form a standard by which we can gauge the suitability of any occupation for a particular individual. However, we still seek an easy means of determining the limit of energy output for tuberculous patients beyond which it is unsafe to go. When this is known it will not be difficult to suggest suitable occupations for most patients when sanatorium treatment is completed.

TABLE IV.—*Calorie Requirements of Man (Orr and Leitch)*

Occupation	Calories per Hour
Sewing	10-20
Writing	10-20
Sweeping	110
Stone mason	380
Sawing wood	420
Tailoring	50
Typewriting	55
Bookbinding	65
Stonemaking	90
Painter	160
Smith (heavy)	350
Coal-mining	320
Walking	150-240
Charwomen	81-157
Lecturing	73
Seamstress	6
Dusting	110
Carpentry	155

Those who cannot be re-employed in their previous occupation will have to be given other work, though to maintain the original standard of living is often difficult. Retraining usually means either temporarily or permanently lower wages for the person over thirty. The peak of the tuberculosis-incidence curve in males is shifting to the higher age groups, so this problem is likely to increase. The situation calls for the establishing of centres for the tuberculous similar to Egham, with close connexion with special workshops where continued employment may be obtained for those unable to find suitable posts in normal industry. Considerable advance in the principles underlying the employment of the tuberculous has been made by the Ministry of Labour's agreeing that such persons need not be given outdoor work. Most outdoor jobs are heavy and often poorly paid. It is very satisfactory that this should be recognized and that sedentary work should be arranged.

Russia has successfully linked sanatorium treatment with the prophylactic workshop attached to the main works, which provides modified employment for patients still under treatment at a dispensary or a night sanatorium. Adequate nourishment and rest are ensured, but remuneration is on a lower scale than that of the healthy worker. The scheme is worthy of close study and might be adopted with slight modification here.

Conclusions

To summarize the relationship of industry to tuberculosis: occupation rarely causes tuberculosis, but conditions of labour can predispose to it. These conditions, particularly the elimination of dust, which appears to be more harmful with regard to tuberculosis in the higher age groups, should receive continued attention, and also that all workers should obtain adequate nourishment during work hours. Tuberculous persons entering hazardous employment should be examined periodically by miniature radiography. A fundamental principle is the exclusion of infectious persons from normal industry, except where the other workers can be protected and suitable employment provided for the disabled person. Pre-employment radiography imposes a liability on the employer when engaging proved healthy persons in a hazardous industry. The return of the tuberculous person to normal industry must be through a properly organized rehabilitation scheme, which should be closely associated with industries that can provide suitable employment for recovered persons. Recent legislation has made this possible, but the co-operation of industry as a whole is needed to ensure success.

A national tuberculosis research organization would investigate methods for assessing the disability of those who are recovering or have recovered from the disease. The Government has accepted its share of the liability; it is now our responsibility to take advantage of the privileges provided and develop this section of industrial medicine. Special workshops or industrial clinics are required for those who cannot take their place in normal industry; indoor work within the disabled

person's capacity is more suitable than outdoor, which is usually heavy and poorly paid.

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THE INTERNAL COMBUSTION ENGINE AND THE SPREAD OF DISEASE

• BY

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From the dawn of history infectious diseases, together with other specialized merchandise, have spread along the trade routes of the world, whatever the mode and speed of transport. To-day it is the speed of travel both on land and in the air which adds danger to the spread of disease from endemic to non-endemic areas. Fifty years ago, when the first European missionaries went to Uganda, it took them between three and four months to walk from Mombasa; to-day the same journey can be made by air in from three to four hours. Flights of twenty-four hours for a journey from West Africa to India or of sixteen hours from England to West Africa are becoming commonplace. With jet-propelled planes the flying times will be even shorter; speeds of 500 to 600 m.p.h. (800-960 km.p.h.) for passenger planes are predicted in the near future. But it is not only in the air that the barriers to rapid intercourse have fallen. A generation ago few Africans dared to wander far from their tribal lands: if they did, it was at the risk of death, or at the best enslavement. Mountains once formed an insuperable barrier. In the old days, for instance, the Nyakyusa in East Africa feared to cross the 8,000-ft. (2,438-m.) range which blocks their valley to the north, since they were liable to die from cold. Disease was also a barrier, for the same tribe did not often visit the adjoining Kinga, who live on the Livingstone Mountain, not only because of the cold but because they were afraid of catching tick fever, which was endemic among the Kinga (Wilson and Wilson, 1945). One small tribe in the Nuba Mountains, in south-eastern Kordofan, are said to have introduced tsetse flies in order that the Baggara, or Cattle Arabs, should give them a wide berth. Evans-Pritchard (1940) relates that the Galla and Amhara of the Ethiopian highlands refuse to descend to the plains for any length of time for fear of malaria. Immediately before the war, and still more during the war, motor roads have been built throughout the Tropics in ever-increasing numbers. Shakespeare's prophecy that "the vasty wilds of wide Arabia are as thoroughfares now" is no less true of Africa and Asia, and the local inhabitants have readily taken advantage of those roads and of the motors which pass along them. There is evidence that in the past few years in Africa yellow fever, cerebrospinal fever, relapsing fever, trypanosomiasis, intestinal bilharziasis, and gonorrhoea have all been spread by those who have used the roads in their search for work or trade.

The possibility that infectious diseases and their insect vectors might take advantage of the rapid means of transport now available was translated into fact when in 1930 Shannon discovered *Anopheles gambiae* in the city of Natal, Brazil; it had apparently arrived from tropical Africa, where it is the most important malarial vector, not by air but by one of the fast torpedo-boats employed in connexion with the French transatlantic air service.

In 1933 the first International Sanitary Convention for Aerial Navigation was drawn up; but in many ways it was unworkable, and in 1944 some of its provisions were modified in the light of more recent knowledge. During the war the possibility that infectious diseases or their insect vectors might be carried from endemic to non-endemic areas was met in the more dangerous areas of Africa by the formation of inter-Allied mosquito control boards, the membership of the boards being

made up of civilian officials and Allied Service personnel. With the end of the war these control boards have in most cases lost their Service members, together with many of their executive staff. Although for the moment there is probably a decrease in the number of persons flying, in a short time the world's air routes will once again be crowded with passengers and freight. The present is therefore a suitable time to discuss very briefly how far the present organization is adequate to guard against the spread of disease by air.

Disease and its Spread by Air

The diseases which are specially feared in relation to spread by air traffic are yellow fever and malaria. There are, however, others which might readily be spread by infected persons or by insect vectors—for example, dengue, poliomyelitis, the insect-transmitted encephalitides, and trypanosomiasis, as well as acute respiratory infections such as influenza.

Yellow Fever

Yellow fever may be carried by an infected mosquito or by a person incubating the disease. The endemic yellow fever zones in Africa and South America, shown in the accompanying map (U.N.R.R.A. Health Division, 1945) are now traversed by a number of air routes. In Africa a great part of the continent between 15° N. and 10° S. is involved, but Tanganyika is excluded. The Barotse Province and the Balovale district of Northern Rhodesia are, however, included, as are the islands in the Gulf of Guinea. The Port of Massawa, in Eritrea, has been excluded.

In South America the ports of Belem in Brazil, Cayenne in French Guiana, Paramaribo in Surinam, Georgetown in British Guiana, the Caribbean ports of Colombia and Venezuela, and the cities of Caracas in Venezuela, Bogota in Colombia, and Corumba in Brazil are excluded. In addition, the Ilheus and Itabuna districts in the State of Bahia, Brazil, are for the time being regarded as endemic yellow fever areas.

It will be seen that the portion of the earth where yellow fever is endemic is too large to be absolutely avoided by long-distance aeroplanes, although in the future it may be possible for aeroplanes to fly the 4,000 miles (6,400 km.) from Cairo to the Union of South Africa without touching down inside the yellow fever area.

Experiments made before the war by Trolli (1932), Hicks and Chand (1936), and others showed that mosquitoes could quite easily survive long journeys by air of over 9,000 miles (14,400 km.) in which heights of 10,000 to 12,000 ft. (3,048–3,658 m.) were reached. Griffiths (1933) also proved that mosquitoes released in the cabins of aeroplanes do not necessarily leave the aeroplane at intermediate stops on the air route. Before the war a number of mosquitoes from the Old World, capable of transmitting yellow fever, had been found in aeroplanes (Whitfield, 1939), including *Aedes aegypti*, *A. simpsoni*, *A. luteocephalus*, *Taeniorhynchus* (*Mansoniodes*) *africanus*, and *Culex fatigans*.

While the chances of an infected mosquito gaining entrance to an aeroplane may not be great, they are by no means remote. With compulsory yellow fever immunization for all those who fly through endemic zones the chances of an infected person being carried are, however, extremely small, provided that active yellow fever vaccine has been used.

Malaria

Malaria may also be spread by a person with parasites in his blood or by the carriage of some of its insect vectors. It is now recognized that different strains of the same species of malarial parasite exist, some being more virulent than others. The introduction of highly virulent strains of *falciparum* parasites into an area where *vivax* strains were predominant might or might not be followed by a severe outbreak of malaria: the experiment has not been tried. After the war of 1914–18 a small outbreak occurred in South-East England as a result of the return of infected soldiers, and a similar outbreak has already taken place in the Berlin area. A number of the anopheline vectors of malaria were found in aeroplanes in Africa and in America both before and during the war. The list includes *Anopheles gambiae*, *An. funestus*, *An. pharoensis*, and *An. albimanus*. While the original appearance of *An. gambiae* in the New World was not directly due to aeroplanes, during the war years it did successfully make the Atlantic passage by air. The difficulties in eradicating it from Brazil have been retailed by Soper and Bruce Wilson (1943). There is also some evidence to show that *An. albimanus*, found breeding at Boca Paton, Florida, arrived from South America by air. Of the anopheline vectors of malaria which have travelled by

air, *An. gambiae* is probably the most dangerous in view of its domesticity and its catholic taste in breeding-places. At present it is found throughout Africa south of the Sahara and as far north as Wady Halfa, just south of the frontier between Egypt and the Anglo-Egyptian Sudan (Lewis, 1942, 1944). It is probable that it has been at Wady Halfa for many years. It has, so far as is known, never reached the Nile Delta, though during the war it was found in Central Egypt. *An. gambiae* is present in Madagascar and has been identified in the Aden hinterland and at Jeddah, in Arabia.

The epidemic yellow fever areas of the world as delineated by the expert commission on quarantine, U.N.R.R.A. Health Division.

been identified in the Aden hinterland and at Jeddah, in Arabia.

Other Diseases

Tsetse flies are inveterate travellers by train, motor-car, and even on the back of the humble pedal cyclist. It is therefore not surprising that they should have been found in aeroplanes in Africa (Symes, 1937). During the war on two occasions *Glossina palpalis* were also caught in Natal, Brazil: their only means of crossing the Atlantic must have been by air (Soper and Wilson, 1943). Chaga's disease has not been reported outside the New World.

Other diseases transmitted by mosquitoes are dengue and the various forms of encephalitis at present limited to America and Japan. There was, however, before the war some evidence that Japanese Type B encephalitis had spread into China. Flies are frequent passengers in aeroplanes: they are, it seems, able to carry poliomyelitis and probably infective hepatitis. Strains of poliomyelitis are known to vary in virulence, while it is also possible that there are different strains of infective hepatitis with varying degrees of virulence. The geographical distribution of sandfly fever and kala-azar by no means coincides with that of *Phlebotomus*. Plague transmission is a more remote danger, though during the war a live mouse was found in an aeroplane arriving at Miami, Florida, from San Juan, Porto Rico.

Prevention of Spread of Disease by Aeroplanes

The measures which are necessary to prevent the spread of insect-borne diseases by aeroplanes are of course well known,

and if they are carried out properly should make the risks infinitesimal. These measures are the sanitary control of (a) aerodromes, (b) aeroplanes, and (c) air-passengers, crews, and ground-staff.

The sanitary control of aerodromes requires a considerable staff. For aerodromes dealing with international traffic the areas involved are large: runways 3,500 yards (3.2 km.) long are required, and extensions up to 5,000 yards (4.5 km.) are visualized in the future. The existence of many acres of flat tarmac and of large hangars means that in the Tropics during the wet season a tremendous volume of rain-water often has to be run off the aerodrome area. Scouring of drains and soil erosion have to be guarded against. Mosquito control must be exercised not only over the actual aerodrome but over a zone of country extending in some directions for as much as three miles (4.8 km.), if during tropical storms mosquitoes from uncontrolled areas are not to be blown on to the aerodrome. This involves the spraying of native villages, and in some cases of urban areas, with D.D.T. or other insecticides, as well as the careful supervision of drains, lagoons, and all other possible breeding areas. It is obvious that a large staff is required. During the war many extensive drainage schemes were begun in Africa in order to sanitize aerodromes. Some of these schemes were finished before the end of the war, other were left unfinished. In any case anti-mosquito schemes cannot look after themselves; constant vigilance is necessary, and the cost of maintenance is usually high.

The sanitary control of aeroplanes involves the use of insecticides. The ideal method is undoubtedly the application of an insecticide to the inner walls of the aeroplane (Madden *et al.*, 1945), combined, while in flight, with some form of aerosol spray containing a rapidly acting insecticide such as pyrethrum (Mackie and Crabtree, 1938). During the war, when the Freon bomb or a hand-spray was the standard equipment, disinsectization was not as a rule carried out till the aeroplane had been grounded, and then often in so perfunctory a manner that insects had ample opportunity either to leave the aeroplane or to remain in it alive for a further journey.

The sanitary control of passengers, crews, and ground-staff involves immunization against yellow fever. In accordance with the International Sanitary Convention for Aerial Navigation of 1933, as modified by the Convention of 1944 (Stock, 1945), all passengers and crew must have been immunized not less than ten days and not more than four years before the date at which they enter the yellow fever endemic zone.

Before the war, when yellow fever immunization was still in an experimental stage, the majority of persons inoculated were tested for immunity. Under wartime conditions this became impossible. Some tests, however, were carried out in West Africa with discouraging results. Thus of 156 British officers and other ranks inoculated within six months in 1943, 83 were protected while 73 were not. There were two reasons for these results: (a) failure to remove residual moisture from the vaccine during the process of preparation, and (b) maltreatment of the vaccine after leaving the place of manufacture. The first difficulty has now been completely overcome, and further tests show that between 97 and 98% are successfully vaccinated. Maltreatment of the vaccine has occurred in a number of ways: breakdown of refrigerating plant used for storage of vaccine; inefficient vacuum flasks for its transportation; the use of hot syringes for injecting the vaccine; and exposure of the redissolved vaccine to high temperatures. The following figures show the results of using an inefficient vacuum flask for transporting yellow fever vaccine (Batch A) some 50 miles (80 km.) by road in West Africa. Tests were made a month after immunization, and all injections were carried out by the same pathologist.

Batch	No. of Persons Protected	No. of Persons Not Protected
A	44	21
B	17	1
C	15	1

Since the yellow fever vaccine is thermolabile it is obvious that considerable care must be exercised in its storage and handling.

Yellow Fever Certification

All passengers by air who are travelling through endemic yellow fever zones must now carry a certificate that they have received yellow fever vaccination more than ten days before the date at which they enter the endemic yellow fever zone and not longer than four years. At present an international yellow fever certificate is printed by the World Health Organization, following U.N.R.R.A., who had issued a booklet, appropriately bound in yellow, containing a yellow fever certificate.

A few minutes' search, however, at an aerodrome allowed seven different types of British yellow fever certificates to be collected, all signed by different medical officers. Since those who examine yellow fever certificates are not always provided with specimens of these various types or with a list of the medical officers who are empowered to sign such certificates, it is not surprising to learn that yellow fever certificates have in the past been forged and that it is reported on credible information that on the Continent there is a black market with a recognized tariff for these certificates. It is therefore obvious that to prevent the forgery only one form of yellow fever certificate should be available, while lists of the medical officers whose signatures are accepted should be kept in every airport.*

The International Sanitary Convention for Aerial Navigation of 1933 as amended by the Convention of 1944 (Stock, 1945) provides for the isolation of persons who do not hold a valid anti-yellow-fever inoculation certificate and who are travelling by air from an endemic yellow fever area to one in which the disease does not exist but in which conditions may permit of its development. Such persons may be isolated in screened quarters until such a certificate becomes valid or until six days shall have elapsed, whichever is the lesser period. The Convention also provides that in exceptional cases the countries signatory to the Convention may issue "certificates of urgency" to persons not immunized against yellow fever "whose unobstructed passage is absolutely and immediately essential on grounds of high policy, certifying that a passage without hindrance to the bearer of the certificate is urgently necessary."

As a wartime emergency such a measure was doubtless essential. In Crown Colonies the right to grant certificates of urgency was vested in the governor, but in practice it involved the granting of these certificates by the governor's deputy, the Colonial Secretary, or his deputy, and in fact by a considerable number of persons in each secretariat. The Governments of the Union of South Africa and of Southern Rhodesia have now very wisely refused to accept these certificates of urgency, the use of which should be everywhere abolished.

During the war, in order to reduce the risk of any person in the incubation period of yellow fever coming within controlled aerodrome areas all ground staff as well as casual labourers were immunized. In some areas this involved the immunization of a considerable proportion of the population of villages and towns in proximity to aerodromes.

Need for an International Organization

The organization which dealt with the sanitary control of aerodromes and aeroplanes during the war has now largely been dispersed, but peace has not brought a solution of these problems, which remain as urgent as ever. Yet many of the countries which find themselves on international air routes have neither the staff nor the money to devote to matters which are not their primary concern. There are three possible solutions. It may be thought that the danger of the spread of infectious diseases and their vectors is negligible and that therefore there is no need to have any special organization to deal with air transport. This point of view, in face of the International Aerial Sanitary Convention of 1933, amended in 1944, can hardly be maintained. It may be thought that there is a danger but that it is safe to allow each separate country to have complete control over the international aerodromes in its own territory. In view of the many loopholes which became apparent during the war, and of the meagre resources possessed by many countries for dealing with international air traffic, it seems that the only really satisfactory organization is an international one with an adequate staff and funds of its own. This concern might well be placed under the World Health Organization of the United Nations, and in close association with P.I.C.A.O. (the Permanent International Civil Aviation Organization). Its functions would be: (1) To take sanitary control of all aerodromes and aerodrome areas which are considered to be involved in the spread of infectious diseases from endemic to non-endemic areas; (2) to control the disinsectization of all aeroplanes on routes where spread of infectious diseases is likely to occur; (3) to control the storage

* The Government of India now insists that valid yellow fever certificates must be signed only by approved persons, and other Governments are adopting the same procedure.

of yellow fever vaccine and its injection under standardized conditions, and to approve institutes for the testing of yellow fever vaccines; (4) to control the issue of yellow fever immunization certificates.

So far as the sanitary control of aerodromes and aerodrome areas is concerned, this implies something more than the biannual meeting of government officials which before the war occurred at the Office International d'Hygiène Publique in Paris. It would involve a partial abrogation of sovereignty on the part of the territories concerned, since the sanitary staff engaged in this work would be responsible not to local directors of medical services but directly to the World Health Organization of the United Nations.

In the age of the internal combustion engine the spread of disease can be held in check only by a scheme which is internationally sponsored and internationally controlled.

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ABACTERIAL PYURIA

WITH SPECIAL REFERENCE TO INFECTION BY SPIROCHAETES

BY

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The problem of sterile, amicrobic, or abacterial pyuria is occasionally brought up in medical publications in relation to a new case observed. It is a problem that has interested us for several years, and we have published some papers on the subject in Chilean medical journals (Vargas-Zalazar, 1937; Coutts, 1938; Coutts and Vargas-Zalazar, 1945); our findings, however, may not be generally known. In our opinion "abacterial" is the right designation for this syndrome, which may originate through ascending or descending infection of the urinary tract by viruses, spirochaetes, or protozoa. In most cases causative diagnosis was not made because dark-ground observation of centrifuged urinary deposit of bladder or kidney urine samples has not been incorporated into routine laboratory practice.

We refer later to cases of abacterial pyuria, which according to our findings are produced by spirochaetes. Our first suspicion of the possible action that some of these micro-organisms might have in the production of such a type of pyuria was aroused more than ten years ago.

A medical student consulted us for slight dysuria and cloudy urine, in the absence of urethral discharge, which had been troubling him for a few days. Prof. Bisquertt-Torres, who had charge of the case, found pus cells but no bacteria of any kind in urine obtained direct from the bladder. Cystoscopy revealed only a slight congestion of the trigone. Bilateral kidney-pelvis catheterization performed on two occasions showed numerous pus cells but no bacteria. Cultures and animal inoculations of urine from both kidneys and bladder failed to reveal Koch's bacilli. At the time Bisquertt-Torres and one of us (Coutts) thought that the most probable diagnosis was that of bilateral renal tuberculosis. Before travelling to Switzerland the patient visited his dentist, who removed a gold-filled molar which was somewhat tender on pressure and showed a certain amount of apical damage in a radiograph. Urinary symptoms then sub-

sided rapidly, the urine cleared, and the pus disappeared. He is now a well-known physician, is married, has several children, and enjoys good health.

In 1937 Vargas-Zalazar, at one of the weekly staff meetings of our clinic, presented a case of abacterial pyuria. In the discussion Coutts, remembering the above case and some similar ones presented by Wildbolz at the French Congress of Urology in 1933 and treated successfully with arsenicals, suggested a search for spirochaetes in urinary deposits observed under dark-ground illumination. These micro-organisms might proceed from the oral cavity or intestinal tract. In this case spirochaetes were discovered. On perusing the medical literature we found that Briggs (1935), Cook (1936), and Wildbolz (1937) had treated similar cases of abacterial pyuria successfully with arsenicals.

The following is a summary of five cases of abacterial pyuria in which we were able to demonstrate spirochaetes or spirilla under dark-ground illumination of deposit from centrifuged bladder urine obtained by catheter.

Case Reports

Case 1.—A male student aged 21 consulted Vargas-Zalazar privately in 1937. He had undergone tonsillectomy at 8 years of age. His present illness began in 1934, when, after gonorrhoea complicated by epididymitis, his urine on complete bacteriological recovery remained cloudy and contained pus cells. The attending urologist studied the case from a renal point of view and found abacterial pyuria in both kidneys. Investigations for Koch's bacilli were all negative. As the patient felt no symptoms he abandoned further medical care. In 1937 renewed urological studies by Vargas-Zalazar gave similar results. An intravenous pyelogram revealed a right hydro-uretero-nephrosis. Dark-ground investigation of bladder urine showed the presence of large numbers of spirilla. He was treated with one dose of 0.15 g. and three of 0.3 g. of neosalvarsan, and in twenty days pyuria and spirilla disappeared from the urine. Later controls have proved his cure to be complete (Vargas-Zalazar, 1937).

Case 2.—A merchant aged 47 consulted Coutts in 1937 because for two months a slight urinary diurnal frequency and tenesmus had been troubling him. His urine was cloudy and did not clear, nor did symptoms disappear after two successive courses of protosil album. On examination there was no urethral discharge, the urine was cloudy, and the prostate and genitalia were normal. Bladder urine contained numerous leucocytes and some red cells but no bacteria. Koch's bacilli were not seen. The bladder capacity was 150 ml., and the ureteral orifices were normal. On the trigone and right wall several aphthoid lesions were observed. Dark-ground illumination of the bladder urine deposit revealed numerous spirilla. Methylene-blue instillations into the bladder and three injections of a pentavalent arsenical intravenously cured him. When last seen he was in perfect health and his former trouble had not recurred (Coutts and Vargas-Zalazar, 1945).

Case 3.—A woman aged 34 entered our clinic in 1938. Her previous history was of no importance. The present illness began fourteen months before with slowly increasing urinary frequency by day and night. Terminal haematuria was occasionally present. The bladder urine contained pus and cocci, but Koch's bacillus was absent from several samples. The bladder capacity was 40 ml.; there was intense congestion of mucosa with numerous disseminated ecchymotic spots and patches, some covered by exudate. Local treatment was unsuccessful. Dark-ground examination of bladder urine deposit showed numerous spirilla. Arsenic and bismuth combined cured the condition rapidly (Bisquertt-Torres, 1938).

Case 4.—A married hospital nurse aged 32 began in 1940 to have painless haematuria lasting for two days. There was a similar recurrence in December, 1941. As the loss of blood was not stopped by treatment she was admitted to our clinic. Her bladder urine always showed red cells and a few pus cells but no germs. Koch's bacilli were never found. Blood pressure and coagulation tests were normal. Bilateral renal catheterization on two occasions showed blood in both kidney pelves and very slight pyuria but no bacilli. Koch's bacilli were not found. A descending pyelogram proved normal. Dark-ground examination was positive for spirilla (bladder urine). She was treated with pentavalent arsenic by mouth, and haematuria then disappeared. In November, 1944, haematuria reappeared, and spirilla were found in bladder urine. She was cured with stovarsol and was sent to her dentist (Coutts and Vargas-Zalazar, 1945). Up to the time of writing she had relapsed once again.

Case 5.—A physician aged 49 consulted Coutts in 1946 for dysuria and cloudy urine. Five days previously a dead nerve was removed from the canal of an upper median incisor. A few hours later the upper lip started swelling, and twenty-four hours later an abscess of the anterior portion of the gum was drained surgically. Bladder