

Use of Maconha (*Cannabis sativa* L.) in Brazil

Control by Health and Police Authorities

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A. USE OF MACONHA — HISTORY OF THE CONTROL

I. GENERAL

In the course of his tour of inspection in northern Brazil in 1941, the Director of the National Medical Control Service inquired into the use of maconha in northern and north-eastern Brazil, with the object of determining how widespread the habit was among the population of those regions.

He reported his findings concerning this form of addiction in Brazil to the National Commission for the Control of Narcotic Drugs, for he considered that the problem called for study, particularly in the areas where maconha grows wild and is cultivated clandestinely for use by the local population and for the illicit traffic.

Maconha is true hemp—*Cannabis sativa* L.—which has become acclimatized in Brazil under a wealth of popular names, being variously known in different areas as *diamba*, *pango*, *liamba*, *dirijo*, *birra*, *elva*, *fininha* and *fumo de Angola*.

This dioecious plant, which grows in shrub form, is identical with the native Central American and Mexican plant known as “marihuana”, “rosa maria”, “D. Juanita” and under other popular names; it is widely used in those areas, from which the vice has spread to the United States.

In Brazil the favourite method of using maconha is by inhalation, mainly from cigarettes and formerly from special pipes known in northern Brazil as *maricas*, an adapted form of the Persian “narghile”.

The use of maconha in the form of intoxicating beverages or electuaries of hashish such as *Bheng*, *Lutki* and *Dawamesk*—a method widely used in the Old World, though there too hemp is usually smoked in the form of cigarettes or in hookahs—is unknown anywhere in Brazil, where maconha cigarettes are made from the leaves, stalks, flowering stems and fruits of the dry and resinous plant, and are known according to weight as *morrao* (2.50 grammes), *baseado* (1.7 grammes) and *fininho* (1.0 grammes).

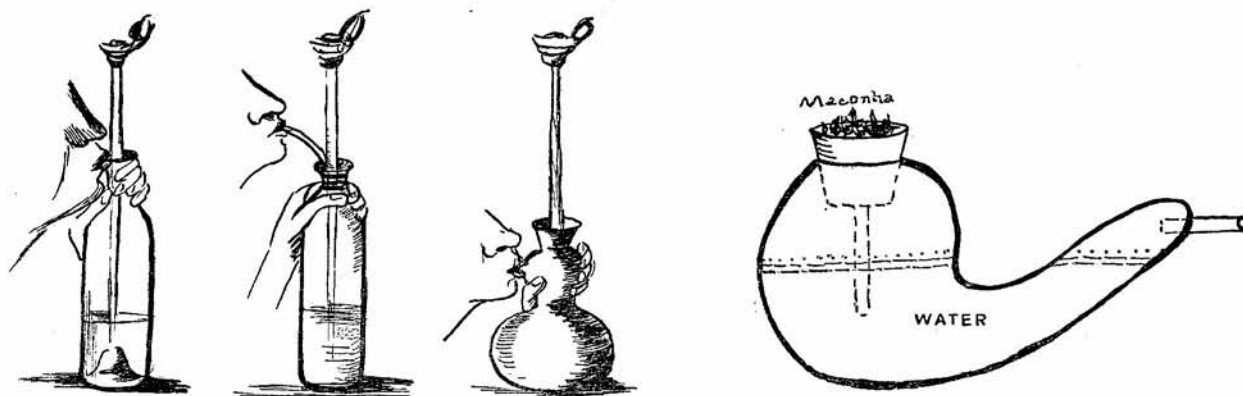


FIGURE 1
TYPES OF WATER PIPES, KNOWN AS “MARICAS”, FORMERLY USED BY MACONHA SMOKERS

Our first inspection in 1941 led us to the conclusion that the health and police authorities were giving far from sufficient attention to the control of the use of maconha in the northern States, where the plant grows wild and where its use is widespread among the lower strata of the population.

At that time we found that an efficient police control service existed only in Pernambuco, where the Watch Committee (*Delegacia de Vigilância e Costumes*) had compiled a register of habitual smokers and vendors of maconha.

At that time the Watch Committee estimated the number of maconha smokers at Recife at over 200, and reported that the traffickers were to some extent engaged in spreading the vice among schoolchildren.

On the basis of the impressions gathered from the inspection tour we concluded that the States of Maranhão and Piauí in the north and Alagoas and Sergipe in the São Francisco valley were the main centres from which the vice of maconha was spreading through neighbouring areas and from which the plant was smuggled to southern Brazil.

We found some smokers in Bahia and Pernambuco; as the plant is virtually not cultivated in these two states, the *diamba* presumably originated from the neighbouring states.

Most of the State Commissions for the Control of Narcotic Drugs were not meeting regularly owing to the lack of the necessary guidance, a circumstance attributable to the deficiencies of the Medical Control Service in the Health Departments of many northern States. The Director of the National Medical Control Service accordingly suggested to the Director of the National Department of Health that the state services responsible for narcotic control should be urged to make fresh efforts and that the work of the State Commissions for the Control of Narcotic Drugs should be co-ordinated through the National Commission.

The supervision of the medical, pharmaceutical and allied professions by those State Health Departments which had been inadequately organized for this work received a fresh impetus from the efforts of the Federal Health Offices and, when the National Commission for the Control of Narcotic Drugs had laid down rules for the operation of the State Commissions for the Control of Narcotic Drugs, these bodies began to hold regular meetings and to produce valuable results.

The maconha problem, which many State Commissions had previously disregarded completely, began to receive close attention. The work of control began to follow a definite policy in some states and was organized in others, with the consequence that uniform control could be applied wherever the illicit use of maconha occurred.

We emphasized at the time that it was necessary to intensify the campaign against the use of this plant throughout northern and north-eastern Brazil because large numbers of Brazilian and foreign troops were stationed in those areas on war service and these might easily fall victim to the vice of maconha with all its accompanying evils.

* * *

Maconha smoking and crime

Dr. P. O. WOLFF, in the monograph *Drug Addiction and Crime* which he submitted to the Argentine Society of Criminology in October 1941, explained the connexion between crime and the effect of the resin of Indian hemp (*cannabis sativa*).

The spread of maconha addiction in Brazil is favoured by the fact that *cannabis sativa* grows wild and its clandestine cultivation is relatively widespread in some north-eastern and northern areas. The vice wins converts easily, for it is merely a matter of smoking cigarettes made with hemp flowers, which are cheap and hence within the reach even of high-school students, who at first receive the cigarettes as presents from the traffickers to accustom them to the drug.

It is not yet completely clear whether maconha (or marihuana) is fully addiction-forming. The present evidence, says Dr. P. O. Wolff, shows only that the use of marihuana over a long period has a disastrous effect on countless persons and does produce some degree of addiction. Many, though not all, maconha smokers find it necessary to increase the dose, but the drug does not enslave them to the same extent as opiates. According to Dr. P. O. Wolff's study, marihuana has physical and mental effects which definitely lead to mental and moral degeneration.

Though admittedly a maconha smoker may become a dangerous person, it should not be inferred that every person who smokes and intoxicates himself with hemp cigarettes becomes subject to criminal impulses; yet the excessive use of this drug undeniably produces criminal tendencies in some individuals. In many instances the offences which they commit are not pre-meditated but have their origin in a particular situation to which he reacts partly because he is a pathological case and partly because he obeys an impulse directly traceable to the intoxication. In this respect marihuana or maconha resembles alcohol, but owing to the special sensations and hallucinations which it causes, it is demonstrably more dangerous than that substance.

The use of the drug produces inhibitions and impairs the mental faculties. The individual reaction, particularly under intoxication, depends mainly upon the character of the person concerned. The drug often produces a hypersensitiveness and excessive irritability due to the paranoiac ideas which rapidly take hold under the influence of maconha. The condition of terror, delirium and extreme excitement reaches a point at which the person concerned develops suicidal and homicidal tendencies. Often maconha smokers have an illusion of persecution and eventually become persecutors themselves, attacking in their headlong course all who cross their path. At times, a person under the influence of the drug has an urge to rid himself of some imaginary danger; when this happens he becomes aggressive and dangerous because maconha tends to magnify the inherent propensities. This explains many offences, the origin of which can be traced to the characteristic effect of this drug. Maconha smokers experience euphoria and visual and auditory hallucinations and, each according to his temperament and mental make-up, commit offences against the person and other crimes, until the prolonged use of this inebriating narcotic drug finally reduces them to a state of physical and moral decay.

It is possible that many tragedies which have occurred among our worthy *jangadeiros* and *sertanejos** can be ascribed to the intoxication produced by *diamba* or maconha. Under the influence of maconha a person may therefore commit serious crimes, even the taking of life, for trifling reasons or without any motive whatsoever: compare the term "hashishim", meaning "assassin", a person who, under the influence of "hashish" resin, is capable of killing to order. Some of these drug addicts enjoy

* *Jangadeiros*: fishermen who live along the rivers in north-eastern Brazil and who use small boats known as *jangadas*.

Sertanejos: people who live in the *sertão* or arid region of north-eastern Brazil.

a reputation as brave, daring and reckless men. They are men who wish somehow to put their powers to the test. They play the hero among their more timorous companions, and are always ready to pick a quarrel or to join in an argument.

This propensity is so marked that they are handled very carefully, and care is taken to avoid ruffling or arousing them. But these are no true heroes. While intoxicated these same men are subject to frights and hallucinations, and run away when the situation turns dangerous.

Individuals with a lively imagination experience a much more intense effect than those who have been leading calm and unexcited lives. Maconha fosters and stimulates ideas and illusions which are already present in the mind, but does not create new ones. Thus, a person with criminal propensities may, on losing his inhibitions and normal control and having his judgment warped through the effect of the drug, translate his criminal thoughts into action. It is a known fact that criminals deliberately intoxicate themselves with maconha in order to give themselves courage for carrying out their criminal plans.

The effect on a healthy individual is different; when intoxicated with maconha he behaves as if he were drunk, and is a nuisance to himself and others without being dangerous. Dr. P. O. Wolff draws attention to this difference in attitude, which he considers highly important.

Even inhaled in moderate quantities, maconha is dangerous. Through its effect on the senses and on time and space co-ordination it may cause accidents; for example, in the case of a maconha smoker driving a vehicle.

In addition to United States statistics, those furnished by the police of many countries of the Middle East, North Africa, British India and Brazil show that the incidence of crime among addicts to *cannabis* is extremely high.

Another aspect of the danger associated with maconha is the tendency to win converts to the habit, a phenomenon noticed in connexion with other forms of drug addiction.

This proselytism has been observed in prisons in countries where there is widespread abuse of this plant. Prisoners recruit new addicts among their cell-mates. Not infrequently affrays occur between groups of maconha-smoking prisoners as a result of the mutual enmity and mistrust created by the drug.

Dr. P. O. Wolff concludes his interesting discussion of the relationship between crime and the effect of *cannabis* resin with some very sound observations from which the following extract is taken:

"I think this brief analysis of marihuana proves conclusively that the drug is a menace to public health; for this reason I wished to draw attention to the matter, particularly since the possibility that the use of the drug may spread further south on our continent cannot by any means be excluded."

His prophecy and his fears have, unhappily, been realized in Brazil; in the north-eastern States the use of maconha has become a social problem which must be checked in time if the vice and all its accompanying evils are not to become general.

Originally limited in scope, the use of maconha began to spread to various parts of the country, as is confirmed by the inquiries into its geographical distribution.

* * *

Heitor Peres, a distinguished psychiatrist and an authority on the subject, describes the effect of diamba on the body as follows:

"The effects of diamba are known from observations of the habitually intoxicated and from experiments carried out on animals and human beings. Intoxication with diamba, like all other forms of intoxication, is marked by somatic and psychic signs. We may point out in passing that in the areas where the diamba habit is rife, those who use it begin using it at a very early age, and that its use is more common among men than among women.

"With regard to the effects on the mind, maconha produces interesting phenomena. The predominant state is one of excitement, which produces euphoria and coenaesthetic and sensory hyperaesthesia, with the occurrence of curious hallucinatory states accompanied by an exaltation of the imagination. The next stage in the intoxication is marked by increasing drowsiness, followed by more or less deep sleep. The clinical picture varies, of course, with the temperament and mental characteristics of the person suffering from intoxication. Diamba produces frequent coenaesthopathic disorders and a variety of delicate psycho-sensory disturbances chiefly affecting the hearing and sight. The diamba smoker's dreams consist of wonderful visions which as a rule represent the gratification of the desires he experiences when awake. He has pleasurable sensations, frequently of an erotic character. He falls victim to weird phenomena such as loss of the sense of time. Events seem to him to last for years. Some see their whole life in review, from the past to the future, while others have visions of distant events which are really telepathic disturbances. In the toxic stage various psycho-motor reactions of an impulsive type may occur.

"Some intoxicated persons quickly recover from their narcotic sleep; others fall into a virtual depressive state. This depression usually affects those who have recently taken to the drug. Generally speaking these are the best-known mental symptoms of the toxic crisis of maconha. Smokers do not use the drug continuously. In almost all cases, particularly in the towns, they smoke at certain times. In the interior of the country the smoker takes several cigarettes in the course of the day, without becoming completely intoxicated. 'Maricas' are smoked in leisure moments, especially in the evening, when the family is together or at smoking parties or black-magic sessions."

The Dantesque picture sometimes presented by individuals and communities among the poor of north-eastern Brazil, and who are assailed by drought, endemic disease and ignorance, is appalling indeed.

* * *

The prohibition of Maconha in Brazil dates back to 1830, when the Municipal Council of Rio de Janeiro made an order "Concerning the sale of goods and medicaments and concerning pharmacists."

"Paragraph 7

"It is unlawful to sell or use *pango* for smoking, or to keep it in any public premises. Any person who sells *pango* in violation of this provision shall be liable to a fine of 20 milreis, and any slave or other person who uses *pango* shall be liable to the penalty of chains for not more than three days.

"The Municipal Council of Rio de Janeiro, meeting on 4 October 1830. Bento de Oliveira Braga (Chairman); Joaquim José Silva, Antonio José Ribeiro da Cunha, Joao José da Cunha, Henriques José de Araujo."

II. THE 1943 CAMPAIGN

In 1943, the Director of the National Medical Control Services had occasion to undertake a tour of inspection in the São Francisco Valley for the purpose of arranging for the Commissions for the Control of Narcotic Drugs of the States of Bahia, Sergipe and Alagoas to adopt a series of measures for the suppression of the use of and trade in *maconha* in those areas.

His report to the National Commission for the Control of Narcotic Drugs contains the following conclusions:

"From our own observation during the tour and from the information obtained through the work of the Bahia, Sergipe and Alagoas State Commissions for the Control of Narcotic Drugs it has been established beyond doubt that *maconha* is widely used in these areas, where the plant grows wild and where, until a short time ago, it was cultivated without any interference whatsoever.

"Among the people of Brazil *maconha* is used only in the lower classes, by persons for whom no social assistance is provided, and abandoned children, the so-called *malagueiros*; it is very widespread among criminals and prison inmates.

"In Bahia the use of *maconha* occurs at a higher social level among foreigners who are in Brazil temporarily owing to the war, and who pay high prices to the *maconha* traffickers.

"In the interior of the country the great majority of planters have no idea that they are committing an offence, being unaware that the law forbids them to plant *maconha* either for their own use or for trade. Until recently the drug was sold freely by herbalists in the markets under the name of *fumo bravo*.

"Then there are the middlemen, who know how profitable the plant can be, and encourage our simple rustics to grow it, paying them a ridiculous sum for the drug, retailing it to addicts at a high price and smuggling it to other parts of the country or even abroad.

"Even the educated classes, as a rule, fail to appreciate the serious evils which *maconha* can produce or to realize that its use constitutes a serious social problem in various countries of Europe, Asia, Africa and even the American continent, and that it is the subject of international action.

"Fortunately, the use of *maconha* is not at present a serious social problem in Brazil, having increased only lately as a result of the abnormal conditions due to the war.

"In view of the concentrated attention being given to the problem and of the way in which the National and State Commissions for the Control of Narcotic Drugs are conducting their campaign against the use of and trade in *maconha*, we feel that it should prove a simple matter to prevent the use of the drug from spreading and to stamp it out where it existed in the past owing to the absence of restrictions on the cultivation and use of the plant, the evil effects of which were unknown to our people and even to the authorities competent to control it.

"Now that all concerned—growers, consumers, traffickers and controlling authorities—have been warned and alerted, it will not be difficult to stamp out the use of and illicit traffic in *maconha* in Brazil, or at any rate to reduce them to insignificant proportions in a short time, provided that there is no break in the continuity of the preventive and penal action to be taken by the controlling authorities. This will be achieved if the following measures are consistently applied:

"(1) An intensive educational campaign against the use and planting of *maconha*, to show its evil effects and the reasons

why its cultivation is prohibited in Brazil and to explain the penalties applicable for violations of the legislation governing the trade in and use of narcotic drugs.

"(2) The methods recommended and applied by the Department of Public Safety of the State of Bahia for the prevention of and punishment for the cultivation and use of *maconha*, should be introduced and made generally applicable in all the states where *maconha* is used and cultivated—Amazonas, Pará, Maranhão, Piauí, Pernambuco, Alagoas, Sergipe and Bahia, where the use of *maconha* or *diamba* must be considered a social problem.

"The methods in question are described below:

"(a) the establishment of a register of addicts and vendors with particulars of their temporary or permanent address or residence in the capital, the interior, other states and foreign countries.

"(b) The mapping by the authorities of the States of Bahia, Sergipe and Alagoas working in co-operation, of areas of plantation in the São Francisco region and neighbouring states.

"(c) Exchange of information between the State Commissions for the Control of Narcotic Drugs, the heads of the state police forces and the authorities of other countries.

"(d) Periodic visits of inspection to prisons, places of detention, garrisons in the interior, Brazilian and foreign merchant ships and the interior of the State, carried out with the co-operation of the competent local authorities.

"(e) Educational talks and lectures.

"(f) The Secretary for Public Safety of the State of Bahia recommends the following penal measures: the committal of addicts to institutions, the imprisonment of traders and itinerant vendors who offer *maconha* for sale, the seizure of stocks of the drug, the destruction of *maconha* plantations and the institution of proceedings against offenders.

"(3) Medical studies of the social effects of *maconha* smoking should be encouraged so that those responsible for controlling the use of this narcotic may realize what these effects are.

"(4) The Commissions for the Control of Narcotic Drugs of states in which *maconha* is used and planted should be encouraged to co-operate with each other. The Commissions should also co-operate with officials of the Ministries of Communications (Posts and Telegraphs), Labour (Regional Inspectorates) and Agriculture (Agricultural Development), the health services of the Army and Navy, and the National Department of Health (National Plague, Yellow Fever and Malaria Services), who can render valuable service by reporting the location of *maconha* plantations.

"(5) The Commissions for the Control of Narcotic Drugs of the States of Amazonas, Pará, Maranhão, Piauí, Pernambuco, Alagoas, Sergipe and Bahia should be urged to keep up the campaign against the use of and trade in *maconha* which has had such splendid beginnings, and to instruct their Chairmen to transmit to the National Commission for the Control of Narcotic Drugs detailed monthly reports covering every aspect of *maconha* control.

"In my view these are the main steps to be taken at the present time, and I submit them to my distinguished colleagues on the National Commission for the Control of Narcotic Drugs for their consideration and for communication, with

their observations, to the Commissions of those states where an intensive and sustained campaign against the use of maconha is most needed."

III. THE 1946 INTER-STATE MACONHA CONFERENCE

As a further step in the campaign to check the use of and illicit traffic in maconha, an Inter-state Maconha Conference of representatives of the health and police authorities of the states of Pernambuco, Alagoas, Sergipe and Bahia was held at São Salvador in December 1946. After some very interesting discussions, the Conference reached the following conclusions:

Suggestions of the Conference:

This conference suggests the following measures to the State Governments, which are now so deeply committed to this health campaign:

1. Planning of measures, initially with particular reference to the States of Alagoas, Sergipe, Pernambuco and Bahia and subsequently with reference to other states;
2. Destruction of maconha plantations and restriction of production to medical or industrial needs;
3. Amendment or re-interpretation of the law, so that the provisions relating to the prevention and punishment of maconha addiction may be strengthened and brought up to date;
4. Inclusion in the agenda of congresses, seminars or meetings dealing with psychiatry, public health and allied subjects of the item "suppression and prevention of drug addiction", with particular reference to addiction produced by maconha;
5. Study and special surveillance of offenders (particularly persons who commit offences against property), seamen, prostitutes and prisoners;
6. Special treatment and protection for adolescents;
7. Cases involving mothers and children, or abandoned or maladjusted minors to receive priority;
8. Establishment, under the Office of Recreation and Traditional Customs or a similar body, of an agency to fight drug addiction;
9. Instruction and training of personnel to deal with the problems of maconha addiction;
10. The exchange of information among the State Commissions for the Control of Narcotic Drugs (records of proceedings, publications, activities, registers of addicts, particulars of inquiries) to be mandatory;
11. Members of State Commissions for the Control of Narcotic Drugs to be entitled to remuneration in all states;
12. Standardization of studies;
13. Provision of more mental clinics and more measures for the diagnosis of psychopathic conditions with a view to the prevention of drug addiction;
14. Dissemination, for educational purposes, of information pointing out the dangers of drug addiction (e.g. adolescents);
15. Institutional and other treatment of addicts and traffickers (penalties, security measures, committal to agricultural settlements, as appropriate);
16. Establishment of a technical library;
17. Proper, regular and systematic supervision of the medical and related professions;

18. Registration of Afro-Brazilian sects and co-operation between the police and the medical profession for the purposes of health education;

19. A small plantation of maconha, to be operated under the authority and supervision of the State Commissions for the Control of Narcotic Drugs, should be used for pharmacological, clinical, psychological and sociological studies.

IV. CONCLUSIONS OF THE NATIONAL COMMISSION FOR THE CONTROL OF NARCOTIC DRUGS

The National Commission for the Control of Narcotic Drugs appointed one of its members to report on the work and conclusions of the Inter-State Maconha Conference. He produced a thorough study, in the light of which the National Commission approved the following conclusions, which it recommends should be followed by the Commissions for the Control of Narcotic Drugs of those states where the use and cultivation of maconha constitute a problem.

1. The authorities responsible for the control of drug addiction in Brazil should plan measures and standardize studies with a view to an intensive educational campaign against the use and cultivation of maconha.

For this purpose, practical courses will be organized to teach the police and health authorities how to identify maconha by its botanical characteristics, to inform them of the evil effects of the use of maconha in its various forms, to explain to them why its cultivation is forbidden in Brazil and what are the penalties for offences against the Brazilian law relating to the trade in and use of narcotic drugs.

2. Medical studies of the social effects of maconha smoking should be encouraged, so that those responsible for controlling the use of this narcotic plant may realize what these effects are.

3. Persons who organize congresses, seminars or meetings dealing with psychiatry or public health should be requested to place items relating to maconha on the agenda.

4. The Commission for the Control of Narcotic Drugs should be urged to co-operate, particularly in those states where the use and cultivation of maconha are most widespread (São Francisco region—Bahia, Sergipe, Alagoas and Pernambuco; northern Brazil—Piauí, Maranhão, Pará and Amazonas).

The State Commissions should work out agreements for the control of the use of maconha or diamba, and for the exchange of records of their proceedings, particulars of addicts and publications and other information concerning drug addiction.

The State Commissions should co-operate with officials of the Customs, Harbour Services, Ministries of Communications (Posts and Telegraphs), Labour (Regional Inspectorates) and Agriculture (Department of Farm Produce), the health services of the Army, Navy, and Air Force, and the National Department of Health (National Malaria, Plague and Yellow Fever Services), whose representatives can give them valuable assistance by pointing out areas in which maconha is cultivated and reporting information about maconha traffickers.

5. Maconha plantations should be destroyed, as prescribed by Order No. 1/47 of the National Commission for the Control of Narcotic Drugs.

6. Under the authority of the Federal and State Departments of Public Safety, an agency should be established with the special functions of suppressing drug addiction; it should be staffed by suitable, reliable and qualified personnel specially trained to deal with such problems.

7. A register of Afro-Brazilian sects should be prepared; the reports of the specialized police authorities responsible for the control of addiction may prove of great medical and sociological value.

8. The State Governments should be urged to remunerate the members of the Commissions for the Control of Narcotic Drugs, for they perform an outstanding service to the community.

Executive order for the destruction of maconha plantations

According to these conclusions the following order was issued (No. 1/1947):

"The Chairman of the National Commission for the Control of Narcotic Drugs, by virtue of article 44 of Legislative Decree No. 891 of 25 November 1938, hereby issues the following rules, which were approved at the meeting of 12 June 1947 and which shall be observed by the State Commissions for the Control of Narcotic Drugs, relating to the destruction of maconha or diamba plantations in Brazilian territory:

"(a) Any plantation of maconha or diamba discovered in Brazilian territory shall be destroyed by the police authority under the technical direction of the Ministry of Agriculture. The said authority shall immediately report any such destruction to the National Commission for the Control of Narcotic Drugs.

"(b) If there should not be any representatives of the Ministry of Agriculture in the locality in which the maconha plantation is discovered, the said plantation shall be destroyed by the police authority acting in conjunction with the health authority or with an official of the State Agriculture Department who is technically competent to identify the said narcotic plant.

"(c) The said authority shall send samples from any plantation which has been or is to be destroyed to the nearest federal or state establishment competent to carry out the botanical identification thereof.

"(d) An authority which destroys a maconha plantation shall immediately transmit to the National Commission for the Control of Narcotic Drugs a detailed report of the action taken, with particulars of the locality, an approximate description of the plant and any other relevant information, and enclose a duly certified sample of the plant."

V. BRAZILIAN CONTRIBUTIONS TO THE LITERATURE ON CANNABIS

In 1949, Professor Decio Parreiras, acting for the National Commission for the Control of Narcotic Drugs, carried out an investigation in the São Francisco region, visiting the States of Pernambuco, Alagoas, Sergipe and Bahia to study the maconha problem.

From the interesting observations he was able to make he produced an excellent report which is now the standard work: *Canabismo ou Maconhismo—Estudos Brasileiros*; it is a store of valuable information for all who make a special study of the diamba question in Brazil.

In the course of his journey he also became aware of the difficulty of obtaining copies of the excellent Brazilian publications which deal with maconha. Owing to this difficulty such works were inaccessible to persons who might wish to consult them, and he accordingly suggested that the National Commission for the Control of Narcotic Drugs should arrange for their re-publication in collected form.

The idea was accepted, and in 1951 the National Commission reproduced some of these works, in a volume entitled *Maconha Coletânea de trabalhos brasileiros*, in order to publicize the harmful effects of the use of this intoxicating plant.

Unfortunately it was not possible to include in this publication the excellent work *Os fumadores de maconha: efeitos e males do vício* by Dr. Rodrigues Doria, one of the pioneers and leading experts who have studied the maconha problem in Brazil. This work, which Professor Rodrigues Doria presented to the Second Pan-American Scientific Congress held at Washington, D.C., on 27 December 1915, is out of print but it is now intended to re-publish it.

The contents of the publication *Maconha Coletânea de trabalhos brasileiros* are as follows: *Sobre o Vício da Diamba*—F. de Assis Iglésia; *Vício da Diamba*—Adauto Botelho and Pedro Pernambuco Filho; *Vício da Diamba*—Dr. Oscar Barbosa; *O Cânhamo ou Diamba e seu Poder Intoxicante*—A. de Leonardo Pereira; *Diambismo*—Heitor Péres; *Algumas notas sobre a Maconha*—Vasconcelos Sobrinho; *Alguns novos dados sobre Fumadores de Maconha*—José Lucena; *O Vício da Diamba no Estado do Pará. Uma Toxicose que resurge entre nós*—Pedro Rosado; *Maconhismo e Alucinações*—José Lucena; *Os Perigos Sociais da Maconha*—João Mendonça; *Relatório apresentado aos Srs. Membros da Comissão Nacional de Fiscalização de Entorpecentes*—Roberval Cordeiro de Farias; *Contribuição para o estudo das Plantas Alucinatórias, particularmente da Maconha*—Jayme Regallo Pereira; *As Toxicomanias de Após Guerra*—Roberval Cordeiro de Farias; *Aspectos do Maconhismo em Sergipe*—Garcia Moreno; *Convênio Interestadual da Maconha*—Eleyson Cardoso; *Estudo sobre conclusões aprovadas pelo Convênio Interestadual da Maconha*—Pedro Pernambuco Filho; *Normas Gerais Recomendadas pela Comissão Nacional de Fiscalização de Entorpecentes; Diambismo ou Maconhismo. Vício assassino*—Eleyson Cardoso; *Maconhismo crônico e Psicose*—José Lucena, Luiz Ataíde and Pedro Coelho; *Os Fumadores de Maconha em Pernambuco*—José Lucena; *Ação Tóxica da Maconha cultivada no Brasil*—José Hasselmann and Oscar Ribeiro; *Canabismo ou Maconhismo. Estudos Brasileiros*—Décio Parreiras; *Maconha, Estudo Químico e Farmacodinâmico*—Maria Margarida Tobias e Silva and Edgard Pires da Veiga; *Maconha, Estudo Farmacodinâmico*—Edgard Pires da Veiga.

B. TECHNICAL STUDIES

As Brazil's contribution to the study of maconha, we reproduce below some passages and conclusions from certain Brazilian publications which we consider interesting and original:

I. BOTANICAL IDENTIFICATION

This section is based on: *Algumas Notas Sobre a Maconha*, by Vasconcelos Sobrinho, agronomist, Botanical Section, Institute of Agronomic Research:

"From time to time the Department of Public Safety sends to us at the Botanical Section of the Institute of Agronomic Research samples of a dried plant and asks us to verify if it is the plant known as 'maconha'.

"It is the object of this paper to describe the characteristics of the plant so that those responsible for narcotics control may readily identify maconha in the possession of vendors.

"A definitive description of the systematics of maconha does not, admittedly, exist as yet; while some writers have held that the plant is true hemp, the absence of a precise and

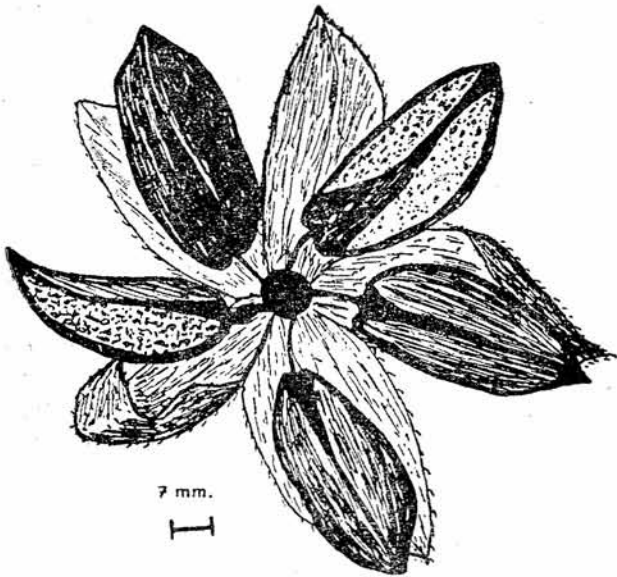


FIG. 2. MALE FLOWER, GREATLY MAGNIFIED



FIG. 3. FEMALE FLOWER, GREATLY MAGNIFIED



FIG. 4. LEAF



FIG. 5. LEAF

widely publicized scientific classification has allowed some doubt to persist.

"By growing a few seeds in the grounds of the Institute of Agronomic Research we obtained enough plants for a systematic study as a result of which, in addition to obtaining information for ready use by all concerned with the identification of the plant, we are able to state with certainty that the plant known in Pernambuco and Alagoas as *maconha* is that known to science as *Cannabis sativa* L. and in many countries as *hemp*.

"*Characteristics* : Unisexual, dioecious plants bearing greenish-yellow, scentless flowers of no conspicuous beauty which appear in large numbers in groups in the axils of the leaves all over the upper half of the plant. The male flowers are pedunculate and the female flowers sessile.

"The male flowers are haploclamydeous and pentamerous; the stamens bear short filaments less than half the size of the anther. The anthers are introrse, basifixed, bicellular, and longitudinally dehiscent. The pollen is yellow, powdery and abundant, with three prominent equidistant pores.

"The female flowers are achlamydeous and protected by one bract almost completely enclosing the ovary and extending along the stigmata. The stigma is sessile, double and plumose; the ovary is superior and unilocular. The fruit is dry, indehiscent and roughly walnut-shaped.

"Vegetative organs—a tall herb, almost shrub-like, reaching an average height of two metres. The leaves are simple, partite and petiolate, with stipules. The lower leaves have seven pseudofolios and the upper leaves five, of which three have a stunted narrow blade. The pseudofolios have deeply serrated edges and bear short, stiff hairs, barely perceptible to the touch, all over the blade.

"The merithals are long; there are nodules which tend to sprout adventitious roots.

"From the above characteristics we can without much difficulty identify the plant as being of the subfamily of *cannaboidae*, genus *cannabis*, species *sativa*—the plant known throughout the world as *hemp*.

* * *

"The material found in the traffic consists of the leaves, stalks, flowering stems and to a large extent of the fruits, all in a very dry condition and sometimes mixed with earth owing to careless handling by the vendors.

"This material can be readily identified by the fruit, which is quite distinctive and is always whole. It is 4.5 mm wide at its widest point and slightly pyramidal in shape, with a hard, shiny and typically speckled (melanistic) shell bearing two well-defined ridges. The ripe fruit is dark and the unripe fruit light brown, so that the first impression is of variation in colour.

"If no fruit is present the material can only be identified in the laboratory. The following elements, easily found in the dry material, are needed for this purpose:

"(a) cuticle—can be removed fairly easily; under the microscope shows highly characteristic stomata between numerous unicellular hairs. The ostioles are elongated, with a very visible cleft. Unicellular, pointed hairs, rounded at the base.

"(b) woody vessels—regular, very uniform in diameter with, in most cases, spiral thickening; thus they are not of much interest, except for the closed vessels (tracheae), which are comparatively wide in diameter with markedly oblique, and

sometimes loose, transverse septa and longitudinal walls with many handsome elongated perforations.

"(c) sieve tubes—exceedingly narrow.

"(d) grains of pollen—rounded, with three equidistant, highly typical protuberances.

"(e) fibres—can also be used to assist in identification.

Fragments of stem and twig which may be found in the material will be put to use; on maceration they will yield a light-coloured shiny fibre.

"In side view under the microscope the fibre is seen to have a wide lumen, which in cross-section is roughly circular. The fibre resembles that of flax more closely than any other fibres, and is distinguished from the flax fibre chiefly by the cross-section, which in flax is polygonal and in hemp, as we have seen, circular."

II. EFFECTS OF MACONHA

This section is based on: *Contribution to the Study of Plants containing Narcotic Drugs with particular reference to Maconha (Cannabis Sativa L.)*, by Professor Jayme Regallo Pereira, Professor of Pharmacology, Faculty of Medicine, University of São Paulo.

Experimental study

The Dixon test which has long been used and is still used for the standardization of *maconha* is based on motor inco-ordination in dogs.

In our experiments using this method we administered to dogs the fluid alcoholic extract of the plant prepared in accordance with the Brazilian Pharmacopeia, the proportion being 1 gramme of the plant (flowering tops and leaves) per cubic centimetre. The fluid extract was administered in Parke Davis gelatinous capsules easily swallowed by the animal. The animal was kept without food for at least 12 hours previously and specially selected for the test, preference being given to dogs of medium weight and docile character, amenable to the handling necessary for the administration of the drug and the observation of their behaviour.

In this case the characteristic action of the drug was observed, although the extract proved less powerful than that used by the United States writers. Doses of 0.4 to 0.6 cubic centimetre per kilogramme of the animal's weight produced no effect at all. A dose of 1 cubic centimetre per kilogramme, however, produced the characteristic effects. Under the influence of this dose, an hour and a half to two hours after administration, the animal made lateral movements of the head and of the haunches. As the effects grew stronger, the animal had difficulty in keeping on its feet. The tail drooped, the eyes were brilliant and it responded when called, while the movements characteristic of inco-ordination ceased. Some animals vomited shortly afterwards and all returned to normal about four hours after administration of the drug.

Among the objective phenomena observed in subjects under the influence of *maconha* and reported by several writers, the most striking are those referable to the autonomic nervous system vasomotor reactions; changes in salivary secretion; changes in the diameter of the pupil; changes in the frequency of the heart-beat and others have been reported by the writers.

Stringaris, in his excellent study on hashish addiction, says that the drug acts as a powerful stimulant to glandular activity. The immediate effects include lacrimation, diarrhoea and involuntary emission of semen.

Such reactions generally appear among the symptoms of intoxication in human beings and may thus to a certain extent reflect modifications brought about by the alteration in the psyche of addicts and by the emotional reaction of patients submitted to pharmacological tests and other conditions which may mask or conceal the actual direct influence of the drug under consideration.

This possibility suggested to us the idea of investigating some of the reactions attributed to maconha in tests using animals.

Among the effects of maconha most widely reported by writers are alterations in the pulse. Generally speaking, writers are agreed in stating that the pulse first becomes more rapid and may attain a rate much higher than the normal. Lucena observed, however, that as the test is continued there is a definite slowing down in the frequency of the heartbeat in the more advanced stage of intoxication. The explanation given by this writer does not seem convincing. Lucena believes that the acceleration in the pulse at the outset of the test is a result of hypovagotonia, and goes as far as to say that in patients under the influence of maconha, minimum doses will cause a block of the vagus nerve. He refers to doses of atropine administered previously for the purpose of studying the autonomic nervous system. Lucena believes that the slowing down of the pulse is a symptom of a hyposympathetic reaction.

We will now turn to our own observations.

For the experiments in this series we used dogs anaesthetized with morphine and somnifene. We recorded variations in blood pressure, pulse and respiration, and studied the electrical excitability of the vagus nerve. From our observations we reached the following conclusions:

1. Consecutive doses of acetic extract of maconha administered intravenously neither abolished nor reduced the excitability of the vagus nerve. Electrical excitation of the peripheral extremity of the right vagus nerve by means of an induced current always produced the characteristic slowing down of the pulse signifying a decrease in the frequency of the heartbeat.

2. All the doses administered in all the experiments carried out on dogs with the vagus nerve intact produced a slowing down of the pulse with a corresponding increase in the amplitude of the heartbeat. Such reactions are indicative of a probable action on the vagus nerve although it is not possible to determine the point at which the drug acts. Careful investigation into the nature of the phenomenon led to the conclusion that the maconha acts centrally on the nucleus of the nerve and on that section of the vagus nerve situated at the nape of the neck at the time when the reported reactions are taking place and the consequence is the rapid acceleration of the pulse and an immediate rise in the blood pressure.

It accordingly seems that the real action of the maconha brings about a retardation of the pulse not by a decrease of sympathicotonia as Lucena thinks, but by hyperparasympathicotonia. The initial tachycardia reported in the literature must be put down to the emotional reactions caused by the experiments, and not as a pharmacological effect of the drug. In addition, we find in Walton the assertion that in most experiments the pulse rate is accelerated as may be expected, owing to the degree of mental excitement.

The simultaneous recording of respiration and blood pressure, in the method adopted for our experiments, revealed another noteworthy fact. While maconha in the doses used does not cause variations in the rhythm or frequency of respiration, consecutive doses of the drug, causing a certain degree of saturation

in the blood, are liable to kill the animal, first respiration and then circulation ceasing altogether.

Experiments on Human Beings

We have carried out only two experiments in this series and they are included here with the purpose of supplementing the first part of the study condensed in this paper. Burning of the lips and tongue, dryness of the mouth, sensation of constriction in the throat, nausea, and coughing experienced by the patients prevented the continuation of the test beyond a certain limit, and made it impossible to achieve the degree of intoxication necessary to cause any hallucinatory phenomena. This does not invalidate the statements of other observers and research workers who have recorded hallucinations as one of the symptoms caused by maconha.

Our observations are as follows:

GG, Doctor, age 31 years

Lit the first cigarette at 3.11 p.m. Complained of salivation at 3.26 p.m., and seven minutes later noticed dryness of the mouth although it seemed to him that while some parts of the mouth were dry, the sub-lingual glands continued secretion. But there was a dissociation in the secretory function of the salivary glands.

At 3.37 p.m. he lit the second cigarette, reporting considerable dryness in the mouth and throat eight minutes later, but had no further effects to report until the cigarette was finished.

J.C. age 55 years, uneducated

This patient was completely unaware of the possible effects of the drug. He lit the first cigarette at 2.50 p.m. and the second at 3.10 p.m. He went on talking naturally without showing any appreciable effects until, on smoking the third cigarette, he began to complain of a slight burning in the lips and on the point of the tongue and of dryness in the mouth. The dryness increased considerably towards the end of the third cigarette. He went on talking naturally. On lighting the fourth cigarette at 3.55 p.m. he found it very amusing and laughed a little excessively on discovering that the smoke of the cigarette was leaving a brown mark on his fingernail. He went on talking without showing any mental disturbance, and finished the fourth and last cigarette at 4.20 p.m.

The irritation of the lips and the tip of the tongue extended to the throat and caused fits of coughing and at times a desire to vomit. This patient reported on the following day that during the night "he had had a very upset stomach" and that some time after the experiment he felt unusually hungry and had to eat some cakes before he had his dinner.

At another test three or four days later the same patient smoked four more cigarettes containing maconha from Maranhão, and exhibited the same symptoms. The irritation of the lips and throat was greater, and he reported that during the night he had vomited a greenish substance, which is consistent with Walton's observations.

Comments

The results obtained by Spivey and Easterfield, when they isolated "cannabinol" from the resin of maconha, the chemical structure of cannabinol being later established by Cahn, seemed to have solved the problem of the active principle of the plant. Using the Gayer method, Work, Bergel and Todd found, however, that cannabinol was a pharmacologically inactive product,

although they succeeded in obtaining a free fraction of cannabinol which was extraordinarily active in a dose of 0.05 milligrammes per kilogramme of an animal's weight. These writers then discovered Beam's test was negative both for cannabinol, and for the active fraction isolated by them. The failure of cannabinol was thus accompanied by the failure of Beam's test.

Then came another equally disconcerting fact to add to the prevailing confusion on this problem: the substance "cannabidiol" isolated simultaneously by Adams and his collaborators from the red oil obtained from North American cannabis and by Todd and his collaborators working with cannabis of Indian and Egyptian origin, was proved to be pharmacologically inactive despite the fact that it gave a strongly positive reaction with Beam's test.

A third substance, "cannabol", isolated by Jacob and Todd, was later added to these two substances—cannabinol and cannabidiol—isolated from *maconha* and proved to be an isomer of cannabidiol.

This progress in the study of the chemistry of the plant did not prove a step towards solution of the problem of pharmacological activity. None of the natural compounds, cannabinol, cannabidiol and cannabol, is, according to Todd, responsible for the narcotic properties of the drugs obtained from cannabis.

Pittenger, in an interesting comparative study of the resinous content of the plant and its pharmacological activity, covering the Indian, African and North American varieties, demonstrated that there was no relation between the chemical and the physiological phenomena. Thus, samples with a high resin content revealed a low physiological activity, while others with a low percentage of resin were quite active. These results led Pittenger to conclude that there was a notable variation in the activity of different samples of the same variety. Considering the great discrepancy between the chemical and the physiological results, he suggests that this proves the illusory nature of the usual former practice of classifying preparations of *cannabis* in accordance with their resinous content.

With regard to the variability of physiological activity noted in different samples of the same botanical variety, Wood says that extract of *maconha* is a very unsatisfactory drug because one-eighth of a grain of one extract will produce definite intoxication, while many grains of another extract which is chemically and physically indistinguishable from the first can be taken without any intoxication.

Alles and his collaborators examined the physiological activity of various examples, using the Gayer and Dixon tests, and concluded that the active principle producing anaesthesia of the cornea in rabbits is probably different from that which causes inco-ordination in dogs, since some samples proved inactive when used on rabbits and extremely active when used on dogs.

The observations of Pittenger and Wood demonstrate the need for biological evaluation. While microscopic examination of the drug may in some cases provide sufficient data for identification of the *maconha*, only biological methods can reveal the actual physiological potency of the drug. Among these tests reference should be made in particular to Gayer's test and motor inco-ordination in dogs, the results of which are more trustworthy than experiments using human beings. The latter generally involve subjective phenomena which sometimes conceal the reactions actually caused by the drug. It is sufficient to recall the highly significant fact that the psychological reactions observed in human beings are much more easily obtained when the smoker smokes *maconha* in company or in a group, than when he is

alone. It is clear that favourable surroundings, in which all present are involved, prepare the mind of the individual for the expansive manifestations of gaiety and loquacity, states to which writers frequently refer, conferring upon them a pharmacological value which they do not in reality deserve. Lucena, who has collected the largest number of data from experiments on human beings, having himself tried to experience the effects of *maconha*, quotes a case in which patients smoked six to eight cigarettes of one gramme each, without observing any really hallucinatory condition, as occurred in cases 6, 7 and 8 reported in his first paper on the subject. Referring more particularly to the phenomenon of hallucination, Lucena in a later article admits the possibility that *maconha* may cause hallucinations, and quotes his observation of a patient who after smoking three *maconha* cigarettes presented pseudo-perceptive phenomena which the writer classifies as hallucinatory. The writer explains that these pseudo-perceptions assumed a hallucinatory character, although they were transitory. Despite his admission of the possibility of the phenomenon he states that he has never had an opportunity of observing true visual, aural, gustatory or olfactory hallucinations, although such facts have been verified by many reliable writers. From our own conclusions based on study of the literature and our own experiments with *maconha* we are inclined to admit that the plant or its active principles may be capable of causing a true hallucinatory state, but only when the degree of intoxication is high and has reached a stage never yet reached in scientific experiments. The fantastic stories related by writers who have used hashish clearly show that the minds of the narrators were more active than the drug. The legend which has for hundreds of years filled the diseased fancy of addicts, inspiring them with the belief in erotic dreams, increased sexual potency, prolonged libido and other reactions connected with sexual phenomena, maintains the reputation of the *maconha* as a plant capable of producing pleasure. Hence the large consumption of *maconha*, which is becoming more and more widespread, particularly in the lower strata of society. The appearance of the vice in the universities of the United States is an alarming symptom of the present-day mentality of youth, under the malevolent influence of the destructive forces which are so insidiously undermining the moral reserves of nations. If weak-minded people have been attracted to marihuana, we believe that the principal factor has been an economic one. There are many other drugs capable of producing euphoria and intoxication more easily than *maconha*. Alcohol in all its forms is always at hand to waft the individual away to the paradise of pleasures and fantasies. *Maconha* is less costly than alcohol, however. And if diseased and suffering humanity is now turning to hashish in the East, to marihuana in the West and to *maconha* in Brazil, it is certainly not owing to the properties peculiar to the *cannabis*, but through the tumult of new emotions, behind which we can often discern the subterranean workings of the dominant sex instinct.

Maconha, in toxic doses, by inhibiting the natural control mechanisms, particularly the faculty of self-criticism, gives free play to the vices, passions and instincts, those dangerous and importunate demons which dwell in the subconscious and are externalized in the attitudes and behaviour of intoxicated persons. The fantasies recounted by the *maconha* smoker, as described by various writers, are therefore the product of the individual's own mind previously conditioned by illness or vice. When it is freed from inhibitions and released from control, it contrives to see and feel that wonderful world of beauty and passion, love and hatred, which fills the abnormal fancy of the hallucinated.

Conclusions

The maconha cultivated in the northern states of Brazil has the same pharmacological properties as the Indian and North American varieties of hemp from the qualitative point of view, but is quantitatively inferior.

Acetonic and alcoholic extracts of maconha gave positive effects when tested on rabbits (Gayer test) in which it produces the characteristic anaesthesia of the cornea, and on dogs, in which it produces motor ataxy when administered in sufficiently large doses.

The results of biological tests are borne out by chemical and physical tests, which showed that the material examined possessed the characteristics reported by writers who have investigated samples of cannabis and derivative products of Indian or North American origin.

III. CHEMISTRY AND PHARMACOLOGY

This section is based on: *Maconha (Cannabis Sativa) Chemical and Pharmacodynamic Study*, by Maria Margarida Tobias da Silva, pharmacist, and Professor Dr. Edward Pires da Veiga.

(a) From the chemical point of view :

1. The best of the solvents used for the extraction of the resin proved to be petroleum ether.

2. Purification, by means of animal charcoal, of the extracts obtained, gave good results when carried out subject to certain precautions (by the cold method, in a closed vessel, protected from the light, twelve hours' contact at the maximum). When carried out by the hot method (watch-bath) in an open container, or by the cold method with excessively prolonged contact, it leads to the loss or deterioration of the active principles, with subsequent difficulties in chemical identification.

3. Elimination of the extractor liquids may be carried out without difficulty by spontaneous evaporation or vaporization using a water bath under reduced pressure; when the water bath method is used, with an open container (under atmospheric pressure), the same difficulties are encountered as those already observed with respect to purification of the extracts.

4. An attempt at identification made with products resulting from burning maconha, and collected in water, gave negative results with all the tests used (except the Beam acid test). We reached the conclusion that part of the resin was retained by condensation in the bell which we used in our improvised method and that may have been the cause of our failure.

5. In the experiments, the P. Duquenois and Hassan Negm Moustapha test proved to be an excellent means of chemical identification when it was carried out on the residue, obtained by evaporation, of various extracts. We observed that the time for obtaining the final characteristic term varied with the three samples used, and appeared to be in direct relation to the proportion of resin. The Beam acid test showed a noticeable sensibility, giving positive results in almost all tests; the Beam alkaline test failed in cases where the extraction of resin was incomplete and where the purification of the extract and elimination of the solvents had been carried out without due precautions. The modification suggested by Bouquet for the Beam acid and alkaline tests did not appear to have any advantages in the chemical identification which we attempted, nor did the ammonia test also mentioned by Bouquet, which gave negative results in all our experiments.

(b) From the pharmacodynamic point of view :

1. Maconha is a peripheric vaso-constrictor.

2. It had no effect on the movements of the paramecia, but it did reduce the movement of the vibratile cilia of the rhinopharynx of *Leptodactylus pentadactylus*.

3. It had a depressive effect on the central nervous system of the dog and of the white camundongo rat when the products of combustion of the plant were inhaled.

4. The doses we administered by intramuscular injection proved inactive in the case of dogs.

5. Small fishes (*Hyphessobrycon Flameus*) proved extremely sensitive to the action of maconha, thereby bearing out the observations of other research workers.

6. The present conclusions are not definitive and are in the nature of a preliminary note.

IV. EXPERIMENTS ON TOXIC ACTION

This section is based on: *The Toxic Action of the Maconha cultivated in Brazil*, by Drs. Jose Hasselmann and Oscar Ribeiro.

Physiological tests of the toxicity of *cannabis Sativa* were carried out on *Lebistes reticulatus*.

It was not possible to show that the toxicity of the leaves was in direct proportion to their distance from base of the plant.

It is probable that the maconha cultivated by us is stronger than that cultivated in the United States.

Leaves picked from below the fifth nodule of the plant have a very high toxicity.

There is a variation in toxicity between different individual plants cultivated in the same place.

V. EXPERIMENTAL WORK BY THE NATIONAL COMMISSION FOR THE CONTROL OF NARCOTIC DRUGS

This section is based on a report submitted to the members of the National Committee for the Control of Narcotic Drugs by Drs. Roberval Cordeiro Farias, Pedro Pernambuco Jr. and Decio Parreiras.

The study of the effects of maconha by Professor Jayme Regallo Pereira caused the National Commission for the Control of Narcotic Drugs to appoint a sub-commission to experiment with Brazilian maconha in order to confirm or disprove the data on the noxious character of the derivatives of *cannabis indica*, which had been recognized for over a century and set forth in studies which are accepted throughout the world.

The experiments were carried out at the Institute of Psychiatry, under the direction of Dr. Cincinato Magalhães de Freitas on 25 February and 9 March 1949, between 10 and 11.30 a.m. They were directed and carefully observed by the members of the sub-commission and the director of the Institute.

At the first meeting on 25 February 1949, ten staff members of the Institute of Psychiatry, in perfect physical and mental health, were selected. The sub-commission distributed seven maconha cigarettes which bore a small mark recognizable only to the Commission, to seven staff members of the Institute and three cigarettes made of corn-silk containing no maconha to three other staff members. The ten cigarettes were absolutely identical in size and appearance, and the maconha cigarettes contained 1.56 grammes of maconha.

A control group smoking corn-silk cigarettes was used in the experiment because it was thought better not to identify the cigarettes smoked, in order to avoid possible psychological influence which might affect judgment of any symptoms that might be reported.

The following smoked corn-silk cigarettes : C.R.M., C.R.S., and M.N. The last named reported the following subjective symptoms : sensation of roughness of the tongue; burning sensation in the throat and palate. Pulse normal. Condition of the pupil, normal. No psychological changes. C.R.S. said that he had the impression he was smoking dead leaves. Pulse normal. C.R.M. felt a burning sensation on the tongue and the inside of the cheeks.

The following staff members smoked *maconha* cigarettes : Dr. A.; Dr. I.; Dr. C.; Dr. A.N.R.; Dr. M.F.; Dr. F.; and a pharmacist, E.A.C. After smoking the first *maconha* cigarette (1.56 grammes), Dr. A. felt a burning sensation in the throat first, and a craving for iced drinks; pulse 90 per minute. Dr. I. showed no abnormal symptoms. Pulse 85 per minute. Dr. C. complained of burning in the throat; thirst and rapid pulse (98). Dr. A.N.R. found the smoke of the cigarette agreeable; he reported thick saliva and difficulty in salivation. Dr. M.F. showed lacrimation; had considerable irritation of the conjunctive and pulse 80 per minute. Dr. F. reported a bitter resinous taste, burning in the nostrils and a sensation of thickening at the tip of the tongue. E.A.C., the pharmacist, after the first few puffs of his cigarette tasted burned resin, had difficulty in swallowing saliva, and anaesthesia of the point of the tongue. Slight excitation. Pulse 95 per minute.

After three minutes' rest the sub-commission handed each person present their second cigarette of *maconha* or corn-silk.

There were no further symptoms to report in nine of the persons under observation. But E.A.C., on beginning to smoke the second cigarette, experienced fits of mental disturbance, buzzing in the head, pulse 122 per minute, and slow reaction of the pupils, and it appears from his written statement that "when the cigarette was finished I closed my eyes and when I opened them I had the impression that my colleagues were figures in a film or in a talking picture, who were coming towards me and speaking to me. When I left the room where the experiment was carried out I had a definite impression that it was early morning and hardly light.

"At the suggestion of my companions I lay down, as I felt giddy and I felt as if walking in my sleep. I closed my eyes and dozed. When I woke up they said I had taken an electric shock. I was doubtful whether that had happened because I felt as if I were drunk. I then felt as though my circulation was behaving in an odd way; it seemed to be faulty and the blood was returning to the heart, as if to choke it. From that I got the idea that I was going to die. In that state of anguish I asked to see my two children with a desperate insistence which left me in a condition of agonizing distress. I was forced to get up and have lunch. I ate very little and after the meal I began to perspire, and returned to normal after two hours. During the afternoon I had a violent headache."

The sub-commission also observed that E.A.C. presented symptoms of lethargy and prostration, alternating with anxiety; he showed phases of laughter and paraesthesia; he found difficulty in walking; he was mentally confused; delirious; irritable but not aggressive; with sudden changes in character; apprehensions; sensations of ridicule; hypermotility; hypersensibility; thirst; drowsiness.

* * *

Some days afterwards, on 9 March 1949, there was a further meeting at the Institute and observations were made, using fresh *maconha* which had recently arrived from the State of Alagoas by air, through the courtesy of Doctor Claudio Magalhães, director of the Alagoas Department of Health and Chairman of the State Commission for the Control of Narcotic Drugs. The *maconha* was administered in double doses, in large cigarettes (*baseados*), each containing 2.8 grammes. It should be stated that some of those present were prepared to find the cigarettes innocuous. There was no control group in this second experiment, and all the subjects smoked *maconha* without knowing it, as they believed that the cigarettes were of two types. The following staff members of the Institute of Psychiatry took part in the experiment : Drs. I.C.L., C.R.S., J.N.G., A., G.V.T., M. de F., M.N., C.R.M. and F.M.

Dr. I.C.L., a woman doctor, after the first few puffs of her cigarette (first 10 minutes) reported "a bitter taste, rather unpleasant; a sweet smell. After a few more minutes I felt a strange burning sensation on the lips, tongue and throat. It was as if they were irritated; then the gums and tongue, principally at the distal extremity, became numb as if under anaesthesia. At the same time I felt that my head was swelling, it was heavy and if I made any lateral movement the oscillations were greater than in the normal state. My heart began to beat rapidly. I had an idea that I could not walk, because my legs were heavy and felt swollen. Then there was pain, in the epigastric area which lasted for 24 hours. I had then smoked only one-third of the cigarette and I decided to leave the room because I felt that I would not be able to move.

"I then began to feel the most curious sensation. I felt as if my entire body were wrapped in a layer of burning cotton pressing lightly inwards. At the same time as physical languor I felt an increase in the perceptive activity. Ideas flowed with impressive speed and as I heard one of my colleagues talking I felt capable of interpreting the play of forces between the ego and super-ego.

"I then tried to write down what I was feeling, but it was impossible. My thoughts were racing and my wavering hand could not keep up with them. I had a real rush of ideas and I do not think that I succeeded in constructing a single intelligible sentence. I then had an enormous desire to laugh, to laugh a great deal at anything, sometimes without any apparent reason. At that moment another strange and very curious sensation occurred : the warm cotton in which I seemed to be wrapped was changed into a kind of vibrating breeze, tremulous and cold, which seemed to be flowing outward from my body.

"When I had returned home and taken a meal, these sensations were replaced by a great desire to sleep. I slept heavily for four or five hours, and then woke up bored, irritated and perhaps a little aggressive."

Dr. I., after smoking *maconha* for a few moments, had a pulse-rate of 125 per minute.

Half-way through the first cigarette (10 minutes) C.R.S., a student of odontology, began to observe that : "The heart suddenly raced, sight became blurred and the head seemed stupid. Simultaneously with these phenomena, as they grew stronger, I felt a powerful reaction throughout the body, and I felt that I was incapable of moving. On this occasion, I left the room with some difficulty in walking. Once outside the premises, however, I continued to feel the symptoms described, with the sole difference that I began to find my sensations agreeable. I was light-headed, felt a sense of general well-being and a desire to laugh

and talk. Although I could reason clearly, I felt a lack of confidence in myself and there was a kind of burning sensation and compression slightly below the sternum. After I had taken a meal I observed the same symptoms. I then slept for about half an hour and on awaking I felt as if I had what is popularly known as a 'hangover.' The symptoms which had previously been pleasant became unpleasant and for the rest of the day I remained in that condition, which only disappeared completely when night came. There was peripheral vasodilatation: congestion of the ocular conjunctiva. Pulse 138 per minute."

Dr. J.N.G., medical practitioner, after smoking for three minutes, had a pulse of 88 per minute rising to 100. He reported a sensation of heat in the legs; vasomotor disturbances, as if he had had an intravenous calcium injection. Anaesthesia of the mouth and tongue. Dizziness. He withdrew half an hour after the experiment began.

Dr. A., after smoking one-quarter of the *baseado* showed fits of dizziness, generalized cramps vertigo, and a pleasant sleepiness. He was alternately depressed and cheerful. Peripheral vasodilatation. State of intoxication, more pleasant than that induced by alcohol. This is liable to cause addiction.

G.V.T., a manual worker, reported a sensation of burning on the tongue; fits of dizziness vertigo; a feeling that his head was going to fall; a desire to laugh. He did not accept the second *baseado*.

C.R.M. felt as if he had menthol on his tongue; there was dizziness and vertigo, which became stronger if he closed his eyes. There was no psychological disturbance.

M. de F. said: "With the first puffs on the cigarette I felt a burning sensation in the respiratory passages, because of the acrid nature of the smoke; when I had smoked two-thirds of the cigarette I began to feel a slight sensation of dizziness which soon increased; I felt oscillations in my body like sound waves spreading from the head to the feet. My reasoning processes were normal. I soon felt completely intoxicated, although I was thinking clearly, but I was doubtful whether I could co-ordinate my movements. Even when I had eaten a fair amount of food the sensation persisted for three hours and I felt sleepy." The pulse was rapid and weak (152 per minute).

M.N. smoked two *baseados*. No psychological change. Rapid pulse, 100 per minute.

M.F. smoked two *baseados*. Pulse 88 per minute. No physical or psychological change.

A.N.R., dentist, felt fresh sensation in the mouth as if smoking a mentholated cigarette; dry mouth; reduction of salivation; burning at the tip of the tongue; thick saliva; burning on the mucous surfaces of the nose and larynx; no psychic disturbance; vomiting after drinking a glass of water.

* * *

Statistical data: (a) of the seven persons who smoked maconha cigarettes (containing 1.56 grammes maconha) in the first experiment, only one experienced psychological disturbances. The maconha used had been gathered a long time previously and had been kept by the National Medical Control Service for over a year.

(b) Of the nine persons who smoked maconha *baseados* (containing 2.82 grammes maconha), in the second experiment, six experienced psychological disturbances. The maconha used had been recently gathered and was sent by air from north-eastern Brazil.

(c) The objective symptoms observed were, in order of frequency, tachycardia and tachysphygmia in eight of the persons observed; abnormal reasoning in four; increased conjunctival irrigation in four; excitation in four; changes in the pupils in four; anxiety in three; lacrimation in two; perspiration in one; delirium and restlessness in one; mental confusion in one; irritability in one.

(d) The subjective symptoms which occurred were, in order of frequency: burning sensation in the throat, eleven; bitter taste, eight; vertigo and dizziness, seven; disaesthesia, five; character changes, five; circulatory disturbances, five; sleepiness, four; well-being and euphoria, three; malaise, three; alternating feelings, three; thirst, three; anaesthesia at the tip of the tongue, three; distress, three; giddiness, two; weakness in the legs, two; gastralgia, two; sensation of intoxication, two; desire to laugh, two; smoke unpleasant, two; resinous taste, two; thick tongue, two; buzzing in the ears, two; sensation of ridicule, sleepwalking; approaching death; headache, delirium and restlessness, one.

(e) The symptoms continued for between three and twenty-three hours.

(f) The first symptoms appeared in the first ten minutes of using the drug.

* * *

Comments: There is an enormous bibliography on the symptoms of persons intoxicated by the use of *cannabis indica* whether in the form of maconha, hashish, cannabinon, fluid extract of *cannabis indica*, or balsam of *cannabis indica*. All are cases of cannabism and the way in which the phenomena observed conform to the classic symptoms, which the present series of experiments in Brazil merely confirms, is striking.

The simple spontaneous statements of M. de F., "I felt completely intoxicated, although I was thinking clearly", reproduces the very words of Taylor, when he reports the state of dual consciousness, of more than one "ego" in this state of intoxication which produces enhanced sensory illusions, "but leaves the capacities for observation and judgment relatively unaffected." The "enormous desire to laugh, to laugh a great deal at anything, sometimes without any apparent reason", to which Dr. I.C.L. refers, was reported nearly a century ago by Alexandre Dumas, in connexion with the case of the Midlothian landowner who was taken to the police by his neighbours because of his habit of immoderate laughter. He was a hashish addict.

The extreme agony, in which E.A.C. called for his children because he thought he was on the point of death, has also been reported by Ludlow as common in the delirium brought on by hashish, and can be corrected by the use of acid drinks (such as lemonade).

The langorous contentment reported by Ludlow was magnificently demonstrated in Dr. A. The sensation of thirst, dry mouth, thick saliva, reported by more than five of our patients were described long ago by Schneider, as the result of a large dose of the fluid extract of *cannabis indica*.

The hallucinatory phenomena, the imaginative ecstasy reported by I.C.L. and by M. de F.; the cotton wrapped around the body, the undulatory movements, the flowing breeze—all are described very fully in the statements of Baudelaire, Alexandre Dumas and Mary Hungerford, among others.

A rapid pulse rate, lacrimation, and peripheral vasodilatation are common phenomena amongst persons who use and abuse *cannabis indica*.

It is quite clear that the constitution of the individual and individual susceptibility have a substantial effect in the symptoms

observed (Walton). A weak and unhealthy person suffering from some nervous defect more rapidly falls victim to cannabism than a normal individual. Thus, in the first experiment, it was found that only one of the seven smokers showed signs of intoxication.

* * *

Conclusions : (a) The maconha cultivated and used in Brazil presents the same dangers and has the same toxic effects as *cannabis indica* in other countries, depending on the dosage, the quality (resin content) and whether it is fresh or stale.

(b) The extent to which the symptoms associated with *cannabis indica* intoxication are manifested is dependent on the subject or individual susceptibility.

(c) The first signs of the effect of the Brazilian maconha are observable in the middle of the first *baseado*, the type of cigarette commonly used by smokers; this is in contrast to the longer period which is observed with other products of the plant under consideration.

C. CONCLUSION

In conclusion, it may be said that a regular campaign against the use of maconha was not instituted in Brazil until 1941.

This does not mean that the problem was hitherto unknown or neglected in Brazil. It is sufficient to refer to the excellent work of Rodrigues Doria, Assis Iglesias, José Lucena, Aduato Botelho, Pedro Pernambuco Jr. and other students who have produced valuable works demonstrating the harmful effects to which persons addicted to maconha smoking are liable.

The first legislation expressly regulating the importation into Brazil of narcotic substances (cocaine, opium, morphine and its derivatives) dates from 1931 and also contemplates the establishment of a special institution for the treatment of addicts (Decreets Nos. 4,294 of 6 July 1931, and 14,969 of 3 September 1920).

Cannabis Indica was first included in the list of substances subject to control in accordance with the international conventions in Decree No. 20,930 of 11 January 1932.

Specific measures for the suppression of the use of maconha were first enacted in Legislative Decree No. 891 of 25 November 1938, the principal enactment on narcotic drugs in Brazil.

In chapter II, article 2 of the Act, the planting of maconha is prohibited and the police are authorized to destroy any plantations found. The article reads as follows :

“ Production, traffic and consumption

“ Article 2

“ The planting, cultivation, harvesting and utilization by private persons of ‘ *Papaver somniferum* ’ and its variety ‘ *album* ’ (*Papaveraceae*), *Erythroxylon coca* and its varieties (*Erythroxylaceae*), *Cannabis Sativa* and the variety *Indica* (*Moraceae*) (Commonly : Indian hemp, *maconha*, *meconha*, *diamba*, *liamba*, etc.) varieties thereof, and any other plants from which the narcotic substances mentioned in article 1 of this Act and its several paragraphs may be extracted, are prohibited in the national territory.

“ 1. All such plants, wild or cultivated, found in the national territory, shall be destroyed by the police authorities, under the technical supervision of representatives of the Ministry of Agriculture, and the police authorities shall then report their destruction to the National Commission for the Control of Narcotic Drugs.

“ 2. If it should prove necessary for therapeutical purposes, the Union may, subject to the approval of the National Commission for the Control of Narcotic Drugs, cultivate and utilize such plants of this nature and extract their active ingredients.”

* * *

It is only since that date that the health and police authorities have had legal authority to undertake a systematic campaign against the cultivation, illicit use and smoking of maconha.

After investigations in 1941 by the Director of the National Medical Control Service, the National and State Commissions for the Control of Narcotic Drugs initiated a regular campaign and took action to suppress the use of and illicit traffic in maconha.

Since that date the campaign has been vigorously continued and although it has not yet achieved its final goal, the results are none the less satisfactory.

Our main objective for the time being is to establish closer liaison between the police and health authorities, the State Commissions for the Control of Narcotic Drugs and the National Commission, with a view to ensuring that as many as possible of the clandestine maconha plantations in the north-east and north of Brazil are destroyed.

Once this goal has been achieved, and the maconha plantations, in the states where they are most common, have either been eliminated or greatly reduced, there will be a decrease in the illicit traffic and in the number of smokers of this intoxicating and hallucination-producing plant.

Maconha smoking is the only form of drug addiction which is at present of concern to the police and health authorities in Brazil.

The use of morphine and synthetic drugs of the morphine type and the use of cocaine are now fully under control. It may be stated that there are now no addicts to those drugs in Brazil.

Control of the use of maconha and other narcotic drugs is exercised throughout Brazilian territory by the National Medical Control Service of the National Department of Health and by the similar services of the State Health Departments. The control measures are supervised by the National Commission for the Control of Narcotic Drugs and the corresponding bodies in the states.

These control and supervisory organizations have their headquarters in the Federal District and in the capitals of all the states of the Federation of Brazil.

The use of maconha in Brazil has never become sufficiently widespread to make it rank as a social problem. Thanks to the measures taken since 1941, we have been able to control and restrict its spread and the evils it brings in its train. Its use is confined chiefly to the poorer classes, to the destitute and to the socially maladjusted, including criminals, and there have so far been few cases of maconha smoking among students and young people of the higher social classes. We attribute this situation to the constant vigilance of the health and police authorities, who spare no effort to prevent the spread of the use of maconha in Brazil.

There is no reason to believe that the *cannabis* problem in Brazil has international ramifications, and it would appear that the illicit traffic is carried on entirely within the national territory. If there is any smuggling out of the country it must be on a small scale, as in the countries where maconha is smoked on a large scale there are extensive plantations whose production is sufficient to satisfy the needs of addicts.

In 1945 a conference of professors of pharmacology from all the faculties of pharmacy and medicine in Brazil was held at Bahia to prepare a plan for the study of Brazilian maconha (*cannabis sativa*). The participants undertook to submit the results of their chemical and pharmacodynamic research on maconha at the end of the current year.

While they do not consider that *cannabis* addiction is a major social problem in Brazil, the health and police authorities are not underestimating it, as is proved by the continuing repressive action taken. It is hoped that maconha smoking will be reduced to the level of the other forms of addictions, which have been practically eliminated throughout Brazil, as soon as illicit plantations scattered throughout certain states are eradicated.

The destruction of maconha plantations can be carried out systematically and continuously in Brazil as neither the fibres nor the hemp seed from Brazilian *cannabis* are used for industrial purposes.

As the cultivation of *cannabis* is illegal in Brazil, all the *cannabis* required for therapeutic uses is imported, chiefly from England, and to a lesser extent, Germany. The amounts imported are very small, 42,500 kilogrammes of hemp and 50,500 kilogrammes of extract having been imported over the ten-year period 1944-1954.

The therapeutic use of *cannabis* in Brazil is steadily declining, as a result of the introduction of new sedative and anti-spasmodic drugs, which are both more reliable and safer.

Manufacturers of preparations containing *cannabis* are changing their formulae and are substituting other substances of proved therapeutic efficacy.

Cannabis sativa L. will accordingly shortly disappear from medical use in Brazil, as the Brazilian medical profession is convinced of the advantage of replacing it by other therapeutic agents whose pharmacological effect is well known.

The use of *cannabis* in veterinary practice in Brazil is also insignificant.