Bull. Org. mond. Santé / *Bull. World. Hlth Org.* 1952, **5**, 377-439

MASS TREATMENT OF SYPHILIS IN AN INDIAN PROVINCE

Report of the World Health Organization Venereal Disease Demonstration Team in the Ghund Area of the Himachal Pradesh, India

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WHO Venereal Disease Demonstration Team

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Manuscript received in February 1951

This report deals with some of the experiences of the World Health Organization Venereal Disease Demonstration Team assigned to the Government of India to establish a suitable system of control in both an urban and rural area and to give instruction in those methods of diagnosis and treatment which could best be adapted to local resources.

The WHO Expert Committee on Venereal Diseases [26, 27] believed that the method of control developed in the United States of America could be applied usefully in many areas of the world, if suitably adapted to local conditions and requirements. The committee suggested that the team's activities should embrace both rural and urban populations.

The importance of working in rural areas is particularly evident in India where, in 1941, 87% of the population was rural and a serious shortage of medical care prevailed. The expert committee believed that proved techniques could be adapted to provide venereal-disease care for this rural group within the budgetary and personnel limitations of the medical services of the country.

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WHO provided a group consisting of a physician, a serologist, a public-health nurse, and a health educator, as well as supplies for a diagnostic laboratory and for clinical activities. The Government of India provided funds for a matching team, for supplies and equipment available locally, for some drugs and medicines, and for transportation. In addition, the Government of India agreed to continue activities started in venereal-disease control after the withdrawal of WHO assistance.

Only one aspect of the activities of the demonstration team in the Province of Himachal Pradesh is discussed—the mass treatment for syphilis of an isolated rural population in the foothills of the Himalayas.

The team was established in Simla, the seat of government of the province, in May 1949, and by September activities were possible outside the city hospital and clinic. For years it had been said that there was a high incidence of venereal disease in the area, but no accurate prevalence- or incidence-rates were available. The only data lay in the statements of the local medical men that much venereal disease in both early and late stages was seen in their practices.

PROVINCE OF HIMACHAL PRADESH

Geography

Himachal Pradesh is a province formed in 1948 by the integration of 22 princely states in the northwestern sector of the Himalayan boundary of India. Its area is about 10,600 square miles (27,450 km²) and in 1948 the population was roughly one million. The province is divided into four administrative districts (see fig. 1, 2)—Mandi, Chamba, Sirmur, and Mahasu—about which a few particulars are given below :

District	*Area* (*square miles*)	(*km²*)	*Population 1948*	*Headquarters*
Mandi	1,531	3,965	303,685	Mandi
Chamba	3,125	8,094	168,908	Chamba
Sirmur	1,046	2,709	156,054	Nahan
Mahasu	4,684	12,131	306,785	Kasumpti

Whereas the districts of Mandi, Mahasu, and Sirmur are contiguous, Chamba is separated from the others by the Kangra valley of the Punjab (India). On the north and east, Tibet forms the boundary; on the south and south-east there are the Punjab (India) and Uttar Pradesh respectively; and on the north-west are Jammu and Kashmir.

At the time of the survey, the Pradesh was administered by a chief commissioner (whose status is equal to that of the governor of a State). Under the chief commissioner are deputy commissioners, one for each district. Under the deputy commissioners are subordinate administrative officers : magistrates, thasildars, and zaildars, down to the lowest adminis-

trative village officer, the lumbardar. The chain of responsibility for administration of district affairs is carried from lumbardar upwards.

A joint advisory committee to the chief commissioner meets periodically to discuss government matters. This committee contains representatives not only of the major local political parties but also of the adjoining governments, Pepsu (Patiala and East Punjab States Union) and the Punjab (India).

FIG. 1. INDIA AND PAKISTAN, SHOWING DEMONSTRATION AREA

The administrative branches under the chief commissioner are the departments of agriculture, civil supplies, education, engineering, forestry, medicine and public health, and police, each with its own director.

The Secretariat, or seat of government, is at Simla, but Simla itself is not in Himachal Pradesh.

FIG. 2. HIMACHAL PRADESH PROVINCE, SHOWING GHUND DISTRICT

The economic resources of the province consist mainly of forest products, wax, and honey. At the lower altitudes, a good quality rice is grown in addition to maize and wheat. Potato-growing is very productive and profitable. The government then had control over an iron foundry at Nahan, a rosin and turpentine factory in the same place, and a salt-mine at Mandi. Methods of farming are primitive.

The commoner trees are deodars, pines, horse-chestnuts, walnuts, and rhododendrons. Among the fruit-trees grown are peach, Himalayan

apricot, wild pear, etc. In the lower hills the mango tree is common, but bears fruit of poor quality.

Wild animals such as the panther, Himalayan black bear, leopard, hyena, and wolf are found in the more remote forests. Among the game birds, the white-crested pheasant, black and grey partridges, jungle fowl, and woodcock are common at varying altitudes in different seasons.

The rivers which flow through the Pradesh are the Sutlej, Giri, Beas, and Ravi.

The monsoon rains are heaviest between the south-east corner of the region and Simla. Near the Tibetan border a continuous wind blows driving dust or dry snow, which stunts the vegetation. The snowfall varies with each locality. The higher peaks are covered with snow for a great part of the year.

The irregularity of the terrain and the fact that a large portion of the Pradesh gets a fair amount of snow during winter months makes communications extremely difficult. This has had an adverse influence on the extension of medical aid to the remote parts of the hills. There are isolated villages in the valleys and hills which most inhabitants have not attempted to leave for years. We have met representatives from such villages both in Ghund and in Ghini valley. There is no railway as such in the province; the railway stations on the East Punjab railway nearest to the Pradesh are Solan, Simla, Nagrota, and Pathankot (see fig. 2).

There are few roads suitable for vehicles in the Pradesh. The Hindustan-Tibet road runs from Simla to the Tibetan border via Narkanda; most of the " kutcha " (second class) roads that connect various parts of the Pradesh are difficult to negotiate and are snowbound during the winter months. There are a few omnibus services within the district where the roads are good. Transportation in the interior is by foot, horses, or mules.

During the summer months there is a shortage of water which affects the crops of the area. Except in the larger cities, the water supply comes from natural sources and is not subjected to any purification. As there is no controlled drainage system in most of the area, rain-water collects in the low-lying valleys and provides a breeding-ground for mosquitos. As a result, malaria has a high incidence in some of the valleys.

Most of the people are farmers. They are illiterate, extremely unsophisticated, and simple in their habits. They hold certain common beliefs which adversely influence the standard of public health. Different dialects are spoken.

Medical Organization

The medical services of the province are headed by a Director of Health Services who is responsible to the chief commissioner. The medical budget for 1949-50 was $199,900, which works out at about $0.2 per head for

medical aid in the area. The total governmental revenue of the Pradesh for the corresponding period was $4,554,859, of which 4.4% is allocated for medical aid. Under the Director of Health Services is an Assistant Director (in charge of maternal- and child-welfare activities).

Most of the hospitals were operated by the previous State governments and have varying standards; the medical department is now, however, aiming at uniformity. There are in the province 21 hospitals and 43 dispensaries, including those practising Ayurveda, an indigenous system of medicine. Four district medical officers are stationed at the headquarters of each district, and there are 13 assistant surgeons, and 38 sub-assistant surgeons (medical personnel who have received a shorter course of training leading not to a degree but to a licence).

Each district medical officer has charge of a number of medical officers who look after hospitals and dispensaries in the outlying areas. An example of the facilities in a representative hospital, at Theog in Mahasu district, is as follows :

Number of beds	8
Average number of patients	8
Average daily number of outpatient visits	40
Staff :	
Medical officer	1
Compounders[i] or dispensers	2
Nurse-dai (nurse-midwife)	1
Ward orderly	1
Chowkidar (caretaker)	1
Orderly to medical officer	1
Sweeper (part-time)	1
Annual budget :	
Medicines	$320
Equipment	$200
Hospital diet (none issued)	—

The annual budget for a typical rural dispensary (moffusil)—as, for example the one in Ghund, staffed by a compounder—is $160 for medicines and $40 for equipment and other expenses. In practice, the amount that can be spared, out of this meagre budget, for anti-venereal-disease activities is very small.

The compounder in charge of this typical dispensary is paid $12 per month and he earns about $12 more for making visits to the homes of those too sick to come to his clinic and for giving injections outside the clinic. Before the beginning of active control work in Himachal Pradesh, his yearly stock of medicines for the treatment of venereal disease was an issue of one pint (0.6 l) of an iodide solution, one pound (0.5 kg) of mercury with chalk, and 1,000 tablets of sulfathiazole (to be used for all diseases requiring a sulfonamide). The individual requiring treatment for syphilis

[i] A compounder is a man trained in first-aid and rudiments of medicine and sanitation. His training is usually arranged through a system of apprenticeship at a hospital, or with a physician, as an assistant.

had to procure his own arsenical, usually neoarsphenamine, and bismuth from the bazaar at Theog (12 miles away and accessible only on foot or horseback), paying about $0.7 per dose for the medicine. He took the vials to the compounder who administered treatment without charge. The income of the average person in the area is so low that he cannot afford to purchase the medicine for more than a few injections. Normally, he will receive treatment only so long as the lesion is present and then will discontinue it, even though the compounder knows of the need for prolonged treatment and has instructed the patient accordingly. It is thus apparent that practically no-one treated at the dispensary with arsenic and bismuth will receive anything approaching adequate therapy. The usual history is that he has had from three to six injections only. The difficulty then is in part economic, in that few people have the money for treatment while the budget allotted by the State is not large enough to provide the funds needed.

There is an extreme shortage of qualified nurses, laboratory technicians, health visitors, social workers, etc. As in many other provinces in India, the reluctance of the general public to study for and work in such services is disappointing. In the Himachal Pradesh, particularly because of underdevelopment and a high degree of illiteracy among the community, the problem of securing competent personnel is even more acute.

Since the province came into being only recently, no statistical data were available on any public-health problem.

The anti-venereal-disease organization in the health services of Himachal Pradesh was started in May 1949 with the arrival of the WHO Venereal Disease Demonstration Team, since when there has been a full-time venereologist for the province. With the help of the WHO team, he is responsible for running a main clinic at Simla and a subsidiary clinic at Nahan. He also supervises the anti-venereal-disease activities throughout the province.

As an integral part of the programme of the Venereal Disease Demonstration Team, training in modern methods of treatment and control of venereal diseases was offered to as many medical officers in the Pradesh as possible.

The medical services of the area have adopted a policy of carrying out some activities on the basis of setting up " camps ". For instance, the qualified ophthalmologist of the Health Services tours the area, setting up camp in hospitals, clinics, dispensaries, or schools in the trading-centres of the province. Word has gone out in advance, so that all persons having an eye disease of any type, particularly cataract, will be assembled for him. He stays from one to five days in a place seeing all patients who come, operating for up to 35 cataracts alone per day, and moving on when work is finished, leaving the local physician to handle the after-care of the patients.

Similar programmes have been carried on for gynaecological and general medical procedures. The venereal-disease team once joined forces with the ophthalmologist so as to handle both types of disease at the same time. Such co-operation saves on transportation and personnel costs, benefits from all advance propaganda, and facilitates joint efforts for the welfare of the patients of the area.

Medical Problems

The majority of people in the area cannot afford to pay the relatively high cost of allopathic treatment. As in other rural areas of India, an indigenous system of medicine, particularly Ayurveda, serves a large section of the population.

In addition to such indigenous systems of medicine, quackery prevails to an alarming extent in the hills. Such practices find easy victims among venereal-disease patients. Almost every older patient who was interviewed in the clinic and who gave a history of having had " Pahari Rog " (the local name for syphilis) invariably told of having undergone treatment from a local " medicine man ". So far as our information goes, the medicines (apart from mercury) used by these practitioners have no specific value in the treatment of venereal diseases. The symptomatic cure which is usually obtained by the passage of time is considered by the individual as ultimate cure. Naturally, the reservoir of infection remains, and the disease spreads. Paucity of modern methods of treatment and medical aid, and the poor economic status of the people, are important factors in the spread of venereal diseases.

The common illnesses that are responsible for keeping the population at a low level of health are malaria, tuberculosis, leprosy, venereal diseases, fly-borne enteric diseases, water-borne diseases, scabies, endemic goitre, deficiency diseases, undernutrition, malnutrition, cataract, diseases due to exposure to the elements without proper protection, and those due to hazardous physical exertion and occupational risks.

Ignorance about fundamental sanitation and personal hygiene plays a great part in the propagation of the above diseases. Despite the fact that there is plenty of vacant space, overcrowding in huts is the rule rather than the exception. The diet is limited, and consistent with the availability of food and the economic status of the people. The food for an average person consists mostly of home-made " chappatheis " which is made of hand-pounded maize flour. The essential components in a balanced diet are lacking : most of the people are vegetarians; fresh fruit is almost unknown in their menu; fresh vegetables are rarely eaten and during the winter months they are unobtainable. Eggs are not part of the daily food, fat is a rarity. In some of the hill places even the milk that is available is not used. Although potatoes are grown abundantly in the Pradesh

they are used surprisingly little by the average family but rather are raised to be sold. Malnutrition and undernutrition influence the general health of the people, and undoubtedly play a part in lowering their earning-power.

The source of water differs with the locality. There are areas showing a high incidence of vesical calculus which is thought to be related to the water-supply.

Endemic goitre is prevalent in the four districts, particularly in Mandi. The large incidence of goitre in the area may be attributed to iodine deficiency in the salt obtained locally.

It is not uncommon to find areas in which malaria is so rampant that depopulation has occurred because the people are afraid to stay; Ghini valley in Sirmur district is a typical example.

Social Customs

Lack of education with consequent ignorance about simple health matters (including venereal diseases) and inadequate medical care are major factors in maintaining the reservoir of venereal infection. The hillman of the Pradesh has very little tendency to hide the infection of syphilis, but resorts to easily available quack remedies. If he attends a hospital at all for treatment, it is usually in the later stages of disease when complications and extensive damage have occurred.

Local marriage customs play an important part in the spread of these diseases. It must be kept in mind, however, that these customs are peculiar to the region and that very different customs are found in other parts of India. Polygamy is practised by a certain group of the population, as shown by the following figures :

Number of partners	*Male*	*Female*
1	286	365
2	36	1
3 or more	4	2

In many cases the advantage of having a polygamous family are great, in that each wife contributes to the operation of the household and farm. By far the larger proportion of men and women, however, have but one partner, and polyandry is infrequent within this group.

In whatever way venereal infections might have been introduced among the population of the hill tracts, there is no doubt that the circumstances for spread were favourable. Lack of facilities for modern treatment and of organized modern public-health control measures, extreme poverty, ignorance about diseases and their consequences, traditional beliefs about treatment, and the flourishing practice of quackery have all tended to increase the transmission of venereal disease in Himachal Pradesh.

GENERAL ORGANIZATION OF WORK

The headquarters for the WHO team having been established at Simla, the matching team was assembled; and a special laboratory and an out-patient clinic were set up. Programmes of routine testing and treatment were instituted in the hospitals for males and females and in the municipal prenatal clinics, and a survey programme to determine the prevalence-rate of syphilis in this and other regions was begun. A training programme for physicians, laboratory workers, and nurses (first from the immediate region, later from other parts of India and surrounding countries) was started. In the first 17 months, 29 persons had completed training, and control activities in at least seven hospitals and clinics in Himachal Pradesh and elsewhere in India had been initiated by some of the trainees.

Laboratory Facilities

The laboratory already operating in Simla had to serve not only Simla, but also the province of Himachal Pradesh, for the serodiagnosis of syphilis as well as other clinico-pathological work. Not more than forty samples of blood per month had previously come through the laboratory for syphilis-tests.

Aware of the paucity of equipment, technicians, and funds for supplies, the members of the WHO team set up the simplest testing procedures possible, compatible with a reasonable degree of accuracy. After some experimentation, the team selected two slide-tests which provided accurate, rapid, and inexpensive serological testing without requiring a high degree of technical skill as compared with a more complex procedure, such as the Wassermann test. A training programme for technicians was instituted when laboratory procedures had been decided upon.

Development of Mass Treatment Demonstration

As soon as the laboratory could handle large quantities of blood-samples, a serological survey was begun, to obtain some information about the prevalence of syphilis in the province and for the selection of the place where mass treatment should be started. It was felt that the chosen area should have a highly-infected population, which should be compact enough to facilitate the organization of treatment and follow-up surveys; isolated as much as possible so that there would be little opportunity for the introduction of the disease into the community from outside; and stable, in the sense that it would remain in the area without a significant loss from migration to other parts of the country. We sought

an area which could be observed during succeeding years, to provide an opportunity for long-term studies of the results of the team's activities. Subsequent experience has, however, dampened hopes of a satisfactory long-term follow-up.

One tentative site of operations, Ghini valley, had been chosen before the arrival of the group, and from the activities in the Ripon clinic it was found that several other areas contributed a relatively large number of clinic patients. Contrary to expectations, it was found that in several areas where rates approaching 100% had been predicted, the actual rate was nearer 30—40%. However, activities in the Theog hospital had shown a rate of infection consistently near 40%, and the medical officer of the hospital pointed out that several tehsils (administrative divisions) of his district had contributed an unduly large number of patients to his clinic. Preliminary survey of two villages showed rates of seropositivity in over 50% of the adults. We decided to concentrate attention on the Ghund area (in which one of the two villages was located) and to carry out the programme of mass treatment there, as the district was found suitable according to the criteria for selection mentioned above.

FIRST GHUND SURVEY AND MASS TREATMENT

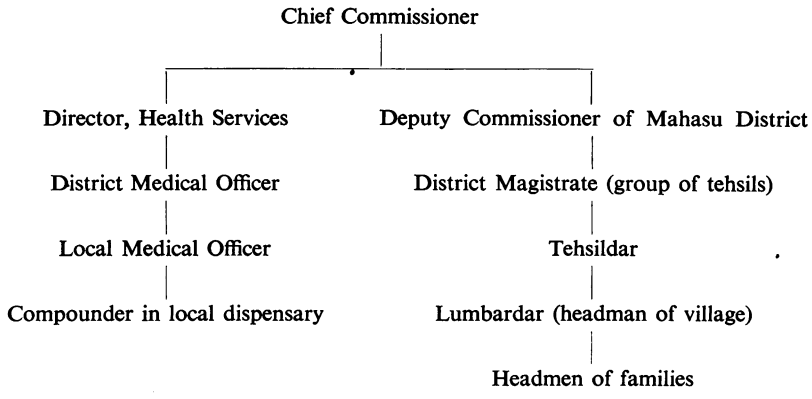
Plans and Propaganda

Ghund is an area of approximately 13 square miles (about 34 km^2) covering the crest and sides of a high ridge which separates the valley of the Giri from that of one of its tributaries (see fig. 3). It is bounded on the south and east by the district of Balsan, on the west by Theog and on the north by Theog and Kumarsain. The river Giri forms a part of the northern boundary. The elevation of Ghund is between 4,100 feet (1,250 m) and 8,615 feet (2,625 m) above sea level.

Practically the whole population is dependent upon agriculture. However, only one-tenth of the area is cultivated. Almost every zamindar (landowner) cultivates his own land, which means that there are very few tenants.

As shown in fig. 2, access to the Ghund area is from Simla through Theog. There is a road suitable for vehicles as far as Theog, 18 miles from Simla. From Theog the area may be reached by a difficult path which can be negotiated only on foot or horseback (fig. 4).

Following the decision to undertake work in the Ghund area, we decided to organize a programme of propaganda and public information so as to secure the co-operation of the people. At this point, a discussion of the district organization is germane; the following chart of administrative authority summarizes the lines which were used.



When plans had been passed by the offices of the chief commissioner, the Director of Health Services, the deputy commissioner, and the district medical officer, the local authorities were approached and asked to serve as key personnel in the programme of publicity. It was felt that the team members themselves could carry the educational programme no further than to the district magistrate and the local medical officer, for the mountain people look upon anyone from another part of the country, even from only a short distance, as a foreigner and regard him with no small degree of suspicion and mistrust. This feeling is fostered by the fact that they speak a dialect peculiar to the area—an individual must have mastered the language in order to establish a feeling of rapport.

The local medical officer, while stationed in the area for about 15 years, had by devoted service won the confidence of these people so that he had influence with them. The district magistrate, likewise a native of the area, was trusted and held in high esteem. Since the local physician had been working closely with the team for about six months before the programme, he was completely conversant with the methods to be used and with the treatment proposed. He and the team members outlined the plan in detail and explained all phases of the work to the district magistrate.

The enthusiasm of the district magistrate and his realization of the benefits which would be brought to the area under his jurisdiction were important factors in his success in telling the people about the objectives of the programme. He and the physician called several meetings of the tehsildars and lumbardars to explain the plan thoroughly. These men are, in effect, the elder statesmen and responsible citizens in the villages. In turn, the tehsildars and lumbardars called meetings of the headmen of all families in the districts or villages under their jurisdiction. In this way it was possible to reach, in a more or less indirect manner, all the inhabitants, to acquaint them with what was to be done, and to inform them of their responsibilities.

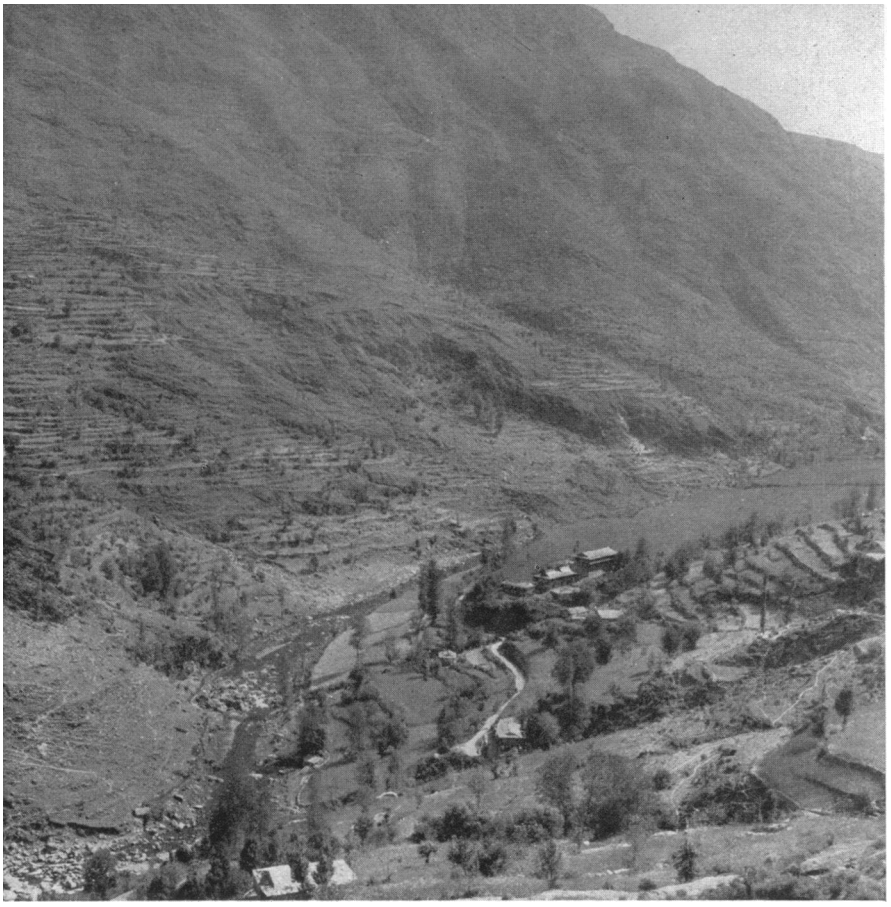


Fig. 3. Terrain in the Ghund, showing Bagain Station

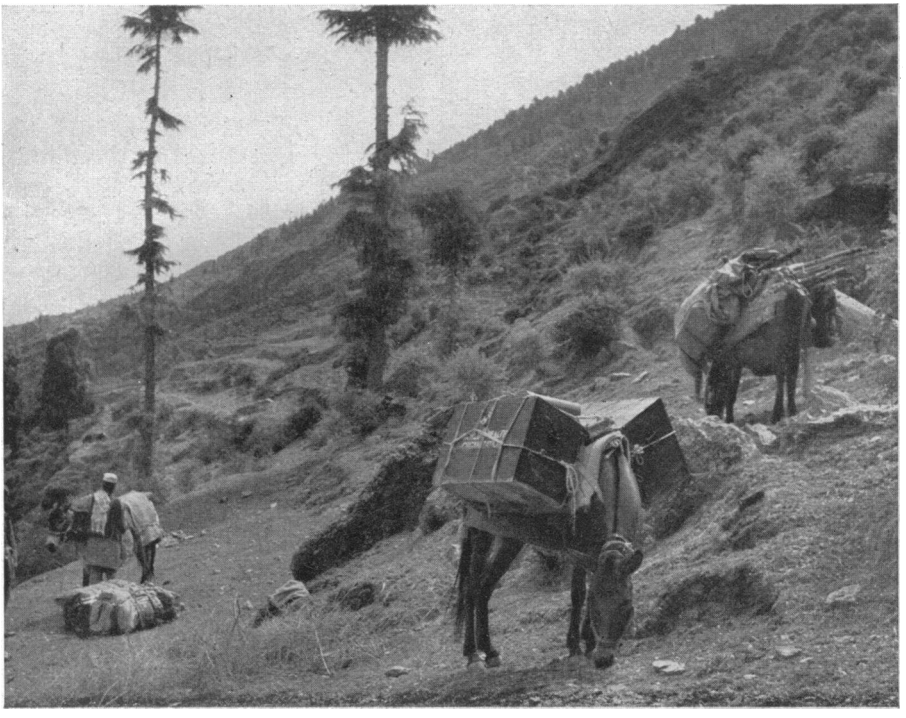


Fig. 4. Equipment of the team en route for the Ghund

quarters at Bagaln Station, Ghana. Construction i
typical of the dwellings in the region.

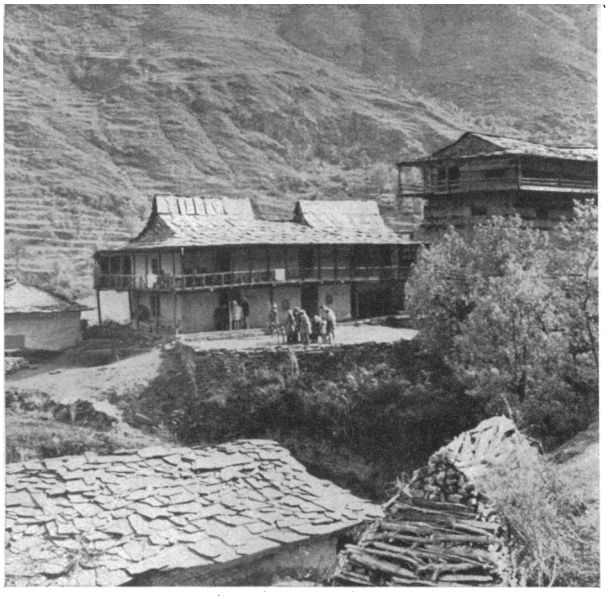


Fig. 6. Balcony of schoolhouse, used as kitchen and dining-room for field workers. A meal is being prepared over a primus stove.

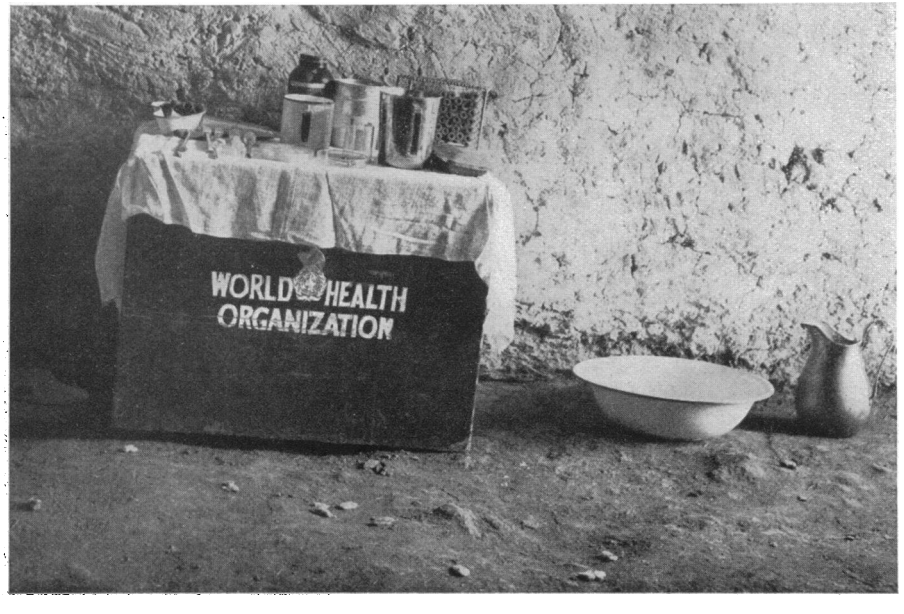
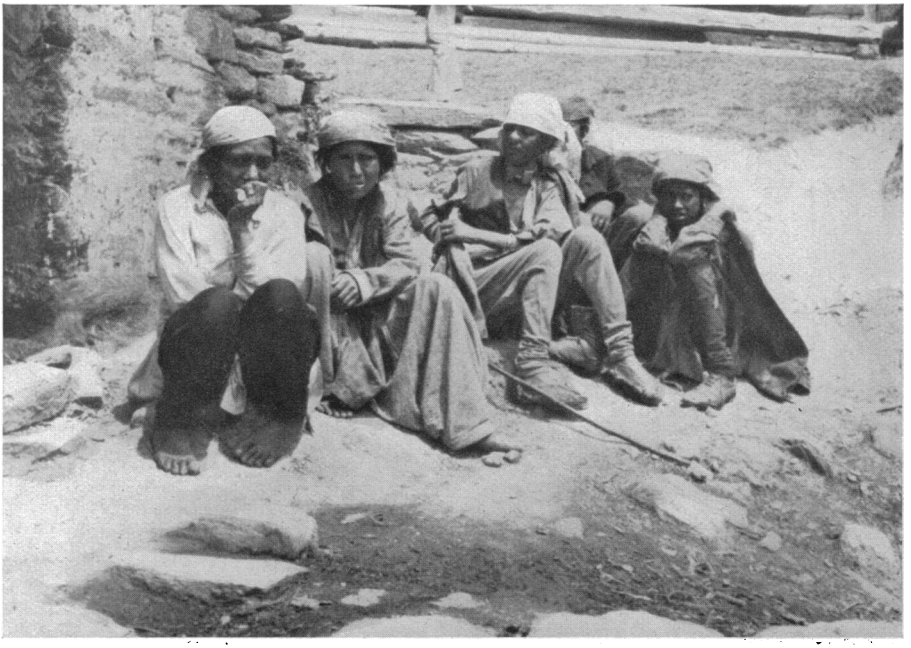


Fig. 7. Work-table
dirt floor of sta
used as examinati
and treatment-room

Fig. 8. Schoolchildren waiting to be examined



ig. 9. Typical hill-
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for treatment

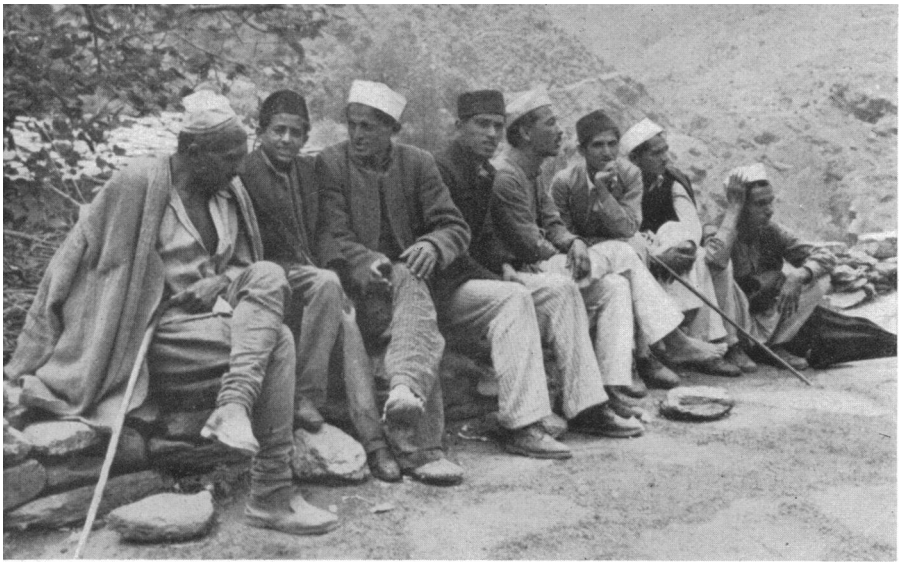


Fig. 10. Typical hill-me
of the Ghund

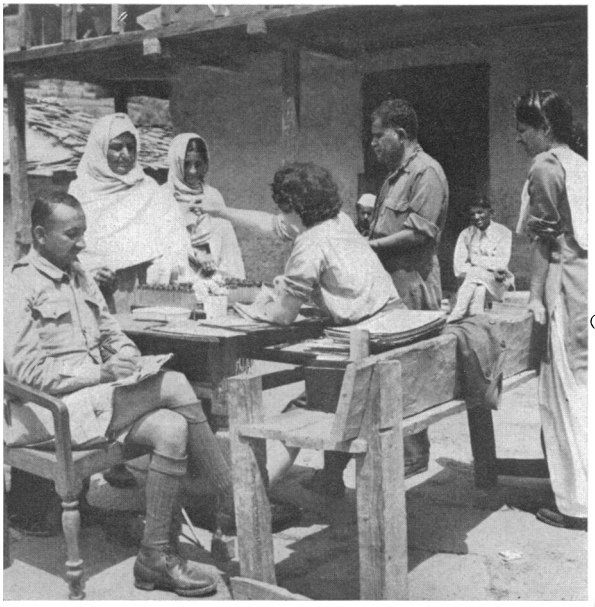
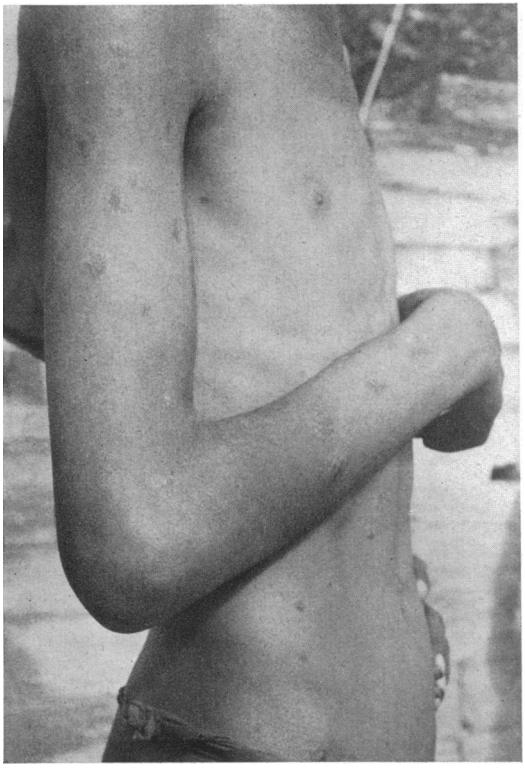


Fig. 11. Bagain Station, Ghund. The petition-writer is seated at the end of the table, checking the two women from his list and acting as interpreter. A trainee-physician and a team-nurse are observing.

Fig. 12. Records of patients



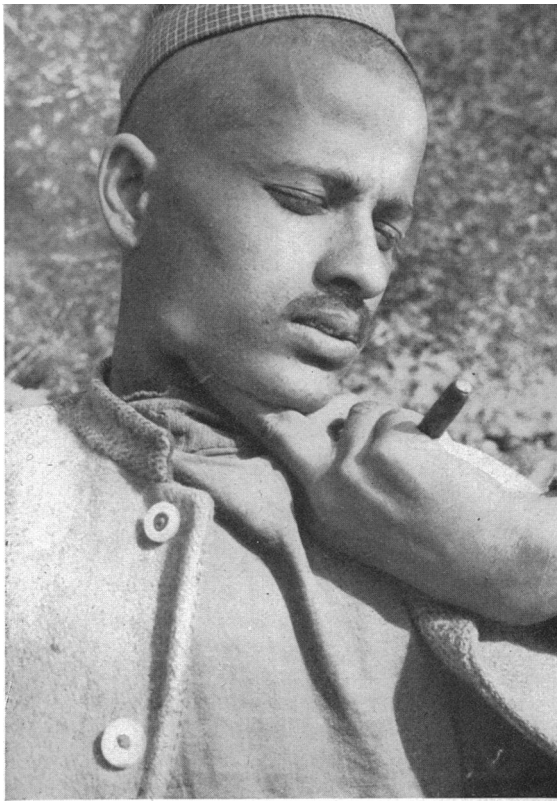


Fig. 14. Secondary eruption of syphilis on youth

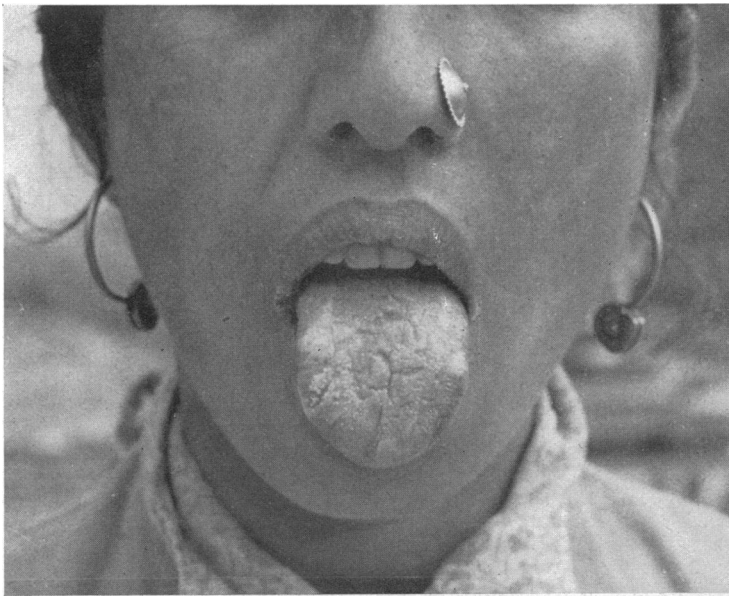


Fig. 15. Mucous patches and fissure at corner of mouth in young woman with secondary syphilis

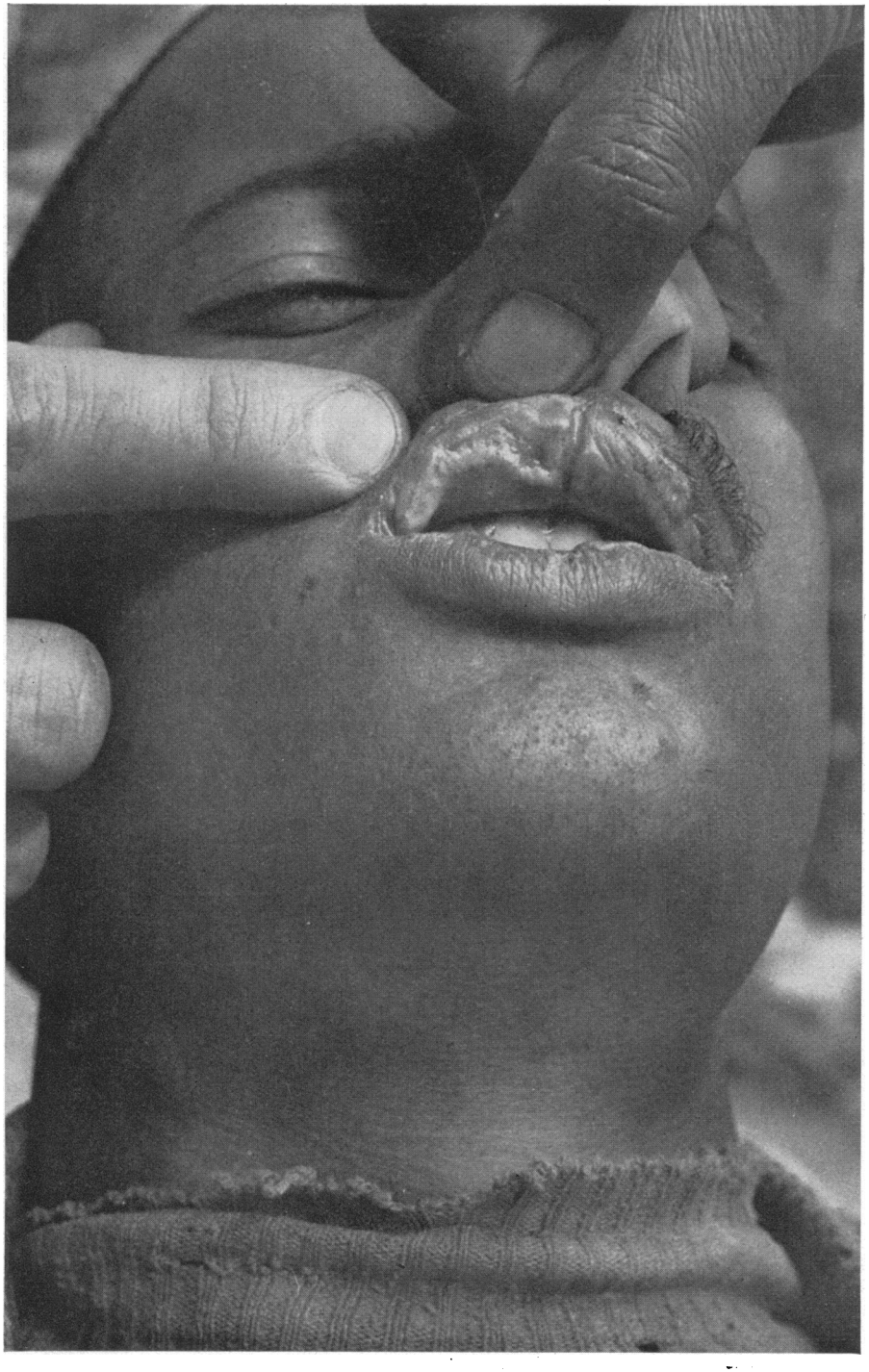
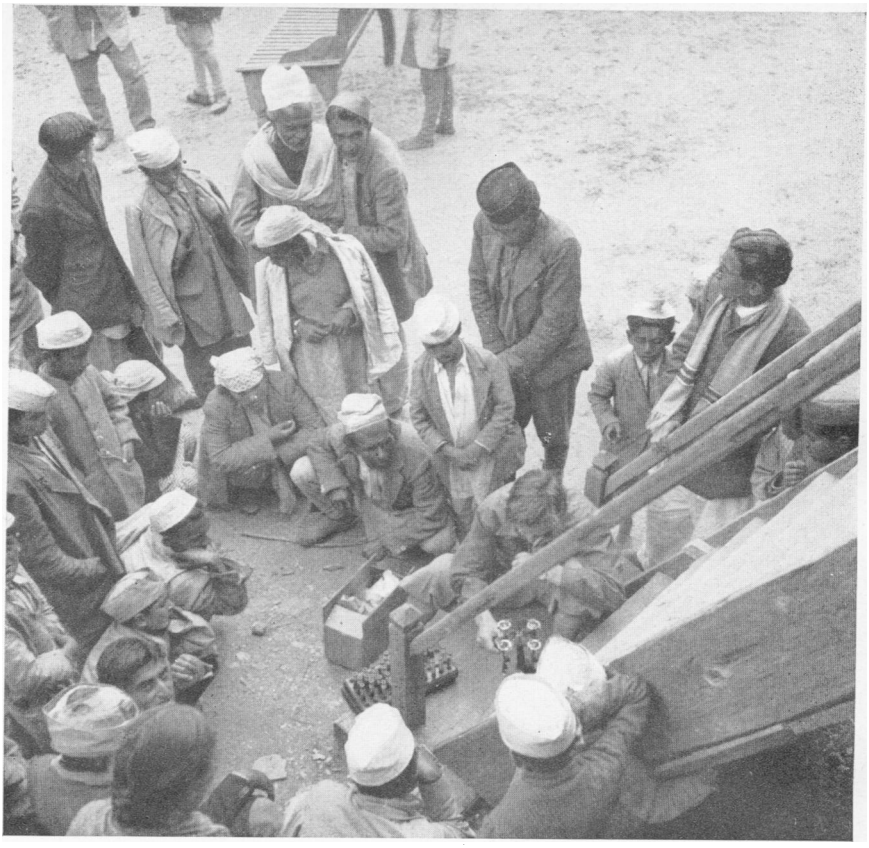


Fig. 16. Mucous patches in young man with secondary syphilis

Centrifuging blood-samples in the field, Bagain Station



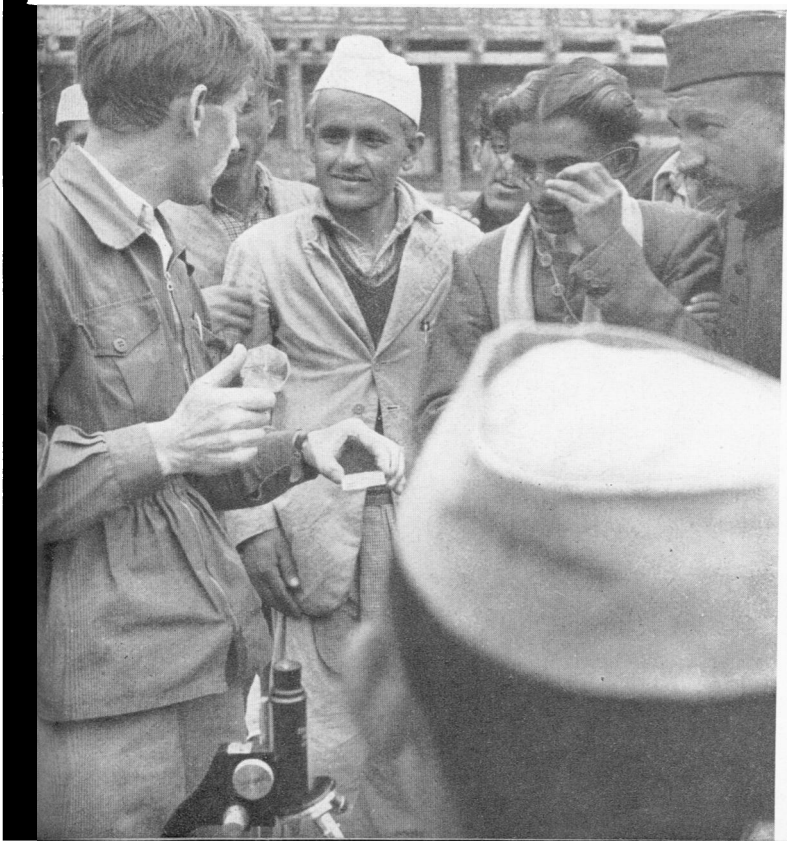


Fig. 18. Team-serologist showing precipitate of a positive serological test for syphilis to one of the men bled earlier in the day. First re-survey in the Ghund

Fig. 19. Scars of healed gumma on an old man, six months after treatment with a single injection of procaine penicillin G in oil with 2% aluminium monostearate

Fig. 20. Scars of healed gumma on an old man, six months after treatment with a single injection of procaine penicillin G in oil with 2% aluminium monostearate

The gist of the information which we attempted to place in circulation was as follows :

The area had an exceedingly high rate of syphilis. In the past it had been difficult to treat the disease, for it was necessary to give many costly injections of arsenic and bismuth, but now a new drug was available with which it was possible to cure the majority of patients by a single injection. By such treatment the physician could prevent the birth of syphilitic children who might die early in life or who might have serious complications (such as interstitial keratitis) later. Treatment could prevent heart disease, damage to the nervous system, and skin manifestations of syphilis which were described by the doctors. In order to tell if a person had syphilis, it would be necessary to draw blood from each one, but the taking of blood would not harm anyone in any way.

An attempt was made to show the people that, since it could not be certain that every person would be cured by the single injection, it would be necessary for a doctor to visit the Ghund area from time to time in the future so as to find out if any one still had syphilis. Everyone's blood would have to be tested again from four to six months after treatment, and then at longer intervals. They were also told how syphilis and gonorrhoea are contracted.

We felt that the district physician and the magistrate were capable of giving this instruction much more effectively than any of the team members. From the initial response of the population of the area we realized that the inhabitants had a fair idea of what was being done, and why. Once the people had had a chance to observe the WHO group in action for a short time, the response was enthusiastic.

Operation of Programme

The living arrangements and working space were very primitive, to say the least. In Bagain (the lower station), the two small schoolrooms were used for examination rooms (fig. 5, 6, 7), while at Durbar Ghund (the upper station), the only examination-rooms available were two stables underneath the dispensary. Light for examination was provided by incandescent kerosene lanterns, and furniture was so scanty that the chests for equipment and the horses' feed-bins had to be used for tables.

As can be understood, the patients had to be examined under the most rudimentary conditions, so that attention was paid chiefly to the history of venereal disease, and examination was the minimum compatible with securing relevant information. Treatment for whatever other remediable conditions were discovered (e.g., scabies) was given as indicated.

Shortage of space made it necessary to register patients in the courtyard in front of the examination-rooms. At a table there, the WHO team nurse, together with another member of the team, prepared a card for each patient,

giving his village, birthplace, names of father, mother, wife, children, and headman of the family-group. An attempt was made to get all information needed to place each individual within a family-group. At the same time questions were asked regarding the number of living and dead children of each person. Working with the two WHO members were the school headmaster, the State petition-writer, one or two officials of the area, and several schoolteachers. The petition-writer had a list showing the composition, with names, of each family in the area. The group mentioned above was concerned with the registration of each patient. As each person came to the table for registration he was checked from the list. Those not appearing were sent for by the official, the naib-tehsildar, who was working with the group. It was possible to call for the first examination almost every person living in and present in the area. No effort was made, however, to call the very old, the very young, and those who were sick at home. Whenever feasible, one member of the party visited the home of anyone who was sick to give whatever treatment was necessary and possible. The propaganda value of this measure is self-evident and it helped to establish goodwill for the group with the population.

At the registration-desk each patient was given a vacutainer tube for his blood-specimen with the same number as that on his card; he then entered the examination-room. In one room a woman doctor and a nurse saw all females; in the other, one or more male physicians saw the men. The children were seen by any one of the physicians (see fig. 8). Blood was taken from each patient, he was examined, and, finally, was given 300,000 units of procaine penicillin G in oil with 2% aluminium monostearate (150,000 units for a child), a tablet of ferrous sulfate, and whatever other medication was necessary. The examination was pointed at getting as much information as possible in the shortest time about the venereal-disease status of the patient.

Physical Examination

At examination, it was possible to strip most males to the waist so that the skin of the upper part of the body was seen, but the women could not be so examined. As a matter of routine, their arms might be bared, and the shirt might be lifted to view part of the chest and back, and the breasts, but it was not possible to perform a complete examination of the skin. The patients were very reluctant to remove all clothing, for it is decidedly contrary to their customs. The men received an examination of the genitalia, special attention being given to looking for inguinal scars and any genital lesions. This, too, was done with difficulty, as there is aversion to showing the genitalia to another man, even to a doctor and in privacy.

The people do not allow free display of the body except in very young children. In the case of females, the perineum was examined, and the lower

part of the labia and the vaginal introitus visualized, from behind, without the patient's knowledge, while the clothing was displaced for the injection to be made. In addition to the fact that the examination facilities did not permit rapid and easy exposure of the genitalia for a routine examination, the women are, for the most part, rather reluctant to permit examination even by another woman. The mouth was examined, the lymph-nodes were palpated, the pupillary reflexes checked, and auscultation of the heart performed.

It will be appreciated that a careful, complete, and leisurely physical and neurological examination of the patient was impossible. We felt that attention should be paid to finding the salient physical features compatible with the method of examination used. The difficulty was enhanced by the lack of proper light and of proper examination rooms and tables, and by the fact that on some days as many as 250 patients were seen by two physicians. These conditions, however, are those under which the doctor in India must usually work and were actually better in respect of clerical and nursing help, equipment, and lighting facilities than those often enjoyed by the physician practising in the rural districts. According to the Bhore report,[10] the average length of time for the physician per patient is less than one minute in rural clinic practice.

Work of the Team in Durbar Ghund

On 18 November 1949, the team moved to Durbar Ghund, the former capital of the old Ghund State and the site of the residence of the Takar (chief or petty Raja)—the former ruler of the area. On the first day, in spite of all preparation, relatively few patients came. They consisted chiefly of the families of the leading men of the district. Fortunately, several men with active lesions of syphilis appeared for treatment and by the next day, these patients experienced some relief of symptoms and began to see the results of therapy. At that time, too, word was brought that a small child of one family was seriously ill. A visit was made to her home where she was found to be critically ill with lobar pneumonia. She was given an injection of penicillin and responded to it quickly, so that she was much improved by the following morning. By that time word had gone round that the WHO group was there to help rather than to do any harm. From then on there was a rapid increase in the number of patients seen daily, as shown by the attendance chart (table I). It was the opinion of the group that by the time the work had finished a very friendly feeling towards them had been created.

Two subsequent monthly visits were made to check with the compounder on the results of treatment and to try to keep the inhabitants reminded of the continuing interest in them and their health. It was, however, impossible to visit them in February and March, as the snow did not permit passage from Theog.

TABLE I. ATTENDANCE, ACCORDING TO AGE AND SEX, IN DURBAR GHUND AND BAGAIN

Date of examination (1949)	Place	Number of patients examined								
		age (years)						total		
		15 and under			16 and over					
		male	female	total	male	female	total	male	female	total
19[a] November	Durbar Ghund	12	11	23	50	46	96	62	57	119
20 ,,		11	16	27	56	54	110	67	70	137
21[b] ,,		53	45	98	50	53	103	103	98	201
22 ,,		30	23	53	56	48	104	86	71	157
23 ,,		13	10	23	44	49	93	57	59	116
24 ,,		4	3	7	19	23	42	23	26	49
25 ,,		1	1	2	7	5	12	8	6	14
26 ,,	Bagain	40	21	61	60	61	121	100	82	182
27[c] ,,		37	33	70	92	92	184	129	125	254
28 ,,		8	20	28	52	52	104	60	72	132
29 ,,		3	5	8	32	23	55	35	28	63
30 ,,		7	4	11	41	31	72	48	35	83
1 December		—	—	—	18	6	24	18	6	24
2 ,,		—	—	—	21	6	27	21	6	27
Total		219	192	411	598	549	1,147	817	741	1,558

[a] Ages of three females not given

[b] Age of one male not given

[c] Age of one male not given

The patients

The medical history given by these patients is highly unreliable. There appeared to be no reluctance to admit having had a disease, for the inhabitants seem very willing to discuss their infirmities with each other, and make no attempts to cover up the fact that they are ill when the evidence is discovered during physical examination. The presence of genital disease is considered as almost a natural accompaniment of growing-up. Very little attention is given to the occurrence of any non-incapacitating condition. Because they have observed that most genital ulcers will heal spontaneously, many prefer to wait rather than to seek medical care. Many patients who had lesions which had persisted for a long time were asked why they had not come for treatment sooner, especially since the compounder stationed in the district can provide some treatment and since there is a monthly visit of the district medical officer. The answers were usually evasive : they had not had time to visit the dispensary; they had been out of the State working; or they had been awaiting an opportune time. Although many had not seen the compounder, his records revealed a fairly steady clinic attendance of patients with venereal disease. The fact that the compounder comes from the district, speaks the language of the people, and is apparently accepted by them probably favours the attendance of a good proportion of the population in time of illness.

The compounder is a fairly well-educated man who had been trained as an apprentice for six months in the hospital of Theog by the doctor in charge. He has a dispensary with antimalarial drugs, anodyne, carminative, laxatives, and a small supply of medicines for local application. He was trained in the administration of arsenicals, bismuth, and penicillin; that is, he is able to give intramuscular and intravenous injections. As these drugs are not issued free of charge, they are given when the patient buys the medicament. The compounder has no diagnostic facilities, but he records the complaints of the patients, such as penile or other ulcers, gonorrhoea, abrasions, fever, constipation, dyspepsia, etc., and gives medicines as he was taught by his preceptor. It is our opinion that the care given in the dispensary is a good type of first-aid which provides symptomatic relief and some specific therapy. While the records of the clinic are not reliable for diagnosis, they give a fair indication of the types of systemic complaints and allow a rough estimate of the categories of disease seen. Of importance to this study are the records, given below, of patients with genital ulcers seen for the first time during the eight months following the opening of the dispensary on 13 March 1949, and before the arrival of the demonstration team.

Period	*Number of patients with genital ulcers seen for first time*
13-31 March	2
April	11
May	8
June	16
July	7
August	8
September	10
October	2
1-15 November	2

Between 8 and 16 patients per day attended the clinic in the cold weather and between 16 and 25 per day in the warm weather; travel in the district is very difficult in cold, snowy weather when paths are not open and when clothes are not warm enough to permit being out-of-doors for long.

Great difficulties were encountered by the team in the rural areas. For example, there is a prejudice against permitting blood to be drawn, the strength of which cannot be understood by anyone who has not worked against it. The attitudes encountered in the Ghund area are representative of those met with elsewhere by the team. There is a belief that it takes 100 drops of food to make 1 drop of blood, so that when the patient sees a tube of 8 ml of blood he thinks that he has lost a very large amount. He frequently complains of weakness, fever, joint pains, arm pains, and many other conditions persisting for weeks or months afterwards—indeed, almost any physical change occurring after the bleeding is associated with that event.

It was thought that drawing blood of the team members or other officials in front of the group as a preliminary demonstration might provide a good example, but the comment was " they have all they need to eat, so they can afford to give blood ".

Treatment schedules

The routine treatment used by the demonstration team for early and latent syphilis consisted of a single injection of 300,000 units of procaine penicillin G in oil with 2% aluminum monostearate. The dosage used was low, but it must be remembered that programmes for other countries with particular problems, such as scarcity of penicillin, must be designed to meet the immediate needs. It is important for the public-health worker to consider how to get the greatest benefit for his district out of a pitifully small stock of drugs and supplies.[j] For instance, if a health department has funds for 1,000 ml of penicillin for syphilotherapy, a single-injection

j Conditions in India in 1948, at the time of starting the work in Himachal Pradesh, differed considerably from those existing at the end of 1951, especially as regards the availability of penicillin and other antibiotics. The import of antibiotics has been increased, the Indian Government's plans for the manufacture of penicillin have been completed, and the local bottling of penicillin imported in bulk from other countries has been initiated as the first step towards local manufacture of antibiotics. Therefore, the treatment-schedules adopted by the team were not the same as those applied in 1951.

schedule of 1 ml per patient would " cure " about 60% of early syphilis cases brought to treatment, or about 600 individuals. A schedule using 2,400,000 units (or 8 ml) of penicillin would cure perhaps 90% of the patients, but 1,000 ml would provide initial therapy for only 125 persons.[2, 12, 28]

It is evident then that, under such conditions, factors other than cure-rates must enter into the consideration of the public-health measures to be adopted. The private physician is not necessarily so limited in his management of patients financially able to pay for treatment, since his responsibility and services may be more narrowly confined to the circle of his clientele. Nevertheless, the use of any penicillin-schedule in underdeveloped areas, such as are found in India, must be based on the availability of the drug. Penicillin is not yet made commercially in these countries, and must therefore be imported and paid for from the " hard currency " reserves of the governments. Thus, the choice of therapeutic schedules in public-health work must be based upon what is practical for the country and not upon what is considered ideal in the USA.

It was decided that the treatment used should be the simplest and least expensive. The schedule selected was based on the experience of Wright, Nicholson & Arnold.[28] Their experience has shown that a single injection of 300,000 units of procaine penicillin G in oil with 2% aluminum monostearate gave a detectable concentration of penicillin in 97% of 374 patients at 72 hours (average level .0420 units per ml of serum) and that 76% of the patients gave a detectable level at 120 hours. Results of treatment of 123 patients with the single injection of 300,000 units revealed a cumulative re-treatment rate of 19% in early syphilis.

We felt that this schedule should prove satisfactory in providing a demonstration of mass treatment, and of reducing the infectious reservoir, which could be carried out with the limited supplies of penicillin and personnel which are normally available to the public-health worker in many parts of the world where the syphilis-rates are high.

Discussion of posology

In discussing syphilis treatment, it is often found that workers from different parts of the world disagree upon the value of a certain schedule. One factor which must be of some importance—the weight of the patients—is very often not even mentioned. During the third Ghund survey a weighing-machine was used. With all the obstacles and difficulties the team encountered, however, it was possible to record the weight of only a few cases in one village—22 men and 16 women. Their weights were : average, males—118 lb (53.5 kg), females—103.5 lb (46.9 kg); median, males—119 lb (54 kg), females—102 lb (46.3 kg).

After the third Ghund survey, the team went to another hill district (Bilaspur) and recorded the weight of almost all the adults who were

examined completely. In all, 413 men and 130 women were weighed. The average man weighed 116.4 lb (52.8 kg) and the average woman 98.5 lb (44.7 kg). Their weights are certainly very low compared with those in many other communities, and it may be reasonable to consider this factor in relation to treatment.

For the evaluation of a drug in animal experiments, the therapeutic dose is usually given in exact weight, or in some arbitrary units, per kilogram of body-weight. The amount of drug needed for a cure may vary with the stage of the disease or with the degree of infection, but the variation is, again, per kilogram of body-weight. That this applies to penicillin treatment of syphilis in rabbits was recently pointed out by Arnold,[3, 4] and by Kolmer.[15, 16] It is to be presumed that the same principles are also valid when dealing with the disease in man, and, in a recent publication, Aufranc & Price [5] have shown that the ratio of favourable results of syphilis treatment with penicillin follows the changes in the dose per kilogram of body-weight used.

Further, it should be considered that the hill people are not only undernourished but are also accustomed to drinking very little water as it is scarce in the hills. It is not possible, therefore, to compare the speed of resorption from their tissues with that of people who eat and drink to the extent customary in the USA. The determination of the blood-level, after penicillin injections, in some members of the local population would be very valuable for planning further mass treatment, for it may be that changes in tissue-status of people with different nutritional backgrounds may influence penicillin levels. This factor deserves further study.

We felt that our method of treatment, while not affording as high a cure-rate as may be obtained by the use of aqueous penicillin in large amounts over a seven-day period,[19, 28] would still prove satisfactory for the objectives of the demonstration, i.e., it would be simple and inexpensive, and would result in a satisfactory minimum cure-rate. Large groups of individuals may be treated with the expectation of reducing the reservoir of infection rapidly and at one time. It is a fact in epidemiology that control of an infectious disease can be accomplished without the necessity of curing every individual.[21] It is assumed that syphilis is not essentially different in epidemiology from tuberculosis, about which the foregoing statement was made, so that any technique which reduces significantly the number of cases of infectious lesions in a given population may be expected to check the spread of the disease.

The method of treatment with a single injection has many advantages in a population such as is found in India, and in other countries where the bulk of the inhabitants are at a similar economic and educational level. The uneducated person who contracts syphilis will usually wait some time before seeking medical care, even if it is available to him, for he hopes that the lesion will heal spontaneously, as it usually does. When the lesion

is closed, he sees no further need for treatment. If he does come for treatment, physicians using arsenic and bismuth have found that, as soon as the lesion is closed, he considers himself cured and can see no reason for taking more injections or having blood-tests performed.

It is the experience of Dr. R. V. Rajam in one of the leading venereal-disease treatment centres in India that only about 5% of all his patients completed the minimal satisfactory course of arsenic and bismuth. The low percentage of patients completing a satisfactory course of arsenotherapy has also been noted in other countries and for much the same reason. Once the lesion is healed, the patient thinks that the doctor who wants to continue injections or testing of blood is interested only in the fee. In the case of those going to urban clinics where no fee is charged it has been found that the patient cannot understand why he should continue to come and to have blood drawn when he is only examined and talked to, but given no treatment—this, in spite of painstaking efforts to explain the nature of the disease, its late manifestations, and the need for follow-up examination to determine cure. For this reason, then, it is highly advantageous to be able to cure with a single injection even though there is a sacrifice of other benefits in terms of education, contact-tracing, etc., which are possible if the patient continues treatment.

The accusation was often made that the blood was being used for the blood-bank, for the hospital in New Delhi, or was being sent abroad. Finally, in some places the rumour was spread that the blood was being used to make a native remedy, which formerly had been made from cattle-brain. No amount of direct explanation or of educational efforts directed through the officials and sub-officials in the districts seemed to have much effect. Before the treatment programme started in November, the people were told that they had been chosen especially for treatment, so that, with regard to venereal disease, they would be made the healthiest people in all India. This advance information and other factors played a part in attracting them to the programme. When November came, in spite of their prejudices, most of the people came for bleeding and inspection. The novelty of having such a group of " foreigners ", both Indian and WHO members, working with them was also an attraction. Even so, the young were not brought because of the parents' fear of injurious effects from injection or blood-letting. When a few, obviously sick with pneumonia, congenital syphilis, or other diseases requiring bleeding and treatment were brought along, detailed explanations were required and made before the children could be touched.

Preparation and Compilation of Data

A list of the population of the area was available from the petition-writer who aided the team throughout the original operation and the

re-survey (see fig. 9, 10, 11, 12). As the patients came they were checked off, and the family relationship was determined whenever possible. Thus, family grouping with respect to the headmen and grouping with respect to marital partners and children was possible. Segregation with respect to village is more or less accurate.

TABLE II. PERCENTAGE, AMONG POPULATION OF EACH VILLAGE, * OF PATIENTS EXAMINED

Name of village	Population	Patients examined	
		number	percentage
Bagain	108	107	99.1
Basa Bagain	206	200	97.1
Bhanal	52	51	98.1
Bhui	13	11	84.6
Charain	86	74	86.0
Damiana	58	54	92.1
Dasana	76	71	93.4
Deothi **	80	107	
Gadehre	66	59	89.4
Durbar Ghund	216	204	94.4
Khahar	90	89	98.9
Madog	38	33	86.8
Paloo	160	147	91.9
Rena	29	27	93.1
Shaloa	129	116	89.9
Tikkar	129	113	87.6
Total	1,536	1,463	95.2

* Various figures for the population are quoted from official and unofficial sources. Since no census had ever been taken in this region it is felt that the petition-writers' information is probably the most nearly accurate available.

** The population roster was not complete for this village.

Table II shows a comparison between the number of persons examined in each village and the population of the village according to the records of the official petition-writer. In view of his lifelong residence in the area and of his acquaintance with each family and individual, it is probable that the list gives a reasonably accurate estimate of the population, except for the very young. For our purposes this section of the population is not of great importance, for even if it had been possible to list them it would have been impossible to test them serologically.

The population investigated was comprised of 354 families. Of these, only 80 were found in which no member had syphilis (22.6%), while 274 families (77.4%) had one or more members with syphilis.

In the area there were two groups of houses which might truly be called villages, namely Durbar Ghund and Bagain. The rest of the village-names actually designate areas in which people live, more or less scattered.

The age of each person was asked and the figure reported is that given by the individual, by the petition-writer, or by a similar person in authority such as one of the teachers or a village headman. However, the age can be taken only as an approximation. There are no birth certificates or other records by which individuals can accurately determine their ages. The family's recollection of the approximate time of birth of the younger child is apt to be correct. However, as the individual grows older his appreciation of the passage of time, and his knowledge of his birth-date, become less and less exact. It can be said that probably starting with the age of 20, or even 15, the actual age may not be within five years either side of that stated; while the margin of error increases with age. It was surprising to note the number of individuals who said their age was 70, 80, 90, 100, or even older. In many cases physical inspection revealed the patient to be obviously in error, and sometimes one of the officials would tell the patient that he was wrong. With such obvious discrepancy, an attempt was made to estimate the age by simple inspection.

With but two exceptions, it was impossible to take blood-samples from children less than five years old. The fear of the parents with regard to withdrawal of blood would not permit it. On the records these individuals are marked as " status indeterminate ". In certain cases, among older groups, particularly when serological discrepancy was found, it was also necessary to class the case as indeterminate. For the purpose of recording other data on these individuals, the practice was adopted of calling all of them syphilitic when the serological status was indeterminate. With respect to the 15 children less than five years old who are thus classified in the village-wide breakdown, the margin of error possibly introduced by 15 individuals in a total of 1,489 is not significant.

Serodiagnosis

Throughout the first and second programmes arrangements were made for serological examination of all samples of blood by a battery of two or more tests. All samples were drawn in vacutainer tubes and, every second or third day, were sent by mule or by hand to Theog where they were handed over to the driver of the team's car who took them to Simla for testing. In Simla they were tested in the laboratory under the very close supervision of the WHO serologist so as to assure uniformity and proper performance of the test. All samples were examined by the Meinicke slide-

test [17] and by the Venereal Disease Research Laboratory, Chamblee, Ga., USA (VDRL) slide-test with cardiolipin.[13] As time and personnel permitted, a sizable percentage of samples were also tested by the Kahn standard test.[13] Whenever the amount of serum available was limited, it was first examined by the Meinicke method. If more was available it was subjected to the VDRL slide-test and then to the Kahn procedures. Quantitative tests of all positive samples were performed by the Meinicke method.[17] It was originally planned to make quantitative determinations by the VDRL slide-test, as is recommended in dealing with samples found positive by the Meinicke test, because the problem of securing and preserving negative serum in laboratories in India is serious and precludes the extensive use of the quantitative Meinicke method. However, as a result of the antigen supply being delayed in the customs there was not enough VDRL antigen to do quantitative tests, so that the Meinicke procedure had to be used.

When we made the diagnosis of syphilis in the absence of clinical findings, reliance was placed on the serological tests, and a diagnosis of latent (asymptomatic) syphilis was made regardless of the absence of history of infection whenever the patient was found to show positive reactions by all procedures used; no spinal-fluid examinations were done. A very few patients were found to show discrepancy in serological testing in the November 1949 programme. In some instances, the age of the patient suggested that he might represent a late case of syphilis in which serological discrepancy is expected to occur frequently. In a few cases, clinical findings, medical history, and age suggested that the discrepancies were the result of false positivity. All such cases were classified as indeterminate, but the number is so small that it is not important with respect to the findings for the entire group.

Regarding the significance of the finding of a positive test, the following comments may be made :

In the area of operations, no such disease as yaws, which is known constantly to cause confusion in serological tests for syphilis (STS), exists. Malaria, as a causative factor in the production of false positive STS, played no part; it is prevalent in the lowlands, but by November the malaria season had already been over for several months and in April it had not yet started. No clinical evidence of malaria was noted in the group. With regard to specificity in malaria, the actual influence of the disease in causing false positive reactions would have been slight, for the VDRL slide-test with cardiolipin has been shown to have a high degree of malaria-specificity, of the same order as the Wassermann reaction.[8, 14, 22] Even in the few cases of serological discrepancy, malaria did not enter into the clinical picture. Experiences in the temperate zones of North America, in the temperate and tropical zones of Central America, and under the climatic conditions existing in India, have demonstrated the high degree of specificity of the VDRL cardiolipin procedure.[7, 8]

Clinical examination revealed no diseases except a few cases of leprosy which might have been expected to cause false positive reactions. There is therefore no reason to believe that seropositivity represents in any significant degree any disease other than syphilis. The re-examination four months later of the patients showing consistently positive serological results serves to confirm the diagnosis. If any significant degree of false positivity had been represented by the original findings, a considerable number of patients would have shown significant serological change. As noted elsewhere, the only changes found were a general decrease in strength of serological titre, according to the Meinicke method, which would be expected after successful specific treatment; and seronegativity in a few of the patients. During one year of work in Himachal Pradesh involving both clinical and laboratory activity, the team found no reason to question the performance and specificity of the procedures used in the programme. It is, therefore, a completely valid assumption that the serological findings reported indicate with a high degree of accuracy the prevalence of syphilis in the group tested.

We would have preferred to be able to perform darkfield examinations upon all lesions which might be a sign of early syphilis and to secure biopsies from those patients presenting lesions suggestive of granuloma. However, this was not done. As we had only a limited staff and there was little time available, and since the ordinary clinic- or hospital-patient was frequently reluctant to permit the second darkfield examination to be done—he complained about the pain of the first—it was considered unwise to attempt the darkfield. It was necessary to base the diagnosis of the lesions found upon the clinical and historical factors and upon the serological test for syphilis, so that a certain error has been introduced into the reporting. However, the findings given here are those based upon the original diagnosis. At the time of the re-survey certain changes in diagnosis were made, but they will be shown separately. The few cases in which the diagnosis was changed would not, however, materially alter the results obtained in November.

The serological study in these three surveys has been complicated by a marked variation in sensitivity of the different batches of antigen used. This makes it rather difficult to compare results from survey to survey. In the first Ghund survey remarkable agreement was found between the tests used, especially between the Meinicke and the VDRL. The results then obtained were the more interesting when considering that nearly half the sera tested were from syphilitic persons. It has already been mentioned that practically no-one had had treatment for syphilis, and also that there were very few patients with diseases which tend to give rise to false positive reactions. In this first survey there were practically no differences between the Meinicke and VDRL methods, either in sensitivity or in specificity. There was disagreement on only 12 sera out of 1,431

tested with these two reactions. None of these 12 sera were from active cases of syphilis—9 were from latent cases and 3 from cases without evidence of syphilis. One of the tests, either Meinicke or VDRL, would have served all practical purposes, and serological work carried out could have been very much reduced (to approximately one-quarter by using the Meinicke test alone). The Kahn test performed on a smaller number of sera in the first survey, paralleled with Meinicke and VDRL tests, was found to be slightly less sensitive. The Kahn test is definitely much more elaborate to perform and more difficult to read than either the Meinicke or the VDRL, and is, therefore, probably not the test to choose in mass surveys of underdeveloped areas.

Relative Prevalence of Various Venereal Diseases

As will be noted in table III, few diseases other than syphilis were diagnosed in November 1949.

TABLE III. DISTRIBUTION OF TYPES OF VENEREAL DISEASE DIAGNOSED ON BASIS OF CLINICAL AND SEROLOGICAL FINDINGS (ALL AGES)

Type of venereal disease	Number of individuals examined					
	male 764		female 725		total 1,489	
	cases found		cases found		cases found	
	number	%	number	%	number	%
Syphilis :						
Primary	15	4.6	1	0.6	16	2.8
Secondary	19	6.0	28	11.0	47	8.5
Latent (asymptomatic, sero-positive)	253	80.0	202	79.0	455	79.6
Congenital	5	1.6	4	1.6	9	1.6
Tertiary	13	4.1	9	3.5	22	3.8
Indeterminate status . . .	12	3.7	11	4.3	23	3.9
Total . .	317	41.5	255	22.4	572	38.4
Other :						
Gonorrhoea	1				1	
Lymphogranuloma venereum	1		1		2	
Granuloma inguinale . . .	7		7		14	
Total . .	9		8		17	

The diagnosis of primary syphilis was made when we found genital ulcerations in patients with a positive serological test for syphilis and in the absence of history of persistence of the lesion over a long period of time.

If the patient had a lesion of six months' or longer duration which was rather limited in extent, and was not accompanied by other evidence of syphilis—such as adenopathy or secondary manifestations—or if the serological test for syphilis was negative, the lesion was described as granuloma inguinale. The diagnosis of the other manifestations of syphilis was based upon the combined clinical and serological picture (see fig. 13, 14, 15, 16). The one patient diagnosed as having lymphogranuloma venereum gave a negative serological test for syphilis, and had multiple draining sinuses, and a history suggestive of the diagnosis. He might have represented a case of granuloma inguinale with multiple draining sinuses, but clinical examination indicated otherwise.

We had only one case, a male patient, in whom the clinical appearances suggested gonorrhoea. Unfortunately, the slides were lost during transport to the laboratory, and the patient failed to return after penicillin therapy, so that the only comment to be made is that this patient was the only one to show an acute purulent urethritis which, to the clinician, appeared gonorrhoeal.

It is also of interest, in spite of the general unreliability of the history of venereal disease in this region, as well as in other parts of the world, to give the findings with respect to the history of the disease, and to scarring suggestive of previous infection, encountered during the first survey.

History	*Number of cases*	
	male	*female*
Inguinal adenitis	94	71
Genital ulceration, patient not described as syphilitic at time of examination	44	42
Genital ulceration, patient described as syphilitic at time of examination	115	106
Urethral discharge	122	not recorded
Two or more venereal diseases	95	32
Scars or active lesions	150	51
Scars or active lesions; no history of present or past ulcer or inguinal adenitis	26	7

It is worth noting that 33 individuals with active lesions or scars either denied ever having had a disease which left the scar or, if with an active lesion, refused to admit that they had previously noted it.

Syphilis

An analysis of syphilis in marriage is given below :

	Male	*Female*
Syphilis (all stages) in both partners	127	132*
Syphilis (early) in one partner with no evidence in other	10	4
Syphilis (latent) in one partner with no evidence in other	82	40
Syphilis in parent, but no evidence in any children under 16 years	70	44
Syphilis in parent, found in children under 16 years	6	6

* The discrepancy represents syphilis in plural wives of one husband.

The figures relating to early syphilis in which only one partner was found to have the disease are worthy of comment. In some cases, the medical history was such as to suggest that the apparently uninfected partner might well have had syphilis in the incubation phase. However, in others the length of duration of the disease gave grounds for expecting

TABLE IV. RELATION, WITHIN EACH AGE-GROUP, BETWEEN NUMBER OF SYPHILITIC PATIENTS AND NUMBER OF PATIENTS EXAMINED

Age-group (years)	Total number of patients examined	Seropositive patients with syphilis (all stages)	
		number	percentage
0- 5	49	1	2.0
6-11	221	11	5.0
12-15	127	14	11.0
16-20	144	44	30.6
21-25	152	72	47.6
26-30	153	91	59.5
31-35	157	93	59.2
36-40	160	84	52.5
41-45	95	38	40.0
46-50	126	69	54.8
51 onwards	105	55	52.4
Total . . .	1,489	572	38.4
Total aged 16 and over	1,092	546	50.0

TABLE V. RELATION, WITHIN EACH AGE-GROUP, BETWEEN NUMBER OF MALE SYPHILITIC PATIENTS AND NUMBER OF MALE PATIENTS EXAMINED

Age-group (years)	Number of male patients examined	Male seropositive patients with syphilis (all stages)	
		number	percentage
0- 5	22	0	0
6-11	113	6	5.3
12-15	64	5	7.8
16-20	65	14	21.5
21-25	67	26	38.8
26-30	72	43	59.7
31-35	81	53	65.4
36-40	90	56	62.2
41-45	44	22	50.0
46-50	74	49	66.2
51 onwards	72	43	59.7
Total . . .	764	317	41.5
Total aged 16 and over	565	306	54.2

that both partners would have the infection. If the history for these individuals is to be believed, it is felt that lack of infection in one might be explained by the findings of Alexander & Schoch [1] which indicated that 41.5% of individuals exposed to early syphilis escaped infection.

Only 12 out of 126 children under 16 years who had one syphilitic parent were found to be syphilitic themselves. However, lack of knowledge of birth-order and of birth-relationship to dead siblings precludes any attempt to analyse this finding.

It is observed that there is no wide discrepancy between the prevalence of syphilis in the male and that in the female sections of the population. This suggests that, in any programme of sampling in areas such as the Ghund, not too great an error is involved in determining prevalence-rates, even if it is not possible to get equal distribution of male and female patients. This fact was pointed out by Leiby [18] when he compared the rates shown by testing men drafted for army service with the rates shown by routine testing of pregnant women from the same population-group.

Table IV, showing the relationship between syphilitic and total population with respect to age, suggests that most of the cases seen in the group below the age of 12 years may represent congenital syphilis, and that the

rapid increase in rate observed in the group aged 12 or older may represent acquired syphilis. This would be in keeping with statements made by physicians of the area that the sexual life of a girl in the Ghund area begins at about the age of 12. It was said that a boy's sexual life began at about the age of 15, but in our opinion it is quite probable that the boy and girl start sexual activity at about the same age.

TABLE VI. RELATION, WITHIN EACH AGE-GROUP, BETWEEN NUMBER OF FEMALE SYPHILITIC PATIENTS AND NUMBER OF FEMALE PATIENTS EXAMINED

Age-group (years)	Number of female patients examined	Female seropositive patients with syphilis (all stages)	
		number	percentage
0- 5	27	1	3.7
6-11	108	5	4.6
12-15	63	9	14.3
16-20	79	30	38.0
21-25	85	46	54.1
26-30	81	48	59.3
31-35	76	40	52.6
36-40	70	28	40.0
41-45	51	16	31.4
46-50	52	20	38.5
51 onwards	33	12	36.4
Total	725	255	35.2
Total aged 16 and over	527	240	45.5

Inspection of tables V, VI, and VII reveals an interesting finding. Up to the 26-30 years' age-group, syphilis tends to be more prevalent among women than men; above this age-group the tendency is reversed. The explanation of this is not apparent, but several factors may be responsible. It may be caused by the marriage of the older man to the younger woman. The older man with wider sexual experience may be expected to have had a greater risk of infection and thus may pass on the disease to the younger woman. The question also may be raised as to whether the so-called " beneficial " effects of pregnancy on the course of the disease in the female may be reflected in the difference observed.

Table IV shows a gradual increase in the finding of seroreactivity, reaching a peak of over 59% positive in the age-group 26-35 years. This

TABLE VII. RELATION, WITHIN EACH AGE-GROUP BETWEEN NUMBERS OF MALE AND FEMALE SYPHILITIC PATIENTS AND TOTAL NUMBER OF SYPHILITIC PATIENTS

Age-group (years)	Total number of patients with syphilis (all stages)	Male seropositive patients with syphilis (all stages)		Female seropositive patients with syphilis (all stages)	
		number	percentage	number	percentage
0- 5	1	0	0	1	100.0
6-11	11	6	54.5	5	45.5
12-15	14	5	35.7	9	64.3
16-20	44	14	31.8	30	68.2
21-25	72	26	36.1	46	63.9
26-30	91	43	47.3	48	52.7
31-35	93	53	57.0	40	43.0
36-40	84	56	66.7	28	33.3
41-45	38	22	57.9	16	42.1
46-50	69	49	71.0	20	29.0
51 onwards	55	43	78.2	12	21.8
Total . . .	572	317	55.4	255	44.6
Total aged 16 and over	546	306	56.0	240	44.0

may well reflect the results of a peak of sexual activity some years earlier, at which time the infection was acquired. From this high level there is noted a gradual decline in the percentage of seropositivity. The significance of this is not clear, but several hypotheses can be put forward. It is known [9, 23, 25] that untreated syphilis materially shortens the life-span, so that the lower proportion of syphilitics in the higher age-groups may represent the result of earlier death of a larger fraction of the syphilitic than of the non-syphilitic individuals of the group. On the other hand, it is known also, from the Brusgaard studies quoted by Moore,[20] that an appreciable percentage of cases of early syphilis without treatment will spontaneously progress to sero-negativity. The decrease noted may represent the action of this factor, as with increase in age the chances of a spontaneously-cured individual falling into the seronegative class will be increased.

Table VIII presents the syphilis-rate by villages throughout the Ghund area. There is no significant difference observed between villages. This was to be expected as there is no variation of educational, social, or economic level in the area. Medical care is available equally to the entire population.

Comparison of the rate of 65% seropositivity in a small group of adults, as found in the preliminary survey of Durbar Ghund, with that obtained

when almost the entire population was examined (table VIII) shows that, although there is a discrepancy, the difference does not invalidate the original survey. This fact suggested that sampling surveys such as the team made, in which the physician and officials of an area assemble as many of the inhabitants as possible, give a usable estimate of the true rate. The uniformity of environmental, social, and economic conditions of large areas of India suggests that, in a given area in which intercourse between people is unhampered, sampling of any one or two villages will provide an index of the prevalence of syphilis in that area.

There was apparently no significant difference between the numbers of living children born to the syphilitic and non-syphilitic groups, and probably none between the rates of sterility for the two groups. This is stressed because the belief is widely held in the region that syphilis is an important cause of sterility. Numerous official reports of a general nature regarding the health of the particular region perpetuate this belief. An appreciable number

TABLE VIII. RELATION BETWEEN NUMBER OF SYPHILITIC PATIENTS AND NUMBER OF PATIENTS EXAMINED, IN EACH VILLAGE

Name of village	Number of patients examined	Seropositive patients with syphilis (all stages)	
		number	percentage
Bagain	107	52	48.6
Basa Bagain	200	72	36.0
Bhanal	51	21	41.2
Bhui	11	5	45.5
Charain	74	33	44.6
Damiana	54	18	33.3
Dasana	71	19	26.8
Deothi	107	26	24.3
Gadehre	59	25	42.4
Durbar Ghund	204	86	42.2
Khahar	89	43	48.3
Madog	33	18	54.5
Paloo	147	52	35.4
Rena	27	12	44.4
Shaloa	116	44	37.9
Tikkar	113	36	31.9
Miscellaneous	26	10	38.5
Total	1,489	572	38.4

of individuals, both syphilitic and non-syphilitic, were found never to have had children. The fact that syphilis by itself is not a cause of sterility has long been known. It is felt that the frequency with which sterility is found in this region probably represents the interaction of many different factors. The gynaecological surgeons in the area report a very frequent endemic finding of inflammatory disease of the tubes. No pathological findings are available, however, as autopsies were so infrequently performed in this region.

Gonorrhoea

As will be noted from the data on page 411, a large number of men gave a history of urethral discharge which they called " gonorrhoea " (" dhat "). No effort was made to secure a history of urethral or vaginal discharge from the women, for they described any such discharge as " gonorrhoea ". A considerable number who complained of " dhat " when they reported for examination were found to have greater or lesser degrees of mucoid or mucopurulent vaginal discharge. In view of the infrequency of gonorrhoea in the male, the frequently reported vaginal discharge could not then, on epidemiological grounds, be considered to be gonorrhoeal, and probably represents chronic cervicitis resulting from injuries of childbirth and from the lack of personal hygiene.

At the second visit a case of acute gonococcic urethritis with positive smear was discovered in a boy from an adjoining State, proving that it does occur in the region. However, few acute cases in the male are found in the Ripon clinic in Simla, which draws its patients from the hill tracts surrounding Ghund. It is evident that gonorrhoea exists in the population of the area, but no explanation can be offered as to the reason for the infrequency of the finding of acute gonorrhoeal urethritis in the male.

Comparison between the rates of occurrence of gonorrhoea and syphilis as observed in Indian troops and in British troops serving in India has shown that gonorrhoea was much less frequent in Indian than in British troops, and that the gonorrhoea : early-syphilis ratios were significantly different in the two groups of troops serving in the same area.

This observation is in keeping with the experience of physicians working in Himachal Pradesh and with the experience of the WHO Venereal Disease Demonstration Team in the Simla clinic. Cases of gonorrhoea in the male were seen there very infrequently.

It has been suggested that some ayurvedic or unani remedy may be effective in the cure of gonorrhoea, so that few victims resort to the doctor for treatment. However, by subterfuge (usually the only way that samples of the medicines used by these practitioners can be obtained), Dr. Harbhajan Singh, Professor of Dermatology and Syphilology at Glancy Medical College, Amritsar, has been able to test the remedies of about 40 different ayurvedic and unani practitioners on cases of acute gonorrhoea. He reports

that he has seen no satisfactory results from any of these remedies which could not be explained by the mere passage of time.

The facts regarding the epidemiology of this disease in the area evidently still need study and explanation.

Granuloma inguinale, lymphogranuloma venereum, and chancroid

Of 565 males, aged 16 and above, 66 showed scars in one or both groins. No information is available in respect of this finding in the females, as complete genital examination could not be done as a matter of routine. No case of early, acute, inguinal lymphadenitis was encountered during either visit. One patient with draining sinuses of long duration—clinically highly suggestive of chronic lymphogranuloma venereum—was seen, while in the hospital for women at Simla a number of female patients coming from the same general area, and showing lymphogranuloma venereum, have been seen. It can therefore be postulated that these scars may possibly represent healed lymphogranuloma venereum.

Chancroidal infection is another possible cause for the inguinal scars. Few of the men showed the large, deep, destructive scars on the penis that might be expected from chancroidal infection left to run the natural course without specific therapy. Therefore, it is felt that chancroidal etiology of the scars is unlikely.

Inguinal scars were noted in 51 out of 306 men (16.7%) over the age of 16 with positive STS, and in 16 out of 259 men (6.2%) of the same age-group with negative STS.

Discussion

It would have been advisable to have performed routine Frei and Ducrey tests on a representative sample of the population in order to gain some information with respect to skin sensitivity, but the practical difficulties involved in securing whole-hearted co-operation from the patients and in seeing them again two days after the injection made this impossible. In the Simla clinic, drawing from the entire Mahasu district surrounding and including Ghund, however, the discovery of patients with the acute adenitis of lymphogranuloma venereum or chancroid is not a common occurrence, while the proportion of patients showing a positive Frei test with lygranum antigen in the face of inguinal scars has been small in the very limited group studied.

Two individuals showing inguinal scars and having a history of earlier adenitis were found to have primary and secondary syphilis as a separate episode. One patient with granuloma inguinale was found to show involvement of the inguinal node with inguinal ulceration. Whether the presence of an inguinal scar together with a positive result in the serological test for syphilis indicates that the scar may be the result of suppurative adenitis as a complication of syphilis, or whether it indicates merely that there

was a co-existence of syphilis and lymphogranuloma venereum or chancroidal infection, cannot be stated.

The suggestion has been put forward that the scarring may result from secondary infection in the nodes of patients with early syphilis. As pointed out by Stokes,[24] secondary invasion may take place and lead to suppuration from the inguinal nodes. Pseudo bubo formation is sometimes an accompaniment of granuloma inguinale. The high rate of inguinal scarring seems disproportionately large as regards either spontaneously healed granuloma inguinale or the number of cases of suppurative adenitis of syphilitic origin seen by those of the authors who have had wide experience in syphilis. It should be mentioned, however, that in the Simla clinic the authors encountered no patient showing a lesion which might be interpreted as a secondarily infected syphilitic inguinal node.

There is a significant difference in the rate of occurrence of inguinal scarring of the syphilitic and non-syphilitic groups. Whether this is a result of the factors mentioned, or whether it merely indicates the greater likelihood that an individual having one venereal disease will contract a second, cannot be determined. It is a finding for which no rational explanation can be given.

General Health Conditions of Group Studied

The Ghund area is one of the poorest in the province. Vital statistics are practically nonexistent. Supposedly, births and deaths are registered by the headmen of the villages who report to the police superintendent of the area. It is common knowledge, however, that the death of an infant frequently is not registered; while birth or birth followed shortly by death is often not reported. The cause of death, when reported, may be a simple statement such as " old age ", " fever ", or " accident ". Medical certification of death or cause of death is practised only in the case of a medico-legal question.

During general physical examination of the patients, a quick inspection was made and outstanding defects noted on the patient's history card. Obviously the inspection was cursory except with respect to venereal diseases, and varied with the sex of the patient. The number of different examiners will account for differences in completeness of examination and in interpretation of defects found.

The first visit to the Ghund area was made in the late autumn, after the harvest had been completed and before the first snowfall of the year. The weather was cold, with freezing at night in some places. In order to be able to work comfortably the team members had to wear woollen underclothing and several sweaters; even then, those who stayed in the exposed courtyard to register the patients felt the cold keenly and often their fingers were so numb that it was difficult to write. In spite of the cold

weather most of the inhabitants were wearing only a cotton shirt, drawers, and undershirt, and women had a thin woollen scarf or blanket which they wrapped around their throat and head or around their bodies as a cloak. Upon examination it was obvious that they were cold and not comfortable. The prevalence of upper respiratory disease, as shown by granular pharynx, cough, running nose, etc., was high. It can be said, in general, that it was very uncommon to find a child not showing a running nose and enlarged red tonsils. At the time of the second visit in April, the weather had become warm and the prevalence of the respiratory disorders was strikingly less.

Skin hygiene was poor. Water is scarce and often has to be carried distances of a mile or more to the homes. Soap could be purchased from the local store, but the cost, relative to the average income, was prohibitive. As a result of lack of fats in the region, even for cooking, no soap was manufactured locally. The inhabitants washed their skin and clothing in soapless water. One of the most welcome gifts to a volunteer assistant was a bar of soap. In view of this situation, skin and clothing were dirty. This should not be considered a reflection on the individuals who were doing the best possible under very unfavourable circumstances. The skin, even of children, was usually dry and finely scaling, and the children as a group showed poor skin turgor with lack of a good layer of subcutaneous tissue. Commonly observed were dryness and scaling of the skin of the cheeks, fissuring at the angles of the lips, and excessive vascularization of the outer portion of the scleral conjunctiva, not infrequently associated with Bitot's spots. A few patients showed pigmented, scaling lesions of the skin of the exposed surfaces which were highly suggestive of mild pellagra. Scabies and fungus infection of face and scalp were common. Impetigo and ecthyma were not infrequently found, superimposed on scabies, among both children and adults.

We conducted a routine inspection of the teeth, searching for signs of congenital syphilis. A few children with suspect teeth (Hutchinson's incisors) were found. Far more common than any sign of syphilis was evidence of imperfect dental development as indicated by transverse, deep striation of the anterior surface and by serration and notching of the incisors. Such findings can be interpreted as probably resulting from disturbances in dentine and enamel formation brought about by conditions such as acute illness, malnutrition, rickets, etc. In general, it was our impression that the incidence of dental caries was not excessively high. However the notable feature of the dental examination was the extremely high prevalence of gingivitis. The teeth were often heavily coated with calculus, and in most patients the gums were found to be receding, often to an extreme degree. Pus was visible at the gum lines, and large quantities could be expressed from around the teeth. Frank bleeding of the gums along with petechial haemorrhage of the skin suggestive of scurvy was not seen.

Thyroid enlargement was one of the most striking routine findings, and was reported in 588 individuals of 1,558 examined in Ghund and its surroundings. To palpation, the gland was usually diffusely enlarged and soft, and nodular glands were occasionally noted.

Generalized enlargement of lymph-nodes or of regional groups of nodes such as the inguinal, epitrochlear, and axillary was so common that no routine record was made. It was the experience of the team in this province that the enlargement could well be regarded as normal. The connexion between enlargement of inguinal nodes and going barefooted or wearing shoes without stockings is self-evident. The enlargement of epitrochlear and axillary nodes in people subject to much trauma to hands and arms is to be expected. The very poor hygiene of gums, hair, and skin probably serves to explain the reason for enlargement observed in the head and neck. For these reasons the lymph-node enlargement in this type of population group is of no practical importance with respect to the diagnosis of syphilis.

Conjunctivitis was common. The people live in low rooms with an open fire in one corner, usually without a chimney so that the smoke must escape through an opening in the wall or roof above the stove. The constant irritation of the eyes resulting from the smoky rooms may, in part, explain the conjunctivitis. Pterygium was common, perhaps related to the irritation of the eyes resulting from smoke, intense sunlight, and from the summer dust.

Corneal opacities, ranging from complete to slight, were frequent. On the basis of physical examination, STS, and evidence obtained from histories, it is felt that syphilis probably played little part in these. Rather, the history, which was one of trauma to the eye (frequently the blow of a piece of underbrush or a tree as the individual was walking or riding), suggested that trauma followed by infection was the important cause.

A number of children were found with complete loss of vision of one eye, and with phthisis bulbi (sometimes with and sometimes without a history of trauma). The finding of a significant number of children and adults showing signs of vitamin-A deficiency (as evidenced by Bitot's spots, corneal roughening, or skin changes) suggests that it may be responsible, in a number of cases, for very rapid onset of complete corneal opacity. Williams (personal communication), has observed this corneal opacity as early as the fourth week of life in some infants born of vitamin-A deficient mothers.

Cataract was frequent in the older group, and the patients were referred to the district hospital for operative treatment. Pupillary reflexes were regularly tested, but the information so obtained, as related to syphilis in the higher age-group, is probably not significant, for a large part of the adult male population is said to smoke a mixture of tobacco and opium both for the psychological effects and to relieve the joint- and muscle-pains

which are so common. Opium and tobacco are readily available as both are grown in the district.

During the examination no attempt was made at percussion or auscultation of the chest in more than a cursory fashion, in keeping with the limitations of time and facilities. Nothing can therefore be said about the incidence of tuberculous lesions of the lung, other than that several patients with apparently far-advanced pulmonary tuberculosis were found, together with one clinically diagnosed as having advanced tuberculosis of the breasts.

A relatively large group of persons showing cardiovascular (valvular) lesions was discovered, including three patients with aortic insufficiency (having positive STS) and showing the classic signs and symptoms of syphilis. Among the children a few were found with evidence of rheumatic cardiovascular disease, with, in one, severe decompensation; some adults with rheumatic valvular disease were also found. From most of those with valvular lesions a history of joint-pain, sometimes with swelling, could be elicited; this was very suggestive of rheumatic fever. The high incidence of upper respiratory infection noted, the climate, and the poor housing combine to suggest that rheumatic fever should be expected in the area; while the finding of cardiac lesions clinically compatible with the diagnosis indicate its almost certain existence there.

It is worthy of note that one of the most common complaints observed in the middle-aged and older group was of aches and pains in joints and muscles, and one of the most frequent requests was for medicine to relieve them. Only one of the patients seen showed clinical evidence of atrophic arthritis, but many showed enlargement of the finger joints. Knowing the hard physical labour necessary for livelihood, the walking that must be done, and the exposure to extremes of cold without adequate protection, it is to be expected that the incidence of degenerative changes in the joints would be high, and such was our clinical impression.

A high percentage of those examined showed the pallor of conjunctivae and nailbeds indicative of anaemia. While no quantitative determination of haemoglobin was possible, inspection of the samples drawn for serological testing following centrifugation revealed in most cases a very small volume of clot, which indicated anaemia, in spite of the fact that at an altitude of 5,000 ft (1,524 m) an increase in red cells and haemoglobin should be expected in normal individuals. No data are available to indicate the etiology of the anaemia, for such studies were not made. However, the physicians of the area state that infestation with roundworms and tapeworms is common; the opinion regarding incidence of hookworm infestation is conflicting. Unfortunately, no studies with respect to the parasitic infestation of the intestine are available for this province. It may also be suggested that the diet, being so restricted, probably contains little iron.

In summarizing the physical findings it may be said that the children did not impress us as being robust or as " glowing with health ". In fact,

the finding of an obviously healthy child with no apparent skin or other defects, and with good skin turgor, and pink cheeks was so uncommon as to lead the examiner to stop work and call for the others to look. Many easily-remedied defects which would respond to a simple, inexpensive health programme were noted. As for the adults it may be said that they had " a lean and hungry look ", were well-muscled, had thin bodies, showed poor skin hygiene and evidence of vitamin deficiencies, and were not robust.

SECOND AND THIRD GHUND SURVEYS

The second Ghund survey was held in April 1950, six months after the first. According to reports from the compounder at Ghund, only one infectious case of venereal disease had been seen during the previous six months. This indicated a great reduction from the average of about eight cases of genital lesions seen by him each month before the mass treatment programme.

During the second survey the team met with considerable resistance to the taking of another blood-sample. The very primitive and uneducated people of this area have the highest regard for the value of every drop of blood, a regard which is rooted in superstition, religion, and old lay conceptions of physiological processes. Those persons with active lesions or other complaints which they connected with venereal disease were more amenable to suggestion and education, and co-operated more readily than the asymptomatic individual. Dramatic response to treatment, as seen in early cases, was of great value in convincing reluctant and sceptical individuals of the necessity for co-operation. The first survey had the benefit of such adjuvant circumstances, whereas during the later surveys the majority of people felt that, since they had had treatment and had no further complaints, the drawing of additional blood would be a waste and would only weaken them.

The principles underlying follow-up of treated cases, even when reiterated in the simplest way, made no impression. The people had an overwhelming conviction that their blood was to be used for purposes other than that of testing. To combat these ideas, a field laboratory was established in the area and testing was performed before large crowds of the sceptics (see fig. 17, 18). After having been tested, the blood-samples were discarded in front of the crowd. This convinced the people that their blood was not being used for export to other areas, and there was an increase in response. Sufficient serum for quantitative testing had been removed from the samples before the field testing was demonstrated, and this serum was brought back to the laboratory in Simla for routine testing.

In the second survey, blood-samples were collected from 453 of the 1,556 persons tested and treated in November 1949. This represents 29.1% of the original group. A particular effort was made to obtain samples from

the group of 609 persons with positive reactions in the first survey : 250 samples were obtained in this group (41.1%). All samples were tested by the Meinicke method, and the Kahn test was done on those samples in which there was a sufficient amount of serum. The reason for so many samples lacking a sufficient amount of serum for all tests was chiefly due to a necessary compromise with donors as to the amount taken. In most instances the individuals would signal to stop after a very small amount of blood had been drawn.

A total of 453 samples was tested with a Meinicke reaction, 450 with the VDRL test, and 238 with the Kahn test.

The third Ghund survey was carried out at the end of November 1950, one year after the first survey and mass treatment.

The hill people's attitude towards the team at this last visit was one of reluctance or near-hostility. In spite of all efforts, including house-to-house visits, we obtained samples from only 177 of the 590 persons whose blood had been positive when tested quantitatively in the first survey (30%). Thirteen persons with new infections or other complaints came forward for treatment; they were quite willing to give a blood-sample. Those who had no complaints argued in the usual way that they had had treatment, and that it was very bad for their health to give more blood. One person complained that he would " rather pay 1,000 rupees " than give 5 ml of blood. It would have been of great value to have had an examination of the babies born of syphilitic mothers who were treated in November 1949. Unfortunately, none of the team members was allowed to see any baby under six months of age as this was prohibited by the Sadus (holy men).

According to the compounder operating the dispensary at Ghund, the frequency of new cases of venereal disease was still very low in comparison with the time before the mass treatment. Actually only 12 new cases had been registered during the one-year period since the first survey, as compared with the 66 in the six-month period before the mass treatment programme, and the majority of these were persons who had recently migrated into the area. Further reliable information was unobtainable.

In analysing the difficulties of re-examining the patients, two major points must be recognized. First, in spite of repeated explanations, the people just did not want to have blood drawn again and nothing could shake their determination. They feared harmful effects. Furthermore, they said " if penicillin cures the disease why should it be necessary to re-examine the blood ?—in fact, why is it necessary to see us at all if we do not have sores or other symptoms of disease which needs medical attention ? " In this area it was evident that disease was considered to be a condition requiring treatment only when symptoms are present—and then only after a reasonable period of waiting to see whether the symptoms will not subside spontaneously, or after the use of indigenous preparations. The concept of the late effects of a disease such as syphilis cannot be grasped.

The relationship between a penile ulcer and shortness of breath on exertion resulting from aortic insufficiency 15 or more years later is not one which can be easily understood. This reaction is to be expected in a group of people whose concept of disease, treatment, and results of treatment has not received the impact of scientific knowledge—even to the extent found in an illiterate population long accustomed to having physicians working among them. Such suspicion and lack of co-operation may seem incredible to the sophisticated medical mind unless the background of these medically ignorant people is understood.

Physicians throughout the world have always had to contend with lack of understanding and co-operation when they attempted to carry out long-term follow-up surveys on treated syphilitic patients. In these circumstances it is felt that the degree of follow-up which we obtained reflects very favourably on the co-operativeness of certain of the local officials and leading citizens who had the responsibility of preparing the area for re-examination and of assisting in the operation.

Re-examination Six Months after First Survey and Mass Treatment

In this discussion the assumption is made that patients treated and not re-examined will show essentially the same pattern of response to treatment as is shown by those patients who were examined. This assumption is based upon the method for evaluating antisyphilitic therapy presented by Iskrant et al. : [11] " Calculate rates by making appropriate adjustments for the loss of patients from observation. The assumption ... is that persons who have lapsed from observation would have had the same experience as those who remained under observation." Table IX shows numbers of new patients at the second survey.

Early primary or secondary syphilis

A fall in strength of the seropositivity of more than two tubes in serial dilution was considered satisfactory provided that the patient showed no clinical evidence of relapse or reinfection. A significant increase in serological titre was taken to indicate serorelapse.

Of 27 patients with primary and secondary syphilis, only one originally diagnosed as having primary syphilis showed serological evidence of treatment failure, indicated by the fact that no diminution of serological titre took place. No evidence of clinical failure was observed in this group. However, one man and one woman (partners) who had secondary syphilis when first treated were found to have genital ulceration of about three to four weeks' duration; both were seronegative. No history of extramarital contact could be elicited from either, but in this respect the history is not reliable. If the condition of the patients represented relapse, one at least should have been seropositive, for clinical relapse is almost invariably

TABLE IX. NEW PATIENTS EXAMINED AT SECOND GHUND SURVEY

Diagnosis	Ghund State		Adjoining States	
	male	female	male	female
Primary and secondary syphilis	3[a]	1[b]	3	4
Latent syphilis	9	6	10	14
Late symptomatic syphilis	2	0	2	0
No syphilis	14	5	9	4
Indeterminate	0	1	3	0
Granuloma inguinale (1 with latent syphilis also)	3	0	0	0
Lymphogranuloma venereum (with latent syphilis also)	1	0	0	0
Children of 15 years and under, non-syphilitic	6	2	3	1
Total new children	6	2	3	3
Total new adults	32	13	27	20
Total new patients	38	15	30	23

[a] These cases were unable to attend for treatment at first visit of team.
[b] This represents a case imported into the area.

preceded by serological evidence of failure of treatment. Very probably these cases do not represent relapses but rather a new infection—syphilis, chancroid, or granuloma inguinale. Both patients were given penicillin when examined but failed to return for observation.

Asymptomatic (latent) syphilis

As mentioned earlier (page 408), it is impossible to classify latency as early or late; the patient is usually unable to date his infection with any degree of accuracy, even if he can give its history. Furthermore, it was not possible to do spinal punctures. The condition of a patient showing seropositivity in the absence of other disease known to give false positive reactions, and not showing active lesions, was therefore considered to be asymptomatic and is frequently referred to in discussion as latent. Our experience in the area over a one-year period has shown that there is little tendency for the occurrence of false positive serological tests for syphilis. A satisfactory response in latency was considered to be shown by the absence of evidence of active lesions and by the finding of the same, or a lesser, serological titre than that observed originally. An increase in seropositivity

noted in one tube was not considered to indicate failure, for it is known that a variation in one or two tubes can normally be expected from day to day if the same patient is repeatedly examined.

One hundred and fifty-four males and 57 females with latent syphilis were re-examined after six months; all but two showed a satisfactory response; three had become seronegative. Since the rate of return to seronegativity is known to be slow in later latent syphilis, the rapid response in these cases must indicate that the infections were early. However, lack of a reliable history for the patients precludes accurate dating of the infections.

Of the patients classified as having latent syphilis, only two could be considered failures, in that each showed a serological titre significantly higher than at the time of treatment. No clinical evidence of disease was found in either.

Tertiary syphilis

The serological considerations for satisfactory response were the same as noted for asymptomatic syphilis; clinical improvement was considered to be indicated by the healing of lesions or by improvement in subjective feelings.

In the cases of cardiovascular and central-nervous-system syphilis, lack of progression of symptoms was considered as satisfactory, regardless of the serological findings, so long as there was no significant increase in the serological titre.

In this group are included the patients with gummata, cardiovascular syphilis, and central-nervous-system syphilis. In the short time between surveys the only change to be expected would be healing of gummata (see fig. 19, 20). It was found that the patients with cardiovascular disease showed no clinical or physical evidence of progression of the disease, while the two having central-nervous-system syphilis stated that they felt much better than before treatment.

Of the 11 patients with late manifestations of syphilis, none showed evidence of progress either subjectively or objectively; and some stated that they felt no different from when first treated.

New infection

Finding of syphilis in a patient who had been seronegative and free of symptoms at the first visit was taken to indicate new infection.

One man, serologically and clinically negative when first seen (at which time therapy was administered) but married to a woman treated in the first survey, was found to have a penile ulcer of 8—16 days' duration. Physical examination revealed only a small penile ulcer with slight inguinal lymph-node enlargement. The patient was seronegative, no history of extramarital intercourse could be elicited, and it was impossible to re-examine the wife although she was called. The man stated that, so far as he knew, his partner

had no lesions. It was not possible to do a darkfield examination, and the patient did not return for observation after treatment with another injection of 300,000 units of monocillin, so that no information is available regarding the healing. Whether the lesion represented a new infection with syphilis, granuloma inguinale, chancroid, or some other disease cannot be said. In any event, he was the only man to show a new lesion after treatment.

One woman, who was seronegative and clinically negative when seen in November, had a genital ulcer of three weeks' or longer duration when re-examined and was still seronegative. The lesion had the appearance of a granuloma inguinale. Neither a biopsy nor the medical history of her partner could be obtained.

The fact that the woman with an ulcer of at least three weeks' duration gave a negative result at a blood-test suggests, with a high degree of probability, that the lesion was not syphilitic, for serological evidence of syphilis is usually manifest within three weeks of the appearance of an ulcer when the serum is tested by two or more methods, of which one is as highly sensitive as the Meinicke test.[6] As for the man with a history of an ulcer of 8—16 days' duration, there is a possibility that he may still have been in the seronegative stage.

Indeterminate status

Two groups of patients came under this heading : the first was that of patients having latent or late symptomatic syphilis who might be found to show a titre higher than that originally found by one or two tubes. While this might indicate progression, on the other hand a variation in titre of one or two tubes may, as pointed out earlier, be completely without significance. Thus, no certain statement can be made regarding these patients, who show only very slight serological alterations.

The second group of patients in this indeterminate category consists of the few who, upon re-examination, were found to show a low-titre serological reaction in one or more tubes, although usually in one only.

Among patients above the age of 40, such a finding might be expected of the individual who had had syphilis early in life, had not developed late, demonstrable lesions, and had achieved spontaneous cure; in such a case, repeated testing might show occasional weak-positive results, such as are observed in treated cases of early and latent syphilis just entering the seronegative stage, or " stage of serologic instability ", as named by Mahoney. It is also known that isolated weak-positive readings can occur with any procedure. They are unrelated to syphilis, being, rather, false positive reactions. It is known that as a patient develops syphilis the chancre normally appears before the serological evidence of the disease.

In the case of men (of whom only 10%, at most, of syphilitic infections develop without an apparent lesion), the likelihood of isolated, weak-positive readings indicating early syphilis in the absence of clinical signs and

symptoms seems to be very slight. In the case of women (of whom probably 50% develop the disease without apparent symptoms), the likelihood of finding a patient just entering the stage of seropositivity is slightly greater. Of this category of patients (seronegative when first seen), only two showed serological findings which require discussion as being possibly indicative of infection.

The first patient, a 26-year-old man, had had a penile ulcer five years earlier, showed no evidence whatsoever of disease at examination, and had no significant history of other illness. The results of tests made were as follows :

VDRL slide-test	positive
Meinicke reaction	weak positive (1,000 quantitatively)
Kahn	2+ positive

In the face of the negative clinical findings, the likelihood of this serological reaction representing an early infection is extremely slight, so that this patient can be classed as being probably a case of false positive serological test of syphilis.

The second patient, a 33-year-old woman, had no significant history and showed no significant evidence of the disease. The results of tests made were as follows :

VDRL slide-test	positive
Meinicke reaction	3,210 quantitatively
Kahn	2+ positive

Thirteen other individuals were found to show some serological findings which could not be correlated with any evidence of new infection, but which appeared, upon analysis of the patient and the serological patterns, simply to have been false positive reactions. The distribution was as follows :

VDRL only, positive	5
VDRL only, weak positive	5
VDRL, weak positive; Kahn, positive	2
Meinicke reaction only, positive	1

A certain number of such patients were found later to have negative reactions. While no definite statements can be made about this group of cases, their number is small and it is probable that the findings are not indicative of early syphilis. If these cases do represent the expression of an old syphilitic infection, the only statement that can be made is that such an occurrence might be expected even in the adequately treated patient.

The VDRL slide-test was found to have become excessively sensitive in our hands just before undertaking the second Ghund programme; we began to find a rather large number of false positive reactions among the routine samples coming into the laboratory. The reason for this is not known. The situation was soon remedied, but not until all the survey samples had passed through the procedure. As a result we felt that, since

the larger part of the cases were classified as indeterminate on the basis of a positive or weak-positive VDRL slide-test, the finding is of no significance.

Other venereal disease

In addition to the 14 patients diagnosed as having granuloma inguinale at the time of the first visit, one case which we then called syphilis, primary and secondary, was later found to be granuloma inguinale. The same diagnosis was made in three more cases : one granuloma newly appearing, one found in a patient who originally had been diagnosed as having secondary syphilis, and one associated with latent syphilis in a patient having a seven-year history of the lesion.

It was impossible to secure biopsy specimens from any of these individuals to stain for Donovan bodies, for the resistance to any manipulation of the ulcer, necessary to get a satisfactory specimen, could not be overcome. However, the findings, in patients who were seronegative for syphilis, of ulcers of long duration, which did not respond to administration of penicillin or sulfonamides, but rapidly began to show improvement under treatment with anthiomaline, indicated that the lesions were of granuloma inguinale. Furthermore, patients from neighbouring areas admitted to the hospital in Simla have been found to show the Donovan bodies in lesions of the same type.

Only six open lesions of venereal disease were found at the second survey when 616 inhabitants of the Ghund area were examined, among whom 446 were given physical examination and a serological test for syphilis at both the first and second surveys; 117 were given physical examinations only; and 53 were given physical examination and a serological test for syphilis for the first time.

Table X shows the number of patients examined in the first survey, according to age-group, and the results of mass treatment as observed at the second survey.

Re-examination Twelve Months after First Survey and Mass Treatment

The third survey was undertaken one year after the first, and only 117 of the 590 positive reactors from the first survey were seen. Thirteen other samples were collected from patients seen for the first time.

Of the 177 persons serologically positive in November 1949 and retested in November 1950 it was found that :

(*a*) the serological titre had fallen in 160 patients, becoming negative in 46;

(*b*) the titre remained unchanged in 14;

(*c*) the titre had increased in 3.

At the third survey in November 1950, we found that the Ghund compounder had seen only 12 cases of genital ulceration during the entire

TABLE X. PATIENTS EXAMINED AT FIRST AND SECOND GHUND SURVEYS, ACCORDING TO AGE-GROUP AND STAGE OF DISEASE

Age-group (years)	Number of patients examined in each age-group		Number of syphilitic patients re-examined			
			primary and secondary syphilis		latent syphilis	
	first survey	second survey	first survey	second survey	first survey	second survey
0- 5	49	0	0	0	0	0
6-11	221	0	0	0	1	0
12-15	127	20	3	0	7	4
16-20	144	60	12	4	32	12
21-25	152	56	13	6	55	21
26-30	153	69	14	9	72	60
31-35	157	67	6	3	81	35
36-40	160	57	8	2	70	29
41-45	95	30	2	0	32	17
46-50	126	57	3	2	63	39
51 onwards	105	30	2	1	42	14
Total	1,489[a]	446	63	27	455	231

[a] The fact that more serological tests were performed than clinical examinations accounts for the difference between this figure and that given on page 421.

year, as contrasted with 66 such cases in the six months before the first survey and mass treatment.

It is thus evident that the treatment programme carried out in November 1949 resulted in reducing both the reservoir of infectious venereal disease and the possibility of transmission. From the observations made, it seems that certain of the cases seen after November 1949 were caused by infected individuals who came into the area and re-established the infection. Such cases not only illustrate the need for constant observation of the area and search for new cases, but also emphasize the necessity for constant expansion of anti-venereal-disease activities around a locus which may have been rendered relatively free of infection.

CONCLUSIONS

Our experience has demonstrated that large groups of people can be assembled for examination and treatment, and that, using simple slide-tests for syphilis, the laboratory can be carried into the field so that the

tests can be performed on the spot, thus making results available the day after the sample is drawn. The experience of the team has shown that, after necessary advance propaganda work, a small group consisting of one or two clinicians, a clerk, a nurse, a serologist, and a technician can move into an area, recruit official help and examine and treat up to 350 patients per day. Because of the need for treatment, the lack of medical facilities, and the need to demonstrate to the people that their government medical services are doing something for them, we feel that it will be desirable for such small groups to move into other areas where venereal disease is prevalent.

Co-operation with the " camp " medical workers on the lines described earlier (page 383) might well be extended since its effectiveness has been demonstrated.

Experience in the Ghund has shown on a field scale that mass treatment by one injection of 300,000 units of procaine penicillin in oil with 2% aluminium monostearate satisfactorily decreases the infectious reservoir. There is, furthermore, no reason to expect that the cure-rate obtained by this method will be substantially less than that reported by previous workers.

The resistance of the population encountered by the group to follow-up serological tests has indicated that it will be impossible, at this stage, to attempt large-scale assessment of results of treatment, while even small-scale activities will be very expensive with regard to the few patients who can be examined and to the even fewer who will be found in need of re-treatment. For example, of the 557 patients re-examined at Ghund, only two were found to show unequivocal evidence of failure, and neither had open lesions.

It is our opinion that if we had gone into the area for treatment of failures six months after the original mass therapy, with advance notice through the officials that we had come to give treatment to all of those who had any sores whatsoever, as well as to any others in the area who had any illness, it would have been possible within two or three days, through the voluntary co-operation of the inhabitants and the services of the compounder and officials, to see all those with open lesions. This programme could have been effectively carried out by one physician alone instead of by the large, more expensive group.

It should thus be possible in future to carry out mass treatment in given areas and to follow up at intervals of four to six months simply by the visit of a single individual for the clinical examination and treatment of all those with lesions. In view of the vast accumulated experience with penicillin from which treatment results can be predicted, serological follow-up tests under the conditions prevailing in the area are unnecessary and, in fact, inadvisable.

It may be felt that a larger dose of penicillin the first time would increase the cure-rate. While this might be considered preferable, its feasibility is

questionable. The importance of economy, for example, may be a minor consideration in a financially well-off community with a low prevalence of syphilis. However, for the public-health officer in many underdeveloped areas the picture is entirely different. He may be facing the problem of a very high prevalence of syphilis in his community, whereas the available funds for drugs and public-health facilities are usually very limited. Under such circumstances, from the public-health point of view, it may be the most rational procedure to aim at a maximum reduction of infectious reservoirs, a result which at least may offer some hope for the future generation. The choice would be either to offer one person maximum chances for cure with the realization that, for example, most other persons in his immediate surroundings receive no treatment at all, or to afford a fair chance of cure to a larger number. A great need exists for simplicity of treatment and for spreading the benefits of modern therapy over as large a section of the population as possible, such as can be done by the methods of treatment described. The list of medical personnel, installations, and budget (page 382) effectively demonstrates this urgent need for simplicity and economy in treatment.

The significant lowering of the level of serological titre, apparent on re-survey of the Ghund area, is highly suggestive, if not conclusive, evidence of a satisfactory response to treatment. Even more striking than the serological response is the diminution in the number of open lesions seen either during the interim or at the time of re-survey. This indicates a significant reduction in the opportunity for spread of the disease in the area, and emphasizes that if its prevalence in the surrounding area is not diminished, infection will be reintroduced. However, spread of knowledge about the results of treatment and of popular desire for cure, coupled with the availability of a hospital which effectively serves the area and with a modified treatment-programme in surrounding areas, suggests that a significant reduction in the reservoir of infectious cases is possible. We feel that, under conditions such as exist in the Ghund region, a means of venereal-disease control, in keeping with the financial and medical resources of the region, and acceptable to the inhabitants, could be established along the lines described in this report.

From the experience gained in the Pradesh the general conclusion can be drawn that, as in many other parts of the world, the prevalence of venereal disease is higher in the lower-income groups of the population. Education in the public-health aspects of venereal diseases, with concurrent provision of modern therapeutic and public-health facilities at a minimum of cost and inconvenience to the individual, change in the social habits and customs, enhancement of economic prosperity, and enactment and enforcement of laws against quackery will help in checking the further spread of these diseases among the population.

ACKNOWLEDGEMENTS

A large number of people contributed to the conduct of this operation, and without their co-operation its accomplishments would have been impossible. It is desired to acknowledge, with gratitude, the contributions of the following :

Mr. E. P. Moon, Chief Commissioner, Himachal Pradesh ; Mr. N. C. Mehta, formerly Chief Commissioner, Himachal Pradesh; Mr. Ram Ratan Mehta, District Commissioner, Mahasu District, Himachal Pradesh; Dr. Gwash Lal, Director, Health Services, Himachal Pradesh; Mr. D. R. Chawla, Statistical Assistant, Himachal Pradesh; Mr. Vidya Sagar, Magistrate, Theog; Mr. Thakur Narain Singh, B.A., LL.B., Tehsildar, Theog; Mr. Girja Nant, Naib-Tehsildar, Theog; Mr. Sita Ram, In Charge, Dispensary, Ghund; Mr. Satya Nand, Petition-Writer, Theog; Mr. Parma Nand, Clerk, Theog Tehsil, Theog ; Mr. Moti Ram, Ghund ; Mr. Budhi Ram, Patwari, Theog Tehsil ; Mr. Paras Ram, Clerk, Office of the Magistrate, Theog; Mr. Manohar Lal, Headmaster, Ghund School; Mrs. Tone Kvittingen, M.D., D.D.S.; and Mrs. Eliese S. Cutler.

The staff of the WHO Venereal Disease Demonstration Team at Simla, who unhesitatingly worked long hours, frequently under uncomfortable conditions, both in the field and at the laboratory in order to meet the heavy demands for services.

The staff of the Regional Office for South-East Asia, New Delhi.

The physicians, nurses, and technicians from India and neighbouring countries who were being trained by the WHO Venereal Disease Demonstration Team and who so wholeheartedly assisted in both the field and laboratory phases of the operation.

SUMMARY

In 1949 and 1950 a World Health Organization Venereal Disease Demonstration Team carried out a survey and mass treatment, followed by post-therapy control tests, in the Province of Himachal Pradesh, India. The report describes the activities of the team in the Ghund district and the results of an antisyphilitic programme in the isolated rural population of the Himalayan foothills. According to pre-survey observations, the incidence of venereal disease was high.

The geographical characteristics and medical organization of the province are described; there were 21 hospitals and 43 dispensaries, each of the latter being in the charge of an official with some medical training and a small stock of medicines, including mercury and sulfathiazole, at his disposal. On the arrival of the WHO team, a venereal-disease section, supervised by a full-time venereologist, was created in the health services of the province. The population also resorts to cheaper, indigenous

RÉSUMÉ

Une équipe de démonstrations de l'OMS pour la lutte antivénérienne a effectué en 1949 et 1950 une enquête et dès traitements en série suivis d'épreuves post-thérapeutiques de contrôle, dans la Province d'Himachal Pradesh, Inde. Le rapport décrit l'activité de cette équipe dans la région de Ghund et expose les résultats de la lutte antisyphilitique au sein d'une population rurale, isolée, dans les contreforts de l'Himalaya. D'après les renseignements reçus d'observateurs médicaux, avant l'enquête systématique, l'incidence des maladies vénériennes y était élevée.

Les caractères géographiques ainsi que l'organisation médicale de la province sont décrits dans le rapport. On compte 21 hôpitaux, 43 dispensaires, chacun de ces derniers étant dirigé par un fonctionnaire possédant une certaine formation médicale et disposant de quelques médicaments, parmi lesquels le mercure et le sulfathiazol. Depuis l'arrivée de l'équipe de l'OMS dans la province, une section des maladies vénériennes a été créée au département de la santé et un vénéréologue affecté à cette

systems of medicine, and quackery is still rife in the mountain districts.

Malaria, tuberculosis, leprosy, venereal diseases, fly- or water-borne enteric diseases, scabies, endemic goitre, deficiency diseases, cataract, diseases due to unprotected exposure to the elements—all these, augmented by ignorance, promiscuity, and inadequate medical care, contribute to keeping the population at a low level of health. Polygamy, practised among a certain group, plays its part in the dissemination of venereal disease.

In November 1949 the demonstration team was established at Simla, the capital of the Province of Himachal Pradesh, and laboratory- and outpatient-services were set up in some hospitals and dispensaries. A survey of the incidence of syphilis was undertaken, and training programmes for physicians, nurses, and laboratory workers instituted. Within the first 17 months 29 persons had been trained and venereal-disease-control activities set up in at least seven hospitals and clinics in the province.

Meinicke and Venereal Disease Research Laboratory (VDRL) slide-tests were used. As soon as the laboratory was in a position to handle sufficient numbers of blood-samples and to assess the degree of infection in different regions, an area for demonstration was selected, isolated enough to obviate the introduction of new infection, and with a population sufficiently stable to offer an opportunity for long-term follow-up surveys.

The Ghund district, which was finally chosen, has an area of approximately 13 square miles, and an elevation of between 4,100 feet and 8,615 feet; it covers the crest and sides of a high ridge which separates the valley of the Giri from one of its tributaries. The team, together with the local magistrate and the district medical officer, drew up a programme of propa-

section. Les habitants ont recours en outre à la médecine indigène moins coûteuse. Des pratiques superstitieuses sont encore en faveur dans ces régions montagneuses.

Le paludisme, la tuberculose, la lèpre, les maladies vénériennes, les maladies intestinales transmises par les insectes ou par l'eau, la gale, le goître endémique, les déficiences alimentaires, la cataracte, les maladies dues aux intempéries et au manque de protection contribuent à maintenir les populations dans un état de santé très précaire, entretenu par l'ignorance, la promiscuité et des soins médicaux inadéquats. La polygamie, pratiquée par un certain groupe, contribue à la dissémination des maladies vénériennes.

En novembre 1949, l'équipe de démonstrations s'installa à Simla, capitale de la Province d'Himachal Pradesh. Un laboratoire et un service de consultations furent établis dans certains hôpitaux et dans les dispensaires. Une enquête sur la fréquence de la syphilis fut entreprise et des cours institués pour la formation de médecins, d'infirmières et de techniciens de laboratoire. Durant les 17 premiers mois, 29 personnes avaient acquis une formation professionnelle, et la lutte antivénérienne était entreprise dans sept au moins des hôpitaux et dispensaires de la province.

On appliqua les méthodes de sérodiagnostic sur lame de Meinicke et du VDRL. Dès que le laboratoire put effectuer un nombre suffisant de tests sérologiques, et que l'on put se rendre compte du degré d'infection de différentes régions, une zone de démonstrations fut choisie. Elle était assez isolée pour que des réinfections venant du dehors soient improbables; la population était stable, aussi espérait-on pouvoir la suivre au cours de plusieurs années.

Le choix définitif se porta sur la région de Ghund, d'une superficie de 33,6 km², formant la crête et les flancs d'une chaîne séparant la rivière du Giri de l'un de ses affluents; son altitude est de 1.250—2.625 m. Les membres de l'équipe établirent avec le magistrat de district et le fonctionnaire médical local un plan de propagande qui devait familiariser la population avec les

ganda to familiarize the people with the arrangements for survey and treatment. Most satisfactory results were achieved, and in spite of a certain reluctance among some of the population, a mass clinical examination was carried out.

Much of the report is devoted to a description of the work of the team in Durbar Ghund, one of the centres of the region, and one section outlines the attitude and medical history of its inhabitants. The treatment-schedules provided for a single injection of 300,000 units of procaine penicillin G in oil with 2% aluminium monostearate. This moderate dose was chosen because of the scarcity of penicillin in the province at the time of the survey; supplies have since improved.

Although the posology adopted did not give the results which would be expected from large doses of aqueous penicillin administered over a seven-day period, it adequately fulfilled the immediate requirements, being simple and inexpensive, providing a satisfactory minimum cure-rate, and rapidly reducing the reservoir—and hence the spread—of infection.

Blood-samples were sent to Theog, where two slide-tests were carried out. Quantitative determination of positive sera was carried out according to the method of Meinicke.

In the absence of clinical symptoms, seropositive cases were diagnosed as asymptomatic (or latent) syphilis; no spinal-fluid examinations were made. A few doubtful or false positive cases were classed as " indeterminate ". Since there was no clinical evidence of yaws or malaria, and very little of leprosy, the risk of false positive reaction was reduced to a minimum. The experience of the team in the course of a year's work gave every reason for assuming that the serological data thus obtained were highly accurate.

Two further surveys were made at six-month intervals after the first. During the second, new blood-samples were obtained from only 29.1% of the people

programmes d'enquête et de traitement. Le résultat fut très satisfaisant. Un examen général et clinique de la population put être effectué, malgré une certaine réserve de la part des habitants.

Une partie importante du rapport est consacrée au travail de l'équipe à Durbar Ghund, l'un des centres de la région. L'attitude mentale des habitants, leur histoire médicale, font l'objet d'un chapitre. La posologie comportait l'injection unique de 300.000 unités de pénicilline G procaïnée huileuse avec 2% de monostéarate d'aluminium. Cette dose modique a été établie d'après les quantités de pénicilline dont disposait la province au moment de l'enquête; les conditions se sont améliorées depuis lors.

La posologie adoptée, bien que ne donnant pas les mêmes résultats que de fortes doses de pénicilline aqueuse administrées durant sept jours, a paru convenir au but poursuivi : elle présentait l'avantage d'être simple, peu coûteuse, d'assurer un pourcentage de guérison satisfaisant et une réduction du réservoir d'infection assez rapide pour empêcher la diffusion de la maladie.

Les échantillons de sang furent envoyés jusqu'à Theog où deux épreuves sur lame étaient pratiquées. L'examen quantitatif des sérums positifs a été effectué par la méthode de Meinicke.

En l'absence de caractères cliniques, les cas séropositifs ont été classés comme syphilis asymptomatique (latente); aucun examen du liquide céphalo-rachidien n'a été effectué. Un certain nombre de cas douteux ou faussement positifs ont été classés comme « indéterminés ». L'absence de pian et de paludisme clinique a diminué au maximum les risques de fausses réactions positives; seuls quelques cas de lèpre ont pu en provoquer quelques-unes. Le travail de l'équipe, au cours d'une année entière, a permis d'affirmer que les données sérologiques ainsi obtenues comportent un degré élevé de précision.

Une deuxième et une troisième enquêtes furent effectuées six et douze mois après la première. Durant la deuxième, on ne put obtenir un nouvel échantillon de sang que

treated six months earlier. In fact, the under-fed population, believing that one drop of blood corresponds to 100 drops of food, opposed the drawing of blood.

A general indication of the results of treatment is given by the statement of the compounder at the Ghund dispensary that the incidence of new cases of venereal disease had greatly decreased since the mass treatment; only 12 were registered during the one-year period following the first survey, as compared with 66 during the preceding six months.

Results indicate that treatment of the population of the Ghund region in November 1949 reduced the reservoir of infection and the transmission of venereal disease. Several of the new cases observed since that date appear to have originated in other areas—a fact which again speaks for the necessity of extending an anti-venereal-disease campaign to areas around the zone which has been freed from infection.

Syphilis is the most widespread of the venereal diseases; of 354 families, only 80 (22.6%) were free of this disease. Gonorrhoea was very infrequent; no satisfactory explanation of this could be put forward.

From their experience the authors draw the conclusions that large groups of people may be assembled for treatment, and that, given slide-tests which can be easily carried out, a laboratory may be established in the field, producing serological results the day after blood-samples have been taken. With the support of the local authorities, a team consisting of one or two clinicians, one serologist, one nurse, one laboratory technician, and one clerk can examine and treat up to 350 people a day.

The Ghund survey has demonstrated that the administration of 300,000 units of procaine penicillin G in oil with 2% aluminium monostearate satisfactorily reduces the reservoir of infection. The opposition of the population to a second post-therapy serological test indicates that at this stage

du 29,1% des sujets traités six mois plus tôt. En effet, les habitants, souvent sous-alimentés, s'opposaient aux prises de sang, considérant qu'une goutte de sang correspond à 100 gouttes de nourriture.

Il est possible de se faire une idée indirecte des résultats du traitement grâce aux déclarations du chef responsable du lazaret de Ghund. Les cas nouveaux survenus après le traitement ont été très peu nombreux : 12 en une année contre 66 dans les six mois qui précédèrent le traitement.

Les résultats prouvent que le traitement effectué sur la population de la région de Ghund, en novembre 1949, a réduit le réservoir d'infection et la transmission des maladies vénériennes. Il semble que quelques-uns des nouveaux cas observés après novembre 1949 provenaient d'autres régions. Cela montre à nouveau la nécessité d'étendre constamment la lutte antivénérienne à partir d'un centre qui a été libéré de l'infection.

La syphilis est l'affection vénérienne de beaucoup la plus répandue. Sur 354 familles 80 seulement, soit 22,5%, étaient franches de syphilis. La blennorragie est très peu fréquente; aucune explication satisfaisante de ce phénomène n'a encore été donnée.

Les auteurs déclarent dans leurs conclusions que, d'après les expériences faites, des groupes de population importants peuvent être réunis et traités et que, moyennant l'adoption de tests sur lames, faciles à effectuer, le laboratoire peut être installé sur le terrain; les résultats des épreuves sont à disposition le lendemain du prélèvement de sang. Une équipe composée d'un ou deux médecins, d'un sérologiste, d'une infirmière, d'un technicien de laboratoire et d'un employé de bureau, bénéficiant de l'appui des autorités locales, peuvent examiner et traiter jusqu'à 350 personnes par jour.

La démonstration faite dans la région de Ghund a prouvé que 300.000 unités de pénicilline procaïnée huileuse avec 2% de monostéarate d'aluminium donnent des résultats satisfaisants permettant de diminuer le réservoir d'infection. La résistance de la population à accepter une deuxième

it is fruitless to hope for an accurate serological evaluation of the results of mass treatment.

The authors believe that in future it should be possible for one physician to follow up the treatment of groups of people in given regions at intervals of four or six months, examining all comers and treating those with lesions. The serological following-up of treated cases appears to be neither necessary nor advisable.

épreuve sérologique post-thérapeutique indique qu'il est illusoire, pour le moment, de vouloir évaluer de façon précise, par des épreuves sérologiques, les résultats du traitement en série.

Les auteurs pensent qu'à l'avenir il serait possible de traiter des groupes de population dans des régions données et d'examiner les cas à intervalles de quatre à six mois. Une seule personne serait chargée de cette tâche; elle examinerait cliniquement tous les individus qui se présenteraient, et traiterait ceux qui sont porteurs de lésions. Suivre au moyen d'épreuves sérologiques les cas traités paraît, dans les conditions observées au cours de cette action, n'être ni nécessaire ni judicieux.

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