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Autor: Cathie, I.A.B.
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Tropical Medicine in the Middle East

1940-1942.

By I. A. B. CATHIE,
Major, Royal Army Medical Corps.

Introduction.

With the outbreak of hostilities in Egypt in 1940 the transportation of vast numbers of white troops used to a temperate climate into the tropics brought a series of medical problems perhaps not usually encountered by the peace-time tropical doctor. Humidity and temperature, lack of any acquired immunity to tropical disease, lack of tropical experience by the doctors accompanying the troops, the numbers of men involved, distances, water shortage and many other factors can combine to create situations of the utmost perplexity. These disadvantages were somewhat counterbalanced by the control it was possible to exercise over the sick, by the experience gained from such large numbers, the constant availability of expert advice in all forms of diagnosis and treatment, and the ready co-operation of all concerned.

There were in fact two areas presenting the same medical features, but sharply divided owing to environmental factors. The base camps in Egypt and Palestine were established with most of the advantages of modern civilisation, while in the battle area the conditions were far more primitive and called for the exercise of much ingenuity and improvisation.

As every writer on tropical diseases has remarked, it is impossible to draw a hard and fast line between what is tropical and what is temperate medicine. Pneumonia, for example, belongs to general medicine, yet in certain circumstances may be frequently encountered in the tropics. Conversely, typhoid fever is by no means uncommon in temperate regions although primarily seen in warmer climates. The following is an account of the diseases, exclusive of battle casualties, seen by the writer in the Middle East up to the middle of 1942, and instead of "tropical diseases" deals with diseases commonly met with in tropical and subtropical climates.

Experience of the relatively civilised form of tropical medicine was gained during the early stages of the campaign while working as clinical pathologist to a large general hospital in the Nile Valley. Here the patients were drawn from both the battle and the base

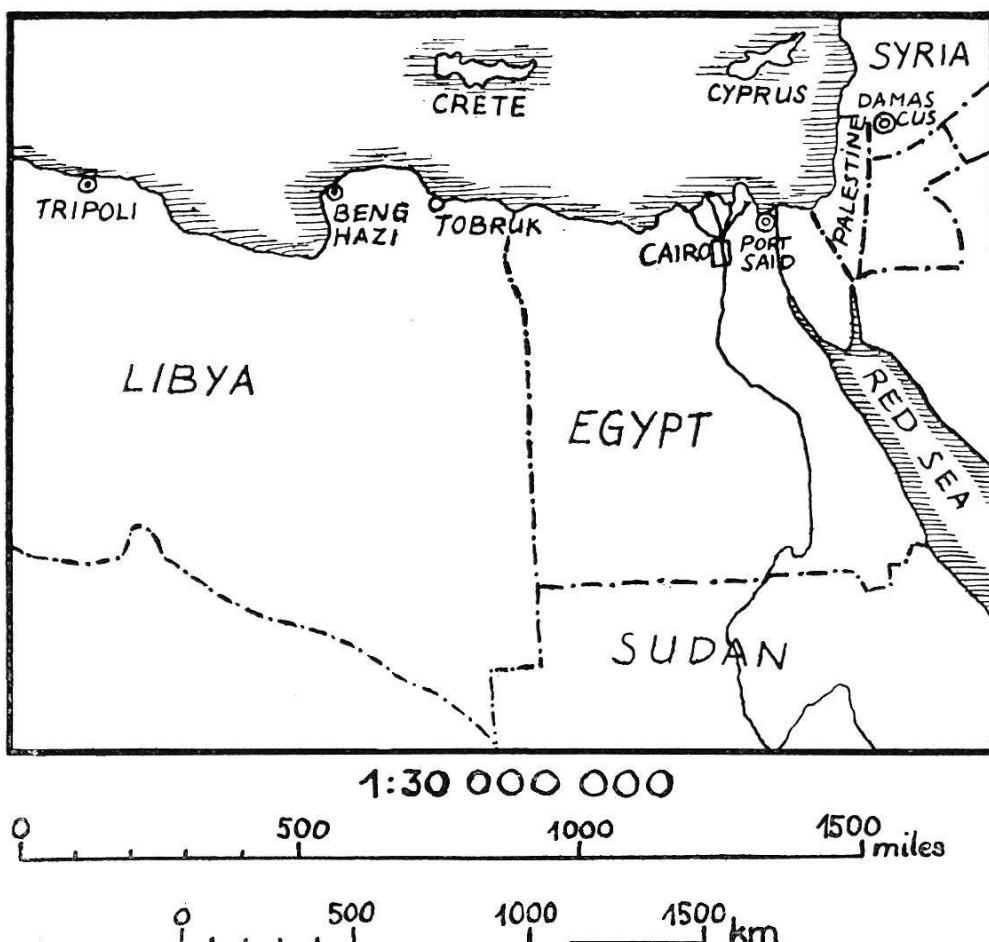
areas, and included also a number of cases of diseases of other regions brought by soldiers previously affected but in whom the illness had hitherto not declared itself. A more primitive and hazardous form was seen when later the writer was attached to a hospital acting as a casualty clearing station in Tobruk. Practically all the medical and most of the surgical cases of the Eighth Army occurring in Tripolitania, Marmorica and Libya were evacuated through this bottle neck, which thus provided an unrivalled opportunity of seeing the different types of disease as well as concentrating the evidence of the need for various prophylactic hygienic measures.

The men came from all parts of the British Empire. There were white troops from Great Britain, Australia, New Zealand and South Africa, and coloured troops from India, Cyprus, Mauritius, Seychelles, South Africa and parts of Equatorial Africa. They were subject to the same illnesses, and reacted in much the same way, irrespective of race. There was little difference to be noted in the incidence, duration or severity of the local diseases when analysed in the light of race or colour. The coloured troops withstood the effects of heat and thirst somewhat better than the white, but between the different white peoples concerned there was little to choose, and what little there was disappeared rapidly during the initial training period, when the men acclimatised themselves with astonishing rapidity.

Local conditions.

The climate and geography of the Nile Valley are universally known and need no mention. The battle area varied from within the Egyptian frontier to South-West of Benghazi. Between Benghazi and Derna the country is hilly, but is sparsely settled and partially developed agriculturally, and there is a fair amount of vegetation. Eastwards from Derna, however, the desert extends up to the sea almost as far as the outskirts of Alexandria. In the main it is undulant, and is traversed from East to West by a series of low but steep escarpments. In parts there is pure sand, but mostly the surface is composed of fine dirt and small stones, loosely knit together by a scanty growth of camel thorn. Around the coastal settlements, and in the wadis running down to the sea, bigger bushes and an occasional date palm are found. Water is very scarce except in the settlements such as Tobruk, Bardia, Sollum and Mersa Matruh.

The climate was not particularly distressing. The main bugbear was the sudden sandstorms, or more properly, dirtstorms, lasting



sometimes for a matter of days, making everything dirty and rendering food unpalatable owing to the grittiness. The torrential spring rains were a source of irritation while they lasted, and the extreme cold of the winter nights in the desert was difficult to withstand.

From the medical point of view the sandstorms, rain and cold were of little interest. What caused most illness was the coincidence of a relative heat wave with a period of high humidity, particularly in the Nile Valley, where the summer shade temperature occasionally reached 116° F. The wearing of loose clothing, topees, sun glasses where necessary, regular habits and the avoidance of foolish exposure kept the numbers of cases of heat stroke surprisingly low. But when such cases did occur the differential diagnosis was often difficult. Cerebral malaria and the other causes of coma such as uraemia and diabetes had to be excluded, and the estimation of urinary chlorides, blood sugar and urea, and blood films for malarial parasites were of the greatest value. Fortunately, at strategic points throughout the Middle East there were laboratories where such investigations could be carried out.

Dehydration to a severe degree practically only occurred in people who for some reason had become separated from their units

for a length of time, and constituted no special problem. Similarly, "kaffan" or desert madness was seldom met with and responded readily to symptomatic treatment.

Insect Pests.

The various disease vectors will be referred to later. Fleas were the biggest nuisance among the minor insects, and it was practically impossible to control them in any way. They occurred throughout the coastal strip, particularly in years-old dugouts, and the simplest procedure was to avoid the dugouts. The soldiers' expedient of pouring some petrol on the floor and then throwing a lighted match into the dugout did little to discourage the fleas and often burned the operator. Especially in areas where camels had been used to graze was a peculiarly virulent type of flea encountered.

Bites from poisonous spiders were rare, though they were sometimes heard of in Palestine. Scorpions were not uncommon but patients with scorpion bites were infrequent. There were differing opinions as to the efficacy of the anti-scorpion serum available.

The local horned viper caused some trouble, as at night it tended to seek the warmth of blankets. Although its bite caused severe constitutional upset fatal cases were not heard of. The anti-serum was effective, but distance and time spent in travel over trackless desert diminished its usefulness. Incision of the bite and symptomatic treatment were usually all that could be done and were always effective in saving life.

Flies, although in themselves harmless, by their very numbers were a source of constant irritation and lack of sleep, and as potential carriers of bacteria, notably typhoid and dysentery bacilli, were fought by every means possible. Sleep was obtained by the use of mosquito nets. Food was kept covered, cook houses and entrances were fly-screened, fly papers were hung where practical, most refuse was burned and indestructable refuse was buried. Deep latrines were dug, the entries kept covered and the exits fly-trapped, instructions were issued that all excreta in the open be immediately covered, and fly swats were distributed. Further, rubbish dumps in the neighbourhood of villages, which were favourite breeding grounds, were whenever possible destroyed. A tremendous propaganda campaign was carried out, and there is no doubt that the average soldier became fly-conscious and faithfully endeavoured to kill his daily quota of flies. The fly traps, placed in the best points of vantage, were perhaps the best reminder of the fly's fecundity and ubiquity.

The success or failure of the anti-fly campaign will not be evident until after the war, but in a country where practically all the acts of most of the inhabitants cause and encourage flies to breed the most that can be hoped for is partial success.

Sandflies.

Nothing could be done to destroy sandflies, and avoidance of their disconcertingly painful bites was aimed at. Sandfly nets of the finest texture were issued, and although practical and easily erected the conditions of desert warfare often did not permit of their use. Thus there was a fair number of cases of sandfly fever.

Usually the course of the fever was typical, showed the normal side effects, and was complete in four to five days. Headaches and photophobia were common. A certain number of cases, however, starting originally as typical sandfly fever, did not clear up as expected by the fifth day, but instead developed stiffness of the neck and signs of mild meningismus. More than thirty such cases were observed in one general hospital in six months. Lumbar puncture showed an increase in lymphocytes up to 1,000 per cmm., a slight increase in protein and reduction in sugar content. Cultures were invariably sterile. The condition cleared up slowly and the lymphocyte count fell equally slowly, often being still slightly raised at the end of a month or six weeks.

In such cases one was forced to a diagnosis of benign lymphocytic meningitis. The spinal fluid was extensively examined, and *Treponema recurrentis* was particularly sought for without success. Sandfly fever became an unsatisfactory diagnosis, and one was never sure that the diagnosis was correct until the patient was convalescent on the fourth or fifth day; and if he was not, lumbar puncture was usually indicated.

Other diseases in which the sandfly was a possible vector were not encountered.

Mosquitoes.

Although malaria was not uncommon in Egypt and Palestine one of the few blessings of the water shortage in the Western Desert was the lack of breeding places for mosquitoes. As troops were constantly arriving from other theatres of war, however, its possibility had constantly to be borne in mind. And although the common type in Egypt was benign tertian there was always the possibility of troops from such a theatre as West Africa arriving heavily infected with *Plasmodium falciparum* and disseminating the more serious infection.

The usual measures were employed to eliminate mosquitoes. Special malaria units ran courses of instruction for medical officers, undertook malaria surveys, drained marshes and potential breeding places, and treated others chemically where drainage was impracticable. The question of compensation for drainage must have been a knotty problem, because as soon as it was decided to undertake such an operation the land appreciated in the eyes of its owner to boom heights. There can be no doubt that the decreased significance of malaria, in comparison to the incidence in the 1914-18 war, was due to the efficiency and thoroughness of the malaria units.

To reduce the surface available for mosquitoes to bite the khaki shorts of the troops were provided with flaps which turned down and tucked into the stockings at night, and their shirts had long sleeves. Also anti-mosquito ointment was issued to everyone. Sprays were available, and dark corners of living quarters were sprayed morning and night.

Plasmodium vivax was much the most frequent offender. *P. falciparum* caused possibly 10% of the cases seen by the writer, while *P. malariae* occurred in about 2% of cases. *P. ovale* was rare enough to remain largely theoretical, although on the rare occasions when it was met with its characteristic shape and staining properties made it readily distinguishable. The prevalence of malaria and the difficulty in its diagnosis led to the adoption by most units of a golden rule that all cases of pyrexia should have at least three blood films examined. In suspicious cases the blood was examined after the preliminary injection of adrenalin. Sternal puncture was extensively used in diagnosis in some laboratories, with varying results. Splenic puncture was regarded as too hazardous a procedure under the existing conditions to become routine practice, and was rarely indicated. A differential leucocyte and demonstration of monocytosis was found to be most valuable presumptive evidence of a malarial infection.

The treatment was routine, and little new emerged. The question of prophylactic quinine in hyperendemic areas remains debatable. Blackwater fever was rare enough to be a curiosity, and its favourable outcome was thought to be due to the administration of large doses of alkali.

Lice.

While always a potential menace lice never became an actual problem. In the back areas regular baths and hygiene were always possible, while the battle area fortunately bordered the sea, and sea bathing, with the provision of sea-water soap, maintained

a reasonable standard of cleanliness. Regular inspection of all men was carried out by the unit medical officer, and mobile bath units were available with, where necessary, mobile disinfection plants.

Epidemic typhus was thus never seen, and the number of sporadic cases seen by any doctor could probably be counted on the fingers of one hand. Diagnosis was made clinically and serologically, and treatment was largely expectant and symptomatic.

Ticks.

As was the case with fleas, ticks tended to infest old fortifications and dugouts, and were especially frequent in the caves along the coast. The huge number of such places made methodical disinfection impossible, and the only possible precautions were mosquito nets and the avoidance of known tick-infested caves. During the periods of rapid movement there was little time to sleep comfortably, and the ticks were left in peace. But in the comparatively long periods of waiting and defensive warfare underground shelters were constructed and old ones renovated for inhabitation, and it is consequently not surprising that in such static periods relapsing fever appeared.

The characteristic temperature chart, even in the absence of a history of tick bites, nearly always indicated the correct diagnosis, and as in any case such patients were examined to exclude malaria, the *Treponema recurrentis* was usually easily demonstrated in blood films taken in a bout of pyrexia. The thick drop method of FIELD was extensively used, and gave excellent results not only with spirochaetes but also with malarial parasites. When possible the place where infection had occurred was evacuated by the remaining inhabitants, although obviously danger from ticks was often a secondary consideration in the conduct of the war.

At first cases of relapsing fever were given an intravenous dose of arsenic and evacuated to the base. Experience showed, however, that such was the effect of a single injection of arsenic that many cases arrived at the base cured. Latterly, therefore, to reduce this waste of time and manpower such cases were held and treated at a forward unit and only sent back if they proved refractory to treatment or some other factor was involved.

Bacterial infections.

Most British troops arriving in the Middle East underwent at some time during the first month a phase of initiation known

locally as "Gypy tummy". This was a form of enteritis lasting three or four days, and characterised by griping abdominal pain, tenesmus, diarrhoea with the passage of mucus, and some anorexia. Fever was usually slight. The mucus showed microscopically a few leucocytes, insufficient to be called a bacillary exudate, and cultures showed no dysentery organisms. The aetiology is not clear. Some observers thought it to be due to a virus infection to which immunity was rapidly established, while others maintained that it was due to an occult dysentery organism, possibly SONNE, whose presence was not demonstrated owing to insufficiently delicate laboratory methods.

Exhaustive bacteriological investigation of the stools showed very occasionally a SONNE or FLEXNER organism, which was usually accompanied by a bacillary exudate. Otherwise no pathogenic organism was isolated, blood was not passed, the disease cured itself in a short time and often called for no treatment. Where a pathogen was isolated the cases were obviously a mild true dysentery, but in others the consistently negative bacteriological findings, in contradistinction to those in true dysentery, and the mild self-terminating course of the illness suggest, in the writer's opinion, that "Gypy tummy" is not bacterial but has possibly a virus aetiology. The point is still open, and improved methods of *B. dysenteriae* isolation may lead to the more frequent demonstration of the causative organism in these cases.

Dysentery.

The prophylaxis of all enterocolitis was concerned mainly with the suppression of flies, the segregation where possible of patients with diarrhoea, and the covering of all excreta and contaminated material until destroyed.

The question of flies has already been mentioned. Bed pans were fitted with covers immediately after use and remained so covered until their contents were discharged into pits containing lysol or cresol. The bed pans were then sterilised before re-using. Food likely to be infectious was well cooked before eating, and food to be eaten fresh was washed thoroughly first in dilute potassium permanganate. Further, the stools of all cooks were cultured routinely to exclude the possibility of their being carriers.

Varying with differing opportunities and conditions different laboratories recovered from 60% to 90% of causative organisms. *Entamoeba histolytica* comprised roughly 10% of the cases. According to rule, *E. histolytica* was not diagnosed unless motile and containing ingested red cells. Time between the passage of a stool

and its reception at the laboratory made a big difference in the number of positive results obtained, and depended to a large extent upon local conditions.

B. dysenteriae FLEXNER, SHIGA, SCHMITZ, and SONNE were recovered in roughly that order of frequency, although the prevalence of organisms varied with locality. The methods of investigation described by BOYD were used, and with the discovery and elimination of certain pitfalls, such as a residue of disinfectant in a bed pan, the positive results reached a high level. Sundry other organisms, such as *S. aertrycke*, were encountered from time to time, as well as atypical strains of *B. dysenteriae*.

As a general, but by no means invariable rule the SHIGA infections were the most serious. At the time under review sulphaguanidine was available only in small quantities in the Middle East, and was reserved for the severest cases, but no-one who has seen the dramatic recovery of a moribund patient can doubt its amazing efficacy in dysenteric infections.

The recovery of chronic amoebic cases was controlled where possible sigmoidoscopically. Sulphaguanidine was of little or no use in such circumstances. Liver abscess was rarely seen, although an occasional abdominal wound was found to harbour amoebae superficially.

Enteric Fever.

Thanks to the vaccination of all soldiers with typhoid, paratyphoid A and paratyphoid B vaccine and regular annual revaccination enteric fever was almost unknown among the British troops. When it did occur the disease was abortive and the course mild. In such cases the diagnosis was often difficult owing to the masked WIDAL test and the difficulty of recovering the organism bacteriologically. When in doubt the WIDAL was repeated at frequent intervals, and a rising titre was regarded as indicating an active infection.

A small epidemic of typhoid fever occurred in a group of prisoners who had been recently vaccinated. A sample of the actual vaccine was also captured, and on examination proved to be non-antigenic, thereby accounting for a negative or very low WIDAL titre in a series of uninfected controls from the same camp. The stools from the infected cases gave a very small number of positive cultures, probably less than 15%. The urine in the early stages was rather more often positive, but repeated blood culture was the most valuable procedure. A sternal marrow culture was done as often as circumstances permitted, and was nearly as often

positive as the blood culture. Post mortem spleen bile and heart blood cultures were nearly always positive, while smears from the base of the intestinal ulcers and even macerated ulcer tissue itself were almost consistently negative.

As the camp in question contained about 15,000 prisoners the remainder of the inhabitants were immediately revaccinated with an antigenic vaccine. A carrier was sought for and found among the cooks by culturing the stools daily for six consecutive days. It would have been interesting to have investigated the members of the camp with Vi antigen, but the numbers and time involved prohibited such an undertaking. The epidemic died out rapidly with rigid hygienic precautions, and with the institution of annual revaccination as in the British army did not recur.

Desert Sore.

Whether tropical sore or desert sore should be included under the heading of bacterial disease is a moot point. It may, however, be justifiably discussed here, as bacteria, whether the causative agent or secondary invaders, play an important part in the development and maintenance of the lesion.

It must be admitted that the cause of these lesions is obscure. They usually started either in a small abrasion of the arm or leg or as the result of an infected insect, probably mosquito, bite. Whether a dirty skin played a part or not is not sure, but a shallow painful ulcer developed at the site of the abrasion. This ulcer grew larger slowly, often taking a matter of weeks, and eventually involving the deep subcutaneous tissues and occasionally muscle. When fully developed it presented the characteristic appearance of a large, often enormous, indolent ulcer with an undermined, overhanging edge and a sloughing base. The surrounding tissue was indurated to a varying degree. Histological examination of the spreading edge showed chronic granulation tissue richly infiltrated with eosinophils, lymphocytes and plasma cells, and containing large numbers of new-formed capillaries. A causative agent, such as LEISHMAN-DONOVAN bodies, was never seen.

Intensive bacteriological research was directed towards desert sore, but the results were unfortunately equivocal. The GRAM-negative diplococcus claimed to have been recently isolated by CASTELLANI was, as far as the writer's knowledge goes, not confirmed in British laboratories. Haemolytic and nonhaemolytic streptococci, staphylococcus pyogenes, *B. pyocyaneus* and the usual common contaminants were easily isolated, sometimes in a mixed infection, while at other times an almost pure growth of one organism would be obtained. At one period the KLEBS-LOEFF-

LER bacillus was isolated almost in epidemic numbers. Such an organism naturally changed the whole clinical appreciation although the lesion presented no special features. In its absence any general upset was due to the absorption of toxic breakdown products in the sore, but the presence of the diphtheria bacillus at once raised the question of virulence and the possibility of generalised absorption of diphtheria toxin and subsequent paralyses. It is interesting to note in this connection that diphtheria bacilli were sometimes recovered from blister fluid obtained by aspiration through an apparently intact skin.

Animal control of bacteriology was one of the great problems in the Middle East. It must be said at once that in the conditions of service the accommodation it was possible to provide for animals was indifferent, and rabbits and guinea pigs did very poorly in the heat and on the diet it was possible to provide. Most laboratories tried to adapt the local fauna to their particular needs, and mice, hamsters, desert rats and even pigeons were investigated. Such results have been, or will be, published elsewhere. It was always possible to have special investigations and virulence tests carried out in a central base laboratory, but a glance at the map shows the distances involved from such centres to the forward areas, and the time taken in travelling led the forward units to develop as far as possible their own resources.

The treatment of desert sore remained an individual problem because of the varying ways the sores reacted. Some would clear rapidly and completely with a simple saline dressing, while others, in fact the majority, ran a slow and protracted course, and took literally months to cure. There were various favoured methods of treatment among the surgeons. Local application of the sulphonamides proved disappointing. The triple dye of BONNEY, flavine, castor oil, powdered vitamin C and other vitamin preparations all had their advocates. A number of cases, however, came to mass excision and drafting.

The general condition was naturally investigated and where necessary built up. The possibility of an avitaminosis was constantly remembered, but such an aetiology was not proved. The diphtheritic cases were at first most common in the Libyan Desert, but subsequently appeared as commonly in Egypt. The occurrence of paralyses in a few patients who failed to report small lesions to their medical officer led to the presumption that strains of *C. diphtheriae* were virulent until proved otherwise, and such cases were treated with diphtheria antitoxin. Local application of antitoxin as well as injection in the subcutaneous tissue around the sore were, as was to be expected, fruitless.

Other Diseases.

The following diseases are discussed only briefly on account of their infrequent occurrence, and because the present article refers only to those diseases commonly seen and presenting special problems for the army doctors. It is probable that every disease that the Middle East is able to confer upon its guests was seen during the course of the various campaigns, but the rarities occurred so rarely as to constitute pathological curiosities.

Owing to the ban put upon bathing in rivers and canals bilharziasis was rarely seen in a white soldier. It may be that more cases will be seen as time draws on. For the same reason worm infestation was rare. Water wherever possible was chlorinated, and it nearly always was possible. It was also allowed to stand after chlorination, and finally was usually boiled.

Brucelloses were almost unknown. The advances in the canning of food since the first world war enables an army to be much more independent of local food supplies than heretofore, and probably plays an important part in narrowing the type of disease to which the soldier is liable.

The significance of the various intestinal parasites, apart from worms, remained unsolved. *Trichomonas*, *lamblia*, and *chilomastix mesnili* were the commonest protozoa seen, and were often found in abundance in cases of enterocolitis in which no pathogenic bacteria could be isolated. But whether their abundance was due to the suitable soil provided by dysentery bacilli or whether they themselves were the cause of the dysentery remained unsettled. The newly heralded treatment of *lamblia* infestation with atebrin proved disappointing. Such parasites as *Balantidium coli* were almost never seen, and cases of sarcosporidiosis were equally rare.

Among these cases of dysentery of doubtful origin many non-lactose fermenting organisms were grown, and merely served to make the search for pathogens more laborious. It was the consensus of opinion that these paracolon bacilli played no part in the establishment of the dysentery symptom complex.

With the transport of large numbers of coloured troops from equatorial regions to the Middle East it was not surprising that they brought with them sundry tropical diseases not usually met with in Egypt. They constituted diagnostic problems not peculiar to the Middle East but to the races of men who brought them. Thus in coloured troops haematuria and well marked bladder papillomatosis due to bilharziasis was sometimes seen, *Ankylostoma duodenale* occurred from time to time, and occasional cases

of leprosy and yaws were encountered. They were infrequent enough to cause no medical administrative problem, yet the possibility that they might be seen had constantly to be remembered when examining coloured troops. Fortunately these troops usually brought their own doctors with them, wise to the ways of their men and experienced in the diagnosis of their ailments.

Kala-azar.

A word must be said about kala-azar, not because of its commonness but as an illustration of the diagnostic conundrums that occasionally presented themselves.

Certain units served in an area of hyperendemic kala-azar in East Africa. While there a number of men contracted what appeared to be ordinary catarrhal jaundice, a by no means uncommon complaint, which cleared up in about a month. Shortly afterwards Eritrea fell and the troops were moved to Egypt. While in Egypt, scattered about the country, and varying from three to six months after removal from Eritrea, some ten or a dozen men fell ill. Most of them had had catarrhal jaundice previously while in the hyperendemic kala-azar area. Now they showed a low intermittent fever, malaise, anorexia and wasting, an enlarged soft spleen and sometimes an enlarged liver. There was a general leucopenia with relative monocytosis. The stools and urine were normal and all investigations thereon essentially negative. Blood smears and sternal marrow showed no malarial or other parasites. Repeated splenic punctures and the serum gel test were also negative.

Naturally a diagnosis of kala-azar was considered, but its relative absence in Egypt, the length of time since coming from Eritrea, the failure to demonstrate the parasites and the negative gel test contradicted such a diagnosis. No other cause of the illness was found, and the treatment adopted was empirical. Some patients showed a transitory improvement with arsenicals, and this led to the consideration of the possibility that we were in fact dealing with a spirochaetal infection. One of these patients died, and an exhaustive autopsy suggested kala-azar, but smears and histological sections were again negative for LEISHMAN-DONOVAN bodies.

A short while after this very scanty LEISHMAN-DONOVAN bodies were found in the splenic smear from another patient. The remainder of the sufferers were at once removed to a special treatment centre and treated for kala-azar with diamidino stilbene (Stilbamidin) with excellent results. They were undoubtedly rather atypical cases of kala-azar, in view both of the repeatedly negative splenic

smears and of the negative gel reaction, and the incubation period seemed unduly long. That the first patient who died also had kala-azar is, in spite of the failure to demonstrate the causative organism, a moral certainty, but unfortunately the negative findings tended to obscure the clinical diagnosis.

The series of cases demonstrated how invaluable some form of central control could be in fighting a possible epidemic. As none of the patients had fallen ill while in Eritrea the various units were not kept together, but were spread throughout the Middle East in accordance with the demands on their services. As soon as the doubtful cases started to occur all these units were checked up on, doctors were informed of the possibility of their encountering such cases, and there was a free exchange of information of the various findings between the different hospitals and laboratories concerned.

Treatment.

In the period under consideration little new in treatment emerged in the strict realm of tropical medicine. Sulphaguanidine has been mentioned, and penicillin was not then being produced in sufficient quantity to be available for experiment. The diamidines recommended by WARRINGTON YORKE were tried out in the more equatorial diseases, but there were few indications for their use in Egypt. Diamidino stilbene was used with very satisfying results in the kala-azar cases discussed above, and the full results of its exhibition in the different protozoal infections will be published elsewhere.

Possibly no group of doctors has ever been so fortunate in having at its disposal such a quantity of readily available blood and replacement fluids to combat the side effects of tropical disease as in the Middle East. Preserved group 0 blood, serum, wet and dry plasma, and various solutions such as dextrose, saline and antiseptics were freely provided by the Blood Transfusion Service and equally freely used. Particularly were they useful in dehydrating diseases in patients already dehydrated by climatic conditions and in the ill-defined tropical anaemias. Fresh blood was also given to combat sepsis, and blood transfusions were freely given during convalescence where indicated.

Conclusion.

According to the Egyptian Ministry of Health the principal diseases endemic in Egypt are: trachoma, affecting 90% of the people; bilharziasis, 55% (75% in rural communities); ankylosto-

miasis (30%); malaria (15%); venereal diseases (12%); pellagra (7%); tuberculosis (2%); and leprosy (0.3%).

If the figures for the tropical diseases in the foregoing list are compared with what has been said it will be realised how successful were the precautions taken against the endemic diseases. As has been said, bilharziasis and ankylostomiasis were practically not seen in white troops, and the same may be said of trachoma. With the diet provided for the fighting soldier any outspoken avitaminosis was not to be expected, although minor degrees of vitamin deficiency were always a possibility and were constantly borne in mind by the medical staff.

An attempt has been made to indicate the more frequent tropical diseases encountered in the Middle East during 1940-42, both in the base areas and in the forward battle zones. No effort is made to present a detailed list of the tropical diseases it is possible to see, as in fact the rarities were seldom or never met with. Nor are details of the different diseases given, as they can be read in any text book. In broadest perspective the simple hygienic precautions are referred to. It is felt that the general excellent standard of health maintained by an army composed of many different types of men, in the main suddenly transported from a wet temperate climate, has seldom been surpassed in any theatre of war, and that the low incidence of actual disease is a tribute not only to the farsighted policy of the medical administration but to the soldiers themselves, who readily appreciated the hazards to which they were exposed and observed all instructions designed to protect them.

The lessons learned in this theatre of war during 1914-18, when the medical far exceeded the battle casualties, had been taken to heart, and the number of doctors, hospitals and medical units of all kinds ensured the immediate treatment of all diseases, the availability of experienced tropical experts facilitated the diagnosis of rare conditions, and the nursing services played a vital part in reducing periods of morbidity. For the great decrease in actual disease incidence the extensive precautions taken by the hygiene units must be thanked.

It should be appreciated that the foregoing remarks are based upon personal experience and observation and in no way represent official opinion.

Zusammenfassung.

In Aegypten treten hauptsächlich folgende endemische Krankheiten auf: Trachom (90% der Bevölkerung); Bilharziose (55%,

in ländlichen Gegenden 75%); Ankylostomiasis (30%); Malaria (15%); Geschlechtskrankheiten (12%); Pellagra (7%); Tuberkulose (2%); Lepra (0,3%). Bei den weißen Truppen wurden Bilharziose und Ankylostomiasis sowie Trachom praktisch nie festgestellt. Die für die kämpfenden Soldaten festgesetzte Nahrung lässt auch keine ausgesprochene Avitaminose erwarten.

Es werden die während der nordafrikanischen Feldzüge 1940 bis 1942 im Nahen Osten in der Etappe und an der Front am häufigsten festgestellten Tropenkrankheiten behandelt und eine Uebersicht über die hygienischen Maßnahmen gegeben. Der allgemein ausgezeichnete Gesundheitszustand dieser Armee, die aus so vielen verschiedenartigen Elementen zusammengesetzt ist und zu einem großen Teil plötzlich aus einem gemäßigten feuchten Klima versetzt wurde, ist kaum je auf einem andern Kriegsschauplatz übertrffen worden, und die niedrige Zahl von akuten Erkrankungen ist nicht nur den vorsorglichen Maßnahmen des Sanitätsdienstes zu verdanken, sondern vor allem auch den Soldaten selber, die die Gefahren, denen sie ausgesetzt waren, richtig einschätzten und bereitwillig die zu ihrem Schutze erlassenen Vorschriften befolgten.

Gegenüber 1914/18, wo die Todesfälle infolge Erkrankung diejenigen auf dem Schlachtfelde an Zahl weit übertrafen, ermöglichte die Zahl der Aerzte, Spitäler und Sanitätseinheiten die sofortige Behandlung aller Erkrankungen; die Anwesenheit von Tropenfachleuten erleichterte die Diagnose in Ausnahmefällen, und der Pflegedienst spielte eine entscheidende Rolle in der Abkürzung der Krankheitsdauer.

Résumé.

En Egypte se rencontrent avant tout les maladies endémiques suivantes : Trachome (90 % de la population) ; Bilharziose (55 %, dans les contrées rurales 75 %) ; Ankylostomiase (30 %) ; Malaria (15 %) ; maladies vénériennes (12 %) ; Pellagre (7 %) ; Tubercolose (2 %) ; Lèpre (0,3 %). Parmi les troupes blanches on ne constata pratiquement jamais ni de Bilharziose et d'Ankylostomiase, ni de Trachome. La nourriture prescrite au soldats combattants ne laisse surgir aucune Avitaminose grave.

L'auteur passe en revue les maladies tropicales les plus fréquemment constatées dans le proche Orient à l'étape et au front pendant la campagne de 1940 à 1942 en Afrique du Nord et donne un aperçu sur les mesures d'hygiène qui ont été prises. L'état de santé très satisfaisant de cette armée composée de tant d'éléments différents et d'une grande part arrachée subitement à un climat

humide et tempéré, n'a guère été surpassé sur un autre front et le nombre très bas des maladies aiguës n'est pas seulement dû aux prescriptions prévoyantes des services sanitaires, mais avant tout au soldat lui-même qui a taxé à sa juste mesure les dangers auxquels il est exposé et a suivi volontairement les prescriptions contribuant à sa sauve-garde.

Tandis que pendant la guerre de 1914 à 1918 les décès par suite de maladie surpassèrent de beaucoup ceux ayant eu lieu sur le champ de bataille, le nombre élevé de médecins, d'hôpitaux et d'unités sanitaires rendirent possible cette fois le traitement immédiat de toutes maladies ; la présence de personnes expertes en médecine tropicale rendit plus facile le diagnostic dans les cas exceptionnels et le service excellent des garde-malades contribua à diminuer la durée des maladies.
