still constitutes a problem for the health of the Argentine nation, affecting a large section of the population in the north;

The harmfulness of this habit has been proven, even though some of its effects still remain open to question;

This knowledge, and the experience gained since the former National Health Department intervened in the matter, indicate the advisability of studying the matter further, by carrying out some investigations new to this country;

Although the intervention of the National Ministry of Public Health to date has succeeded in putting an end to the previous absence of control over the trade in this commodity and restricting annual imports of it to a predetermined quantity, the problem can only be solved through an *ad hoc* body grouping together all the officials required to make an exhaustive study of the matter and assuming the functions of special adviser on the subject;

It would unquestionably be useful to establish such a special commission and entrust it with the functions necessary for co-operation with other national or provincial bodies, in particular the health authorities of the northern provinces of Argentina which are directly affected by the problem of coca-leaf chewing, since subsequent to the promulgation of Legislative Decree No. 31,208/45, Act 12,912, situations have arisen which have had to be settled according to the circumstances, although not in strict conformity with the spirit of the Act;

Furthermore, Order No. 20,507 of 19 October 1949 issued by this Ministry provides for the consideration of necessary amendments to the current system;

Now therefore, the National Minister for Public Health hereby orders:

Article 1. A Technical Coca Commission is established, for the purposes set forth in the preamble to the present Order.

Article 2. The Technical Coca Commission shall be composed of the following officials of the National Ministry of Public Health: Chairman, the Technical Director of Social

Psychopathology; members, the Director of the Health Code and Legislation, the Director of Food, the Director of Pharmacy and the Pharmaceutical Industry and the Chief of the Narcotics Control Section.

Article 3. The Technical Coca Commission shall have the following functions:

(a) To carry out the necessary studies to obtain exhaustive information on the biological and toxicological effects of habitual consumption of the drug;

(b) To promote the reform of current legislation on the traffic in and use of the drug, with a view to elaborating and proposing a plan for the progressive total elimination of coca-leaf chewing;

(c) To agree upon the quantity of coca to be imported into the country annually and its distribution between those importers who were registered as at the date of Order No. 20,507/49 issued by the National Ministry of Public Health.

Article 4. In order to carry out its work the Technical Coca Commission shall establish contact with such provincial and municipal health authorities as it deems fit, and shall be empowered to deal directly with them and to detail members of the Commission to those parts of the country where coca-leaf chewing is most prevalent; it shall also be empowered to contact other similar national or international commissions and likewise to solicit such special advice as it deems necessary, from any organs of this Ministry.

Article 5. The Technical Coca Commission shall, within ninety days, draw up the draft legislation designed to replace that at present in force.

Article 6. For registration, communication by the Directorate-General of the Ministry, publication in the *Daily Bulletin* and inclusion in the archives.

Order No. 23,559, 20 March 1950

In view of the reasons stated by the Director of the Health Code and Legislation, and

Whereas:

The said reasons are legitimate and under the proposed modification acceptable, the National Minister for Public Health in the normal discharge of his functions, hereby decrees:

Article 1. That provision of Order No. 23,134/1950 which establishes that the Director of the Health Code and Legislation shall be a member of the Technical Coca Commission created by the said Order, is hereby cancelled.

Article 2. The Commission referred to in the preceding article is empowered to solicit the services of the Directorate of the Health Code and Legislation, in an advisory capacity, when it deems necessary.

Article 3. For registration: for publication by the Directorate-General of the Ministry in the *Daily Bulletin*; for communication to those whom it may concern; and thereupon for inclusion in the archives.

[Signature follows]

ANNEX V

Illustrations



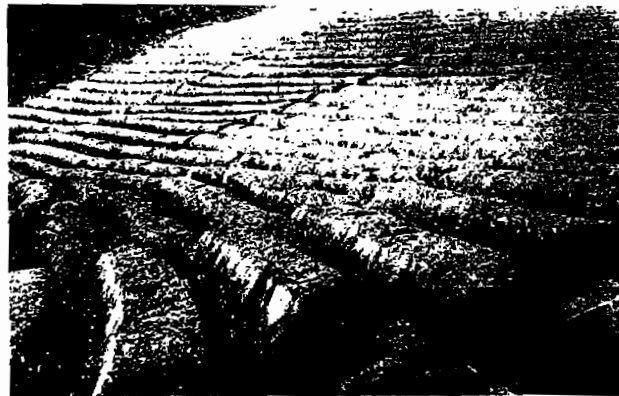
Coca Leaf.

Feuille de coca.

Hoja de coca.

Victor W. Von Hagen

Coca-leaf plantation. Early stage.
Culture du cocaïer. Premier stade.
Plantación de hojas de coca. Estado inicial.
(Coroico, La Paz, Bolivia).



Simultaneous cultivation of coca leaf and banana tree. Nor-Yungas, La Paz.

Culture parallèle du cocaïer et du bananier. Nor-Yungas, La Paz.

Cultivo paralelo de la coca y del plátano. Nor-Yungas, La Paz.

(Tauchmann, La Paz).



Coca leaf plantation. Advanced stage.
Culture du cocaïer. Stade avancé.
Plantación de hojas de coca. Estado avanzado.
(Coroico, La Paz, Bolivia)

Coca-leaf plantation ready for harvest.
Cocaïers prêts pour la récolte.
Hojas de coca listus para ser cosechadas.
(Cajamarca, Peru).



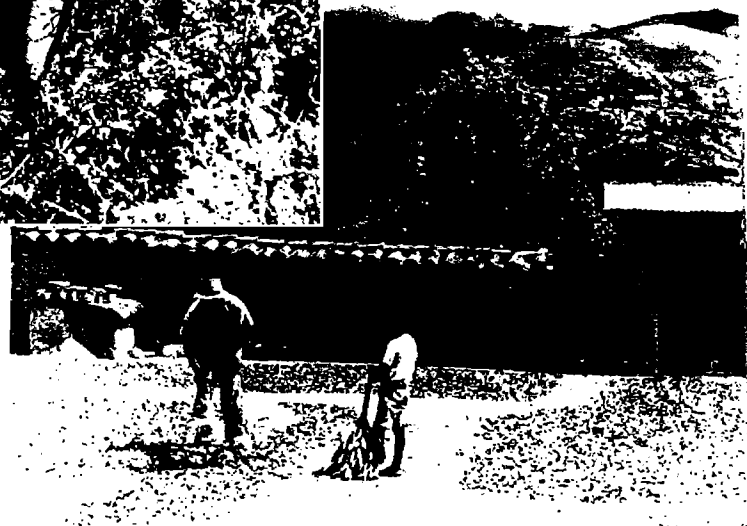
Ibidem.
(Quillabamba, Cuzco, Peru).



Coca-leaf harvesting.
Récolte des feuilles de coca.
Cosecha de hojas de coca.
(Quillabamba, Cuzco, Peru).



Coca-leaf harvesting. Sud-Yungas, La Paz.
Récolte des feuilles de coca. Sud-Yungas, La Paz.
Cosecha de hojas de coca. Sud-Yungas, La Paz.
(Touchmann, La Paz).



Drying of coca leaves. Sud-Yungas, La Paz.
Dessiccation des feuilles de coca. Sud-Yungas, La Paz.
Secadero de hojas de coca. Sud-Yungas, La Paz.
(Touchmann, La Paz).



Coca-leaf plantation.
Culture du cocaïer.
Plantación de hojas de coca.
(Chulumani, La Paz, Bolivia).
(Touchman, La Paz).

Visit to a coca-leaf plantation by the Commission.
Visite par la Commission d'une plantation de cocaïers.
La Comisión visita una plantación de hojas de coca.
(Quillabamba, Cuzco, Peru).



Indian chewer (Quechua) of the Cuzco region.
"Coquero" indien (Quechua) de la région de Cuzco.
Coquero indio (Quechua) de la región de Cuzco.
(Touchmann, La Paz).





Factory worker chewing coca leaf. La Paz.

Ouvrier d'usine en train de mâcher la feuille de coca. La Paz.

Obrero de fábrica coqueando. La Paz.

[Tauchmann, La Paz].

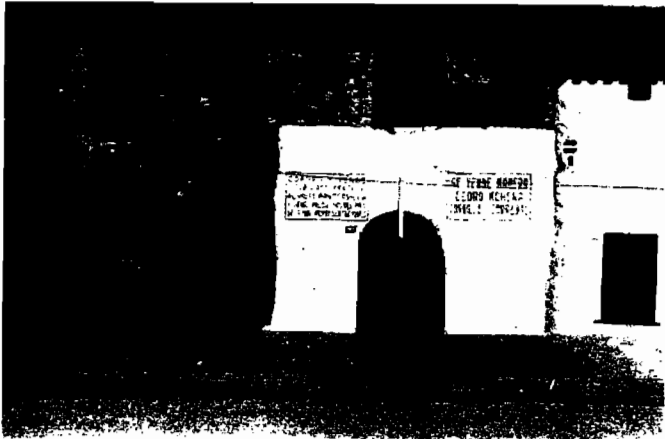


Aymara agricultural worker chewing coca leaf. Nor-Yungas, La Paz.

Ouvrier agricole aymara en train de mâcher le feuille de coca, Nor-Yungas, La Paz.

Obrero agrícola aimará coqueando, Nor-Yungas, La Paz.

[Tauchmann, La Paz].



Coca-leaf wholesaler.

Grossiste en feuilles de coca.

Mayorista de hojas de coca.

(Huánuco city, Peru).



Indian coca-leaf retail dealers: public market in Puno, Peru.

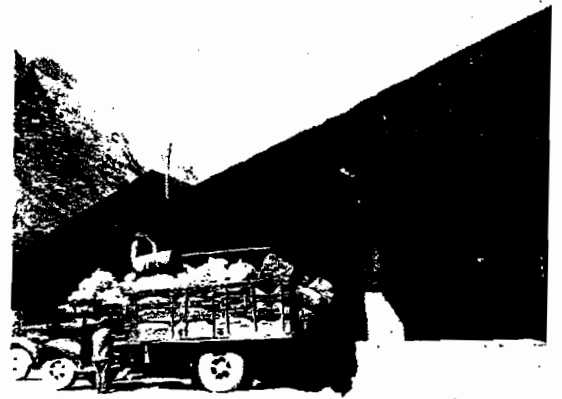
Détaillants indigènes en feuilles de coca. Marché public à Puno, Pérou.

Indígenas vendedores de hojas de coca. Mercado público en Puno, Perú.



Indian public market, Cuzco, Peru.
Marché public indigène, Cuzco, Pérou.
Mercado público indígena, Cuzco, Perú.
Martin Chambi

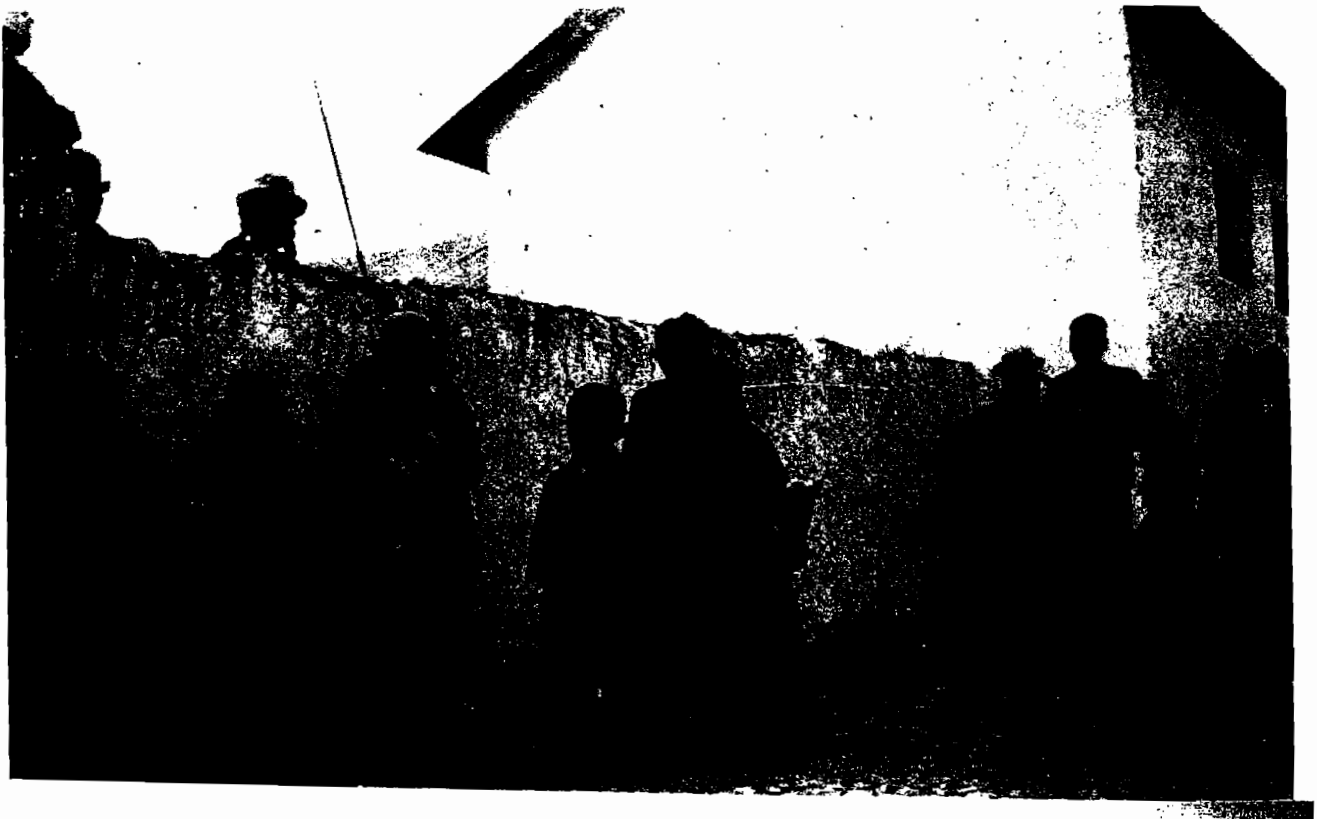
Coca-leaf Customs house at Unduavi, La Paz, Bolivia.
Douane des feuilles de coca à Unduavi, La Paz, Bolivie.
Aduana de la coca en Unduavi, La Paz, Bolivia.



Children from Ilave near Puno, Peru, where the Adventist missionaries preach the suppression of coca-leaf chewing.

Enfants d'Ilave, près de Puno, Pérou, où les Adventistes prêchent la suppression de la mastication des feuilles de coca.

Niños de Ilave, cerca de Puno, Perú, donde los Adventistas predicán la supresión de la masticación de hojas de coca.





Children from Pisac, near Cuzco, Peru.

Enfants de Pisac, pres de Cuzco, Pérou.

Niños de Pisac, cerca de Cuzco, Perú.

Indian dwelling on the Andean Altiplano.

Demeure indigène sur l'altiplano andéen.

Vivienda indígena en el altiplano andino.



Indian dwelling on the way to Macchu-Picchu, Cuzco, Peru.

Demeure indigène sur la route de Macchu-Picchu, Cuzco, Pérou.

Vivienda indígena en el camino a Macchu-Picchu, Cuzco, Perú.





Indian peasant from the Andean, Altiplano.
Paysan indigène de l'altiplano andéen.
Labrador indígena del altiplano andino.

Martin Chambi



Ibidem.

Martin Chambi

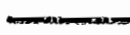

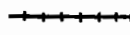



Indian craftsman from the Andean Altiplano.
Artisan indigène de l'altiplano andéen.
Artesano indígena del altiplano andino.

Martin Chambi

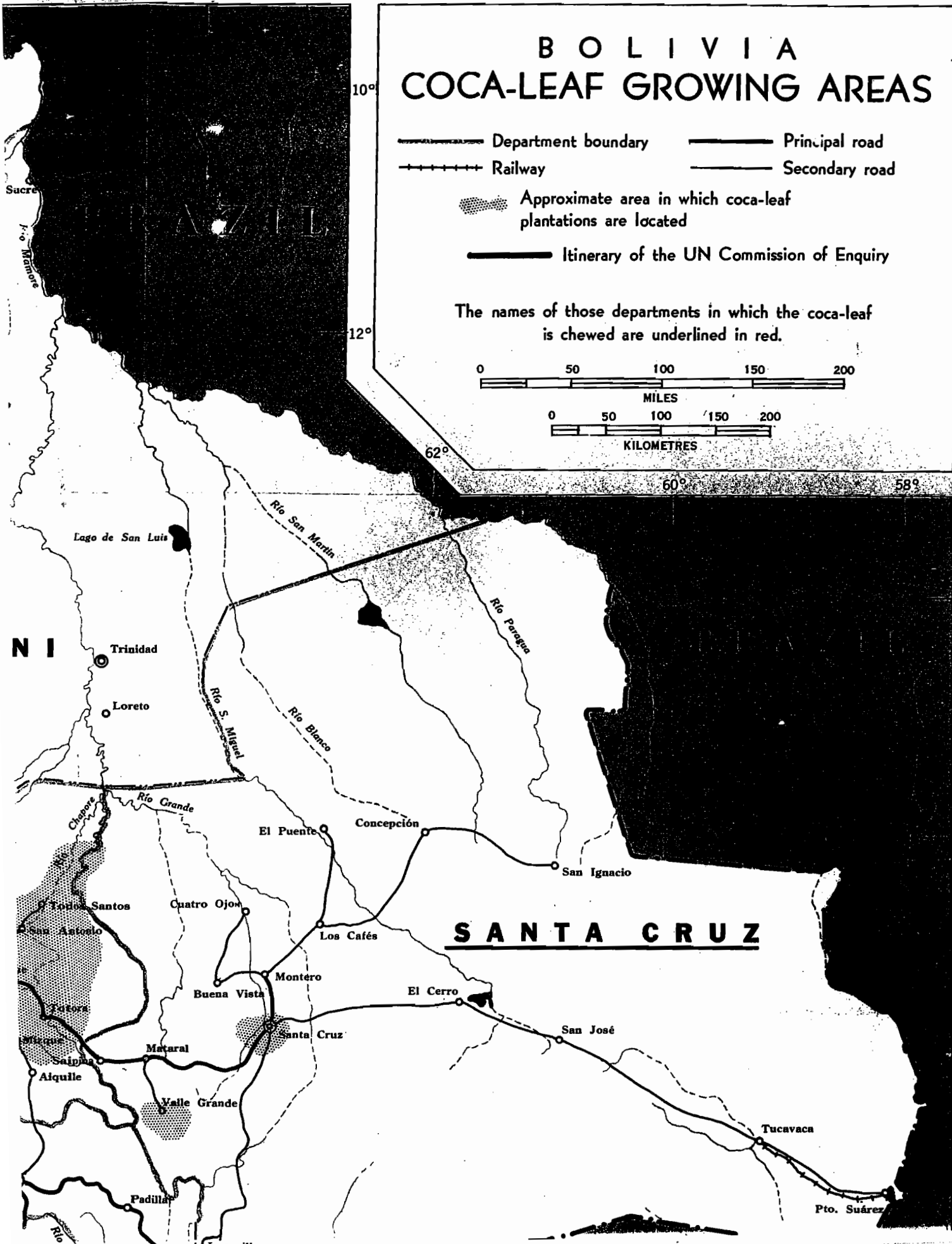
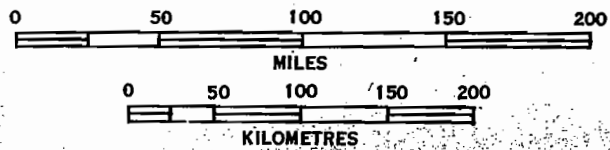


64°

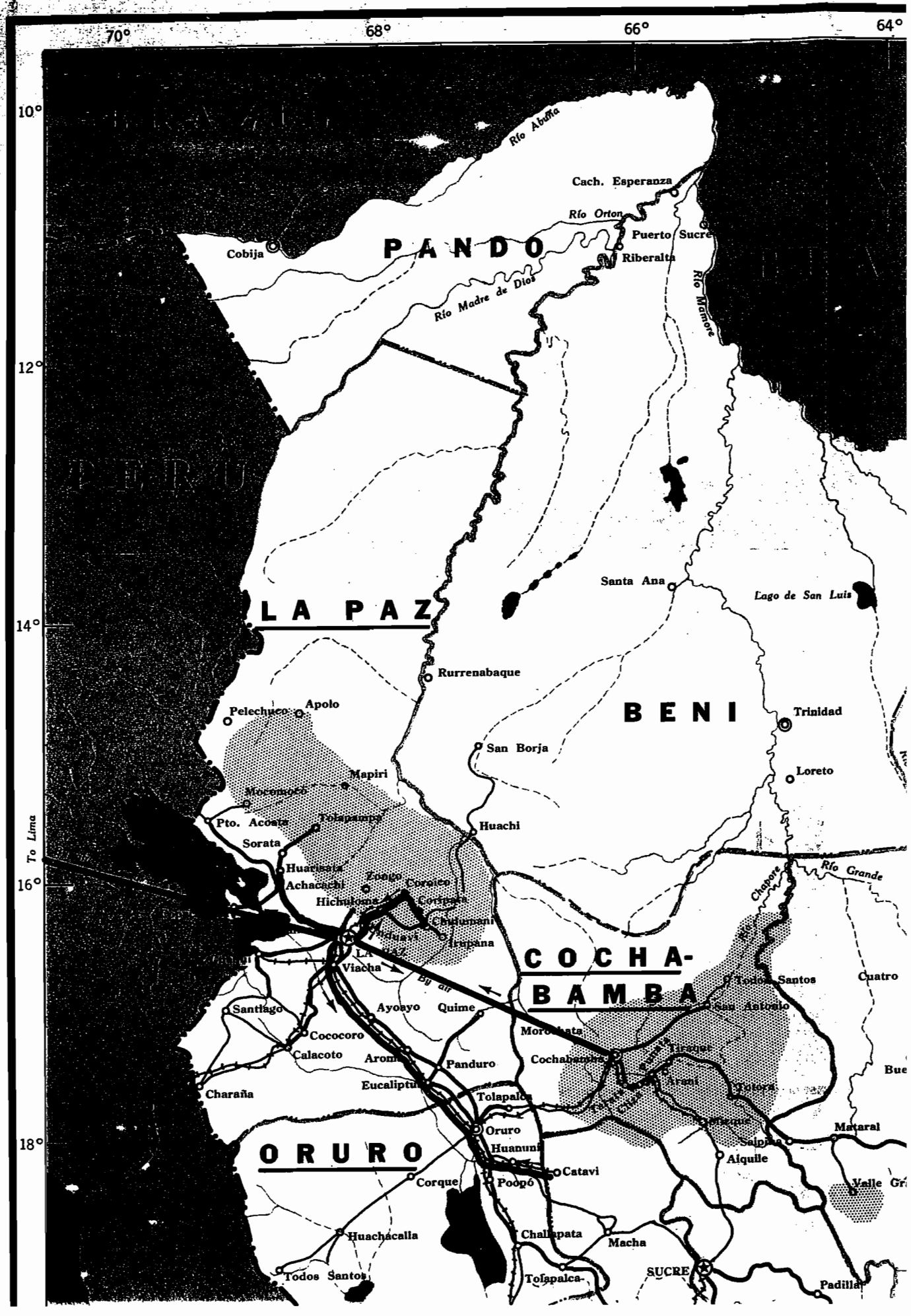
BOLIVIA COCA-LEAF GROWING AREAS

-  Department boundary
-  Principal road
-  Railway
-  Secondary road
-  Approximate area in which coca-leaf plantations are located
-  Itinerary of the UN Commission of Enquiry

The names of those departments in which the coca-leaf is chewed are underlined in red.







70° 68° 66° 64°

10°
12°
14°
16°
18°
To Lima

PANDO

LA PAZ

BENI

**COCHA-
BAMBA**

ORURO

Cobija

Cach. Esperanza

Rio Orton

Puerto Sucre

Riberalta

Rio Madre de Dios

Rio Mamora

Santa Ana

Lago de San Luis

Rurrenabaque

Trinidad

Pelechuco Apolo

San Borja

Loreto

Mocomaqui

Mapiri

Pto. Acosta

Tolapampa

Huachi

Sorata

Huacisaca

Zongo

Achacachi

Uyapico

Hichaloma

Cortezas

Chaltenani

Chiriqui

Viacha

Irupana

Santiago

Ayoyayo

Quime

Cococoro

Calacoto

Aroma

Panduro

Charaña

Eucaliptus

Tolapala

Oruro

Huanuni

Morochata

Cochabamba

Tirari

Yacu

Yutera

Salpica

Aiquile

Quatro

San Antonio

Bue

Mataral

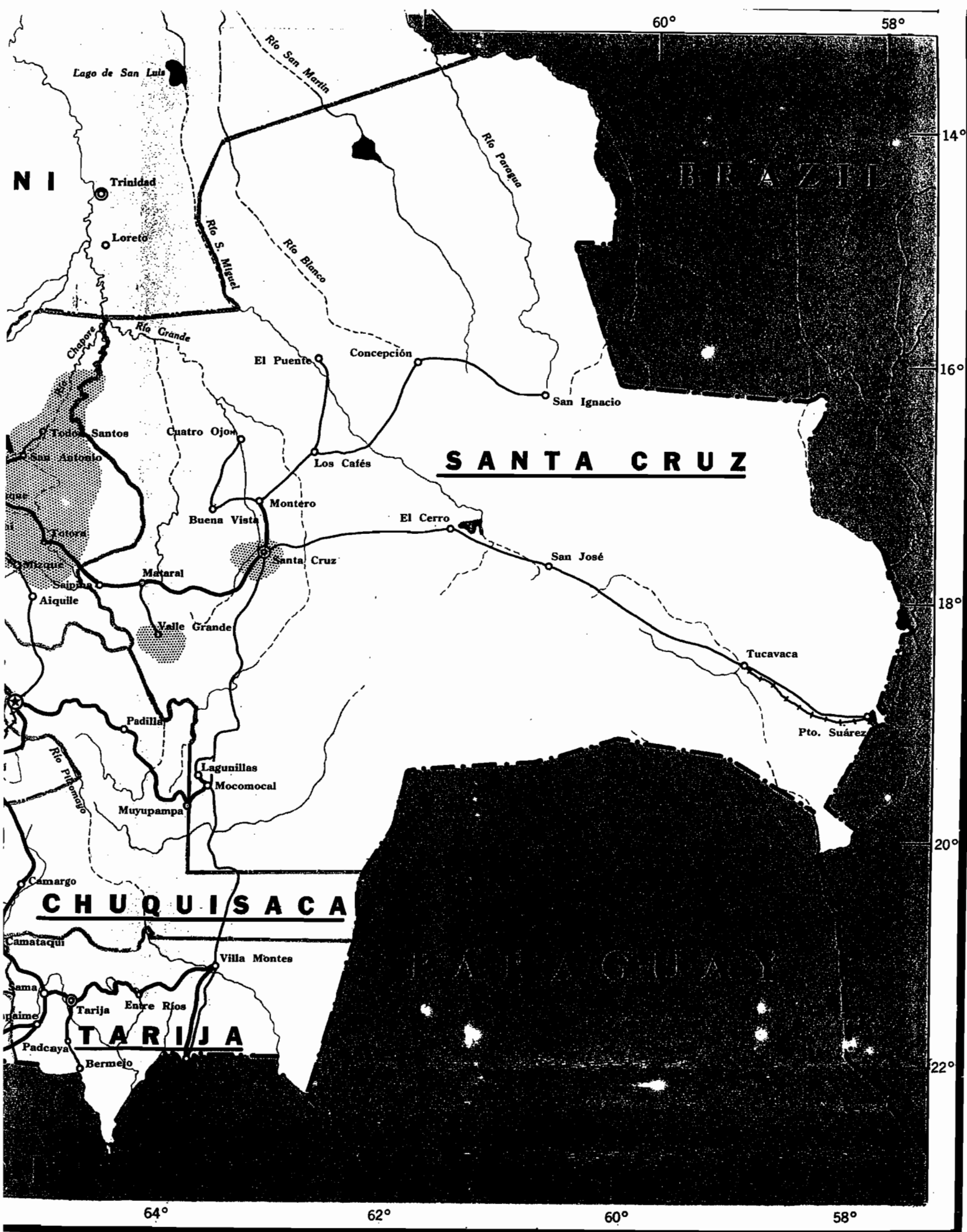
Valle Gr

Padilla

SUCRE

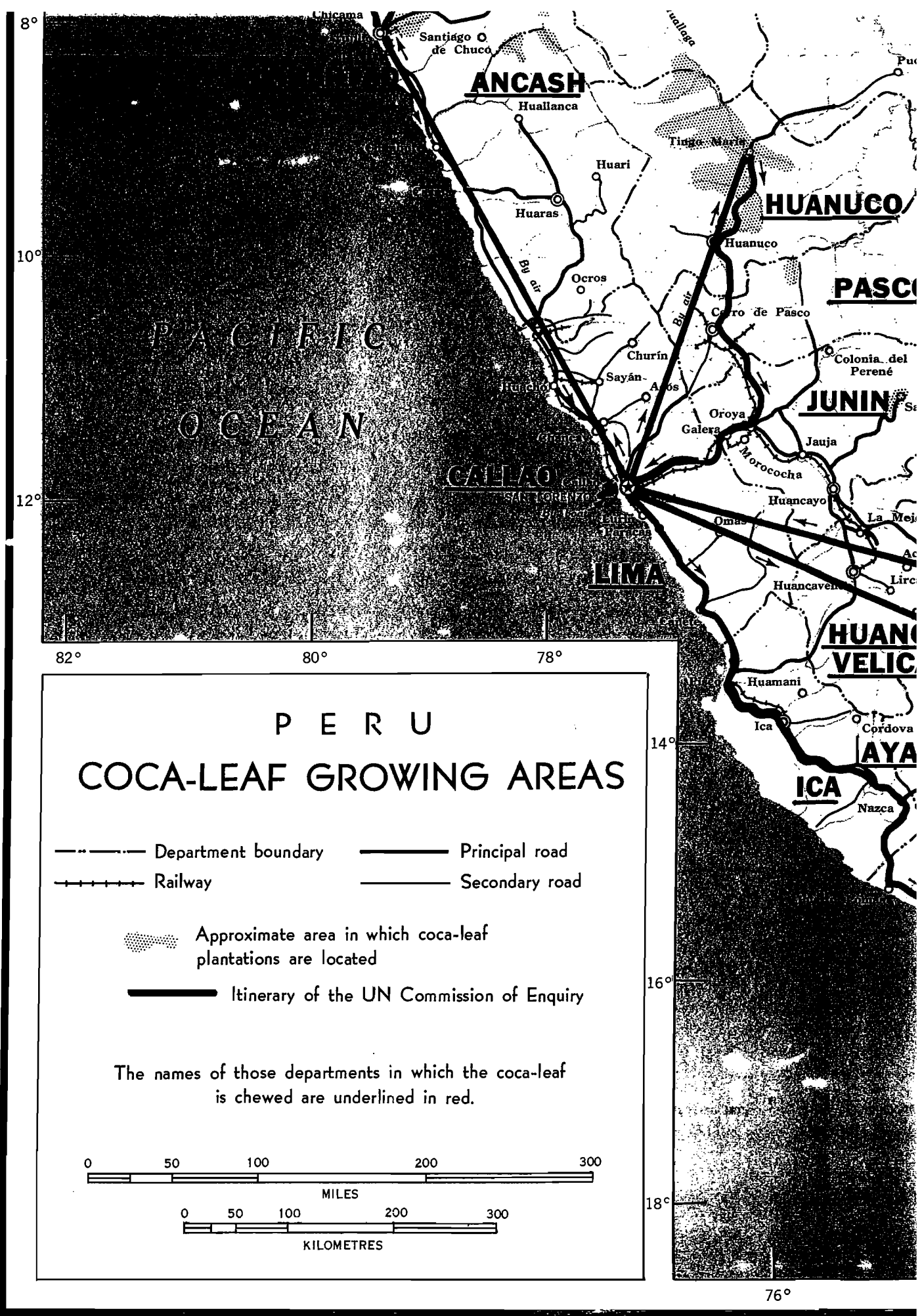
Padilla











PERU

COCA-LEAF GROWING AREAS

- - - - - Department boundary ——— Principal road
 + + + + + Railway ——— Secondary road

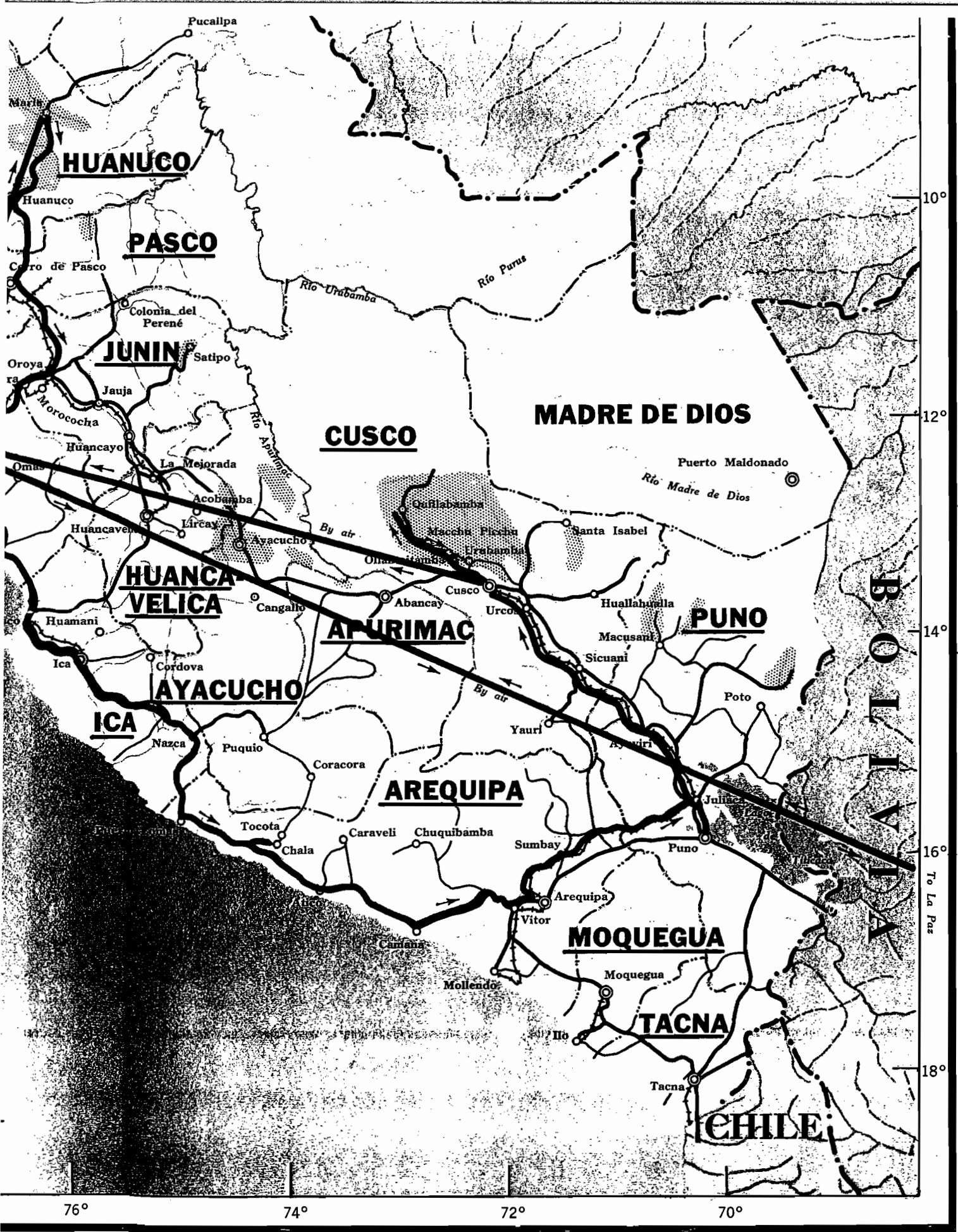
[Stippled Area] Approximate area in which coca-leaf plantations are located
 [Thick Black Line] Itinerary of the UN Commission of Enquiry

The names of those departments in which the coca-leaf is chewed are underlined in red.

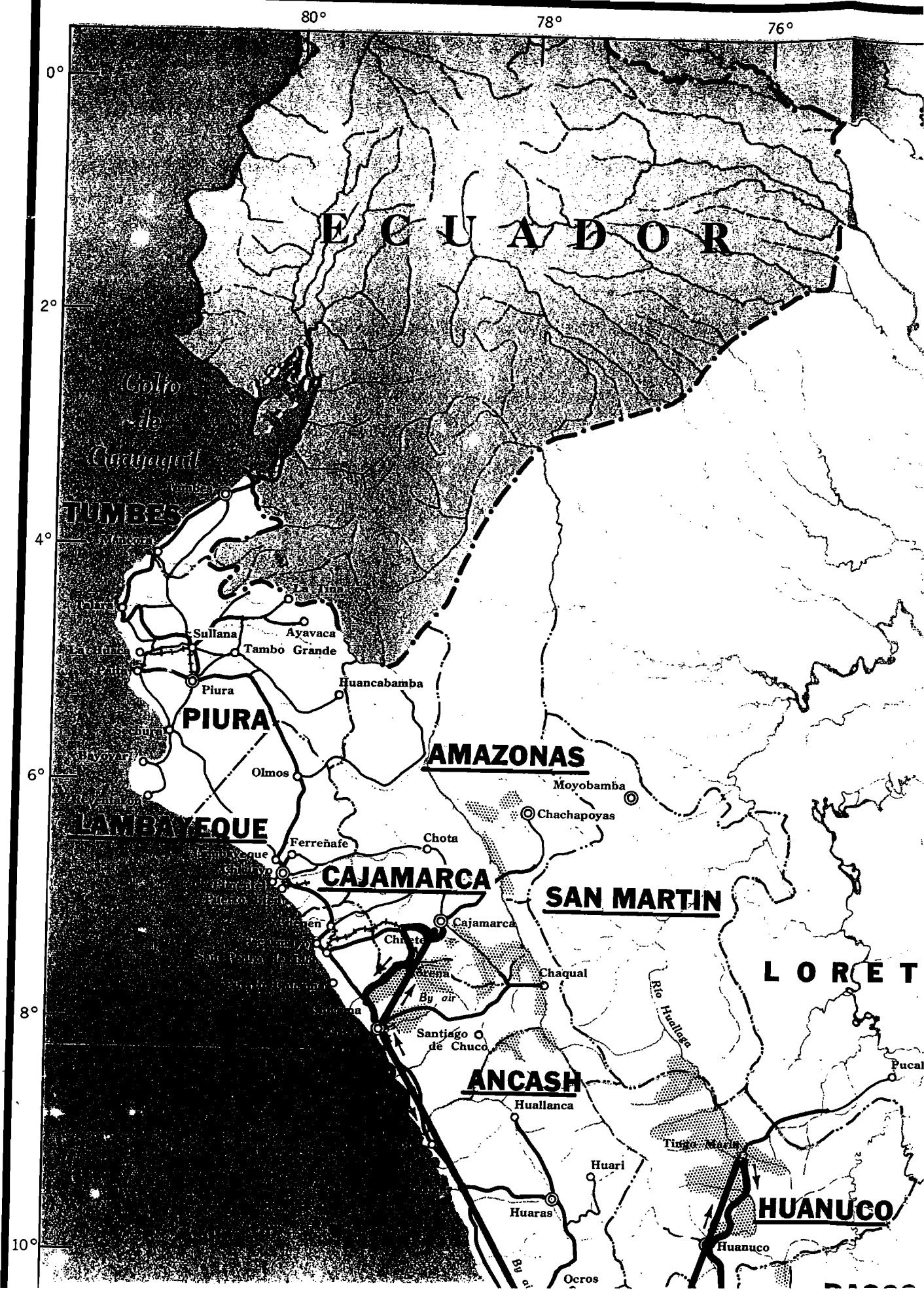
0 50 100 200 300
 MILES

0 50 100 200 300
 KILOMETRES

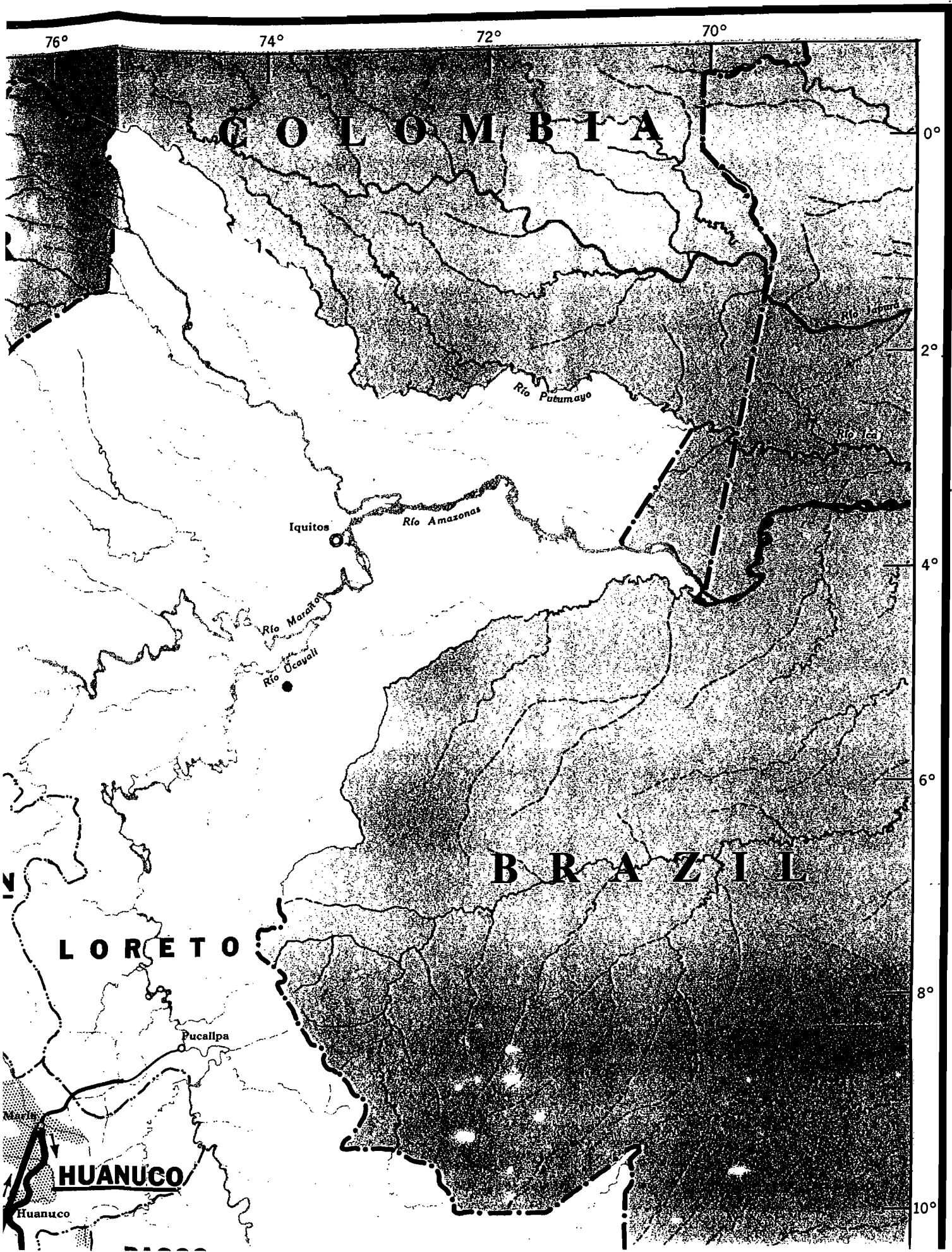












76°

74°

72°

70°

COLOMBIA

0°

2°

4°

6°

8°

10°

Iquitos

Río Amazonas

Río Putumayo

Río Marañon

Río Ucayali

Río Juruá

Río Tapanahy

LORETO

Pucallpa

HUANUCO

Huanuco

