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Robt. Lee and History

*This book is dedicated in affectionate friendship to
Charles Nicolle, scientist, novelist, and philosopher*

animals — not as yet convicted of being sources of human disease, such as domestic mice in Europe and America, New World mice, rabbits, woodchucks, monkeys, and even horses and donkeys — can be inoculated with the Rickettsiæ and harbor them for varying periods. In many of them this maintenance of the virus is peculiarly dangerous because it is what we call “inapparent” — that is, the animal shows no signs of illness, yet retains within its body a virus capable of transfer to insects or to other susceptible animals. “Inapparent” infection is beginning to possess an importance of the first order in epidemiological reasoning in many fields other than that of typhus fever. In the Rickettsia problems, however, it has already attained practical significance. A rat inoculated with typhus virus shows no apparent symptoms except, in some cases, a little fever. Yet two or three weeks later one can produce typical typhus reactions in guinea pigs or infect lice by intrarectal inoculation of the apparently healthy rat’s brain! But this is again tempting us into discursiveness. We return to our main theme.

CHAPTER XIII

In which we consider the birth, childhood, and adolescence of typhus

I

THERE are, as we have stated, two distinct types of true typhus virus. The diseases they cause in man are identical and both are transmitted from one individual to another by human body and head lice. Both in man and in animals recovery from one type protects against the other, testimony of their close and fundamental kinship. They can be distinguished only by relatively slight but definite differences of behavior when inoculated into guinea pigs, rats, and mice, and by reactions, called immunological, which are far too technical to occupy us here. Before these distinctions had been recognized typhus had been regarded all over the world as a single disease perpetuated by man-louse-man transfer. This observation, however, together with epidemiological observations in Australia and American case studies, led to an intensive search for virus reservoirs other than man. The result was the discovery of natural rat infection and of rat-flea transmission.

Now in correlating the origin of virus strains with their manner of behavior in guinea pigs, it was soon observed that all the viruses obtained either directly from rats or from rat fleas, as well as those isolated from human victims in America and Mexico (regions where the

maladjusted apes; while the apes, passing through this stage, go on to adulthood, where they cease to struggle for the things they cannot achieve and arrive at reasonable contentment. This is in keeping with Goethe's view that man is a permanent adolescent.

However this may be, it is likely from evidence that, somewhere in the legendary past of louse history, an offspring of a free-living form not unlike our book louse found that life could be infinitely simplified if, instead of having to grub for food in straw, under tree bark, in moss or lichen, in decaying cereals and vegetables, it could attach itself to some food-supplying host, and sit tight. It is one of the few instances in which nature seems extremely logical in its processes. The louse sacrifices a liberty that signifies chiefly the necessity for hard work, the uncertainty of food and shelter, and exposure to dangers from birds, lizards, and frogs; loses the fun of having wings, perhaps; but achieves, instead, a secure and effortless existence on a living island of plenty. In a manner, therefore, by adapting itself to parasitism, the louse has attained the ideal of bourgeois civilization, though its methods are more direct than those of business or banking, and its source of nourishment is not its own species.

Thus, at any rate, arose the parasitic lice, — first, perhaps, the biting ones, the Mallophaga, — and there developed, showing the infinite elasticity of nature: —

The chicken louse
Tritonon, the goose louse
The slender duck louse

The pigeon louse
The turkey louse
The biting guinea-pig louse
Trichodectez, the horse louse

to mention only a few. Out of these, or parallel with them, came the animalcules with which we are chiefly concerned. Not content with a diet of feathers, fur, and dandruff, these varieties — cast off by a kind Providence upon thin-skinned, warm-blooded animals — discovered by an incomprehensible cleverness (or perhaps by an accidental scratch and an occurrence not unlike the discovery of roast pig by the Chinese) that under their feet ran an infinite supply of rich red food. They developed boring and sucking structures, and thus arose: —

The hog louse
The dog louse
Polyplax, the rat louse
The foot louse of the sheep
The cat louse
The short-nosed ox louse
The monkey louse
Our own *pediculi* — the head louse and the body louse of man

2

It is with the last two that we are chiefly concerned, and they are so closely related that, even now, by an occasional *mésalliance* resulting from the meetings of young people about the neck band, a body louse may go native and interbreed with a head louse. The crab louse we may

neglect. He is probably of distinct generic origin and a creature that merits neither respect nor sympathy; not even terror.

Although the human head louse first came into the hair of primitive savages from fur-bearing animals, even in this respect the give-and-take does not appear to have been entirely one-sided. Ewing suggests that the Ateles monkeys may have received their lice from natives; and the similarity between the various monkey lice and those of man is so close that they can interchangeably feed on one or the other host without harm. We have ourselves fed two hundred Arabian head lice on an East Indian monkey for weeks at a time, with relatively low mortality. Such interchange of hosts is not usually possible. A louse fed on a foreign host, in most cases, suffers a probably painful and fatal indigestion.

Ewing further suggests that the spider monkeys obtained their lice from man when the latter reached tropical America in his dispersion from the Old World. The fur of the Ateles monkeys is very similar in coarseness and abundance to that of the head of man, and the blood of this monkey is physiologically more nearly like that of man than that of some other monkeys of the New World. These reflections of Ewing are of great importance in connection with our biography, since the question often arises whether typhus was present in America before the conquest of Mexico. If, as Ewing states, the phylogeny of the Ateles-infesting lice has followed that of their hosts, it is likely that the lice have been in America for a long geological period. The genus *Ateles* or spider

monkey—we quote Elliott from Ewing—has a wide area of distribution, extending from South-Central Brazil as far north as the state of Vera Cruz in Mexico, and from the Pacific coast of Ecuador to the Atlantic coast of Brazil. There are two distinct American groups of *pediculus*, according to our authority—one of them confined to man, and one to monkeys. "The foremost infesting man are largely hybrid head lice, the pure strains of which were originally found on white, black, red, and yellow races living in their original geographical ranges. The monkey-infesting lice of America, so far as known, fall into distinct species according to the hosts they infest, thus indicating to a certain degree at least a parallel phylogeny for host and parasite. If the monkey hosts procured their lice from man, it was not from recent man, but from man that lived tens of thousands of years ago—long enough to allow species differentiation."

Once established on the head of a savage, the louse passed from race to race, acquiring slight changes of form and feature in the process, so that to-day it would seem that we can deduce some information as to human racial relationship from the characteristics of the lice found in different parts of the world. The *Pediculus humanus nigritarum*, or head louse of the African Negro, is slightly different from the head louse found on European and modern American heads. The latter appear to be hybrids, with a strong strain of the *nigritarum*. The *Pediculus humanus americanus*, found on the prehistoric scalps of American Indian mummies, is again different, and this ancient parasite has been taken from the scalps of living

properly belonging to this division of the family are conveyed to man by the bites of ticks; and since, in these cases, the virus can be hereditarily transmitted from both the mother and the father tick to the little ticks, no animal reservoir is necessary for continued survival. Yet, since guinea pigs, rabbits, and a number of other animals are susceptible to the disease, it is not impossible that an animal reservoir, as yet undiscovered, may exist.

Probably identical with our American spotted fever is the so-called, tick-transmitted, "typhus" of San Paulo, Brazil. It is an interesting demonstration of the essential similarity of these infections in man that the San Paulo tick fever was regarded as true typhus by experienced physicians as long as clinical observations unaided by laboratory study formed the sole criteria of judgment.

Another variant of the spotted-fever group is the *Fièvre Boutonneuse*, or *Escharo-nodulaire*, which was first described from Provence in the neighborhood of Marseilles, but has also been found in Rumania. It is tick-transmitted and, as in spotted fever, the virus passes hereditarily from one generation of tick to another, without the necessary intervention of an animal reservoir.¹

Finally, in true typhus fever we now know of two distinct subfamilies, and suspect that others may exist.

As in the other Rickettsia diseases, the virus of both varieties of typhus is transmitted to man by insects. The body and the head louse carry the infection from one

human being to another. The louse takes up the virus with infected blood, the Rickettsiae multiply in the cells lining its stomach and intestinal walls, and appear in large numbers in the feces. Louse transmission was the great discovery made by Nicolle, which furnished the first powerful weapon for a counter-attack against the disease. It explained the manner in which epidemics are propagated. It removed all mystery from the historic association of typhus epidemics with wars, famines, and wretchedness. It justified the traditional designations of "camp fever," "prison fever," and "ship fever." But it left unanswered the problem of the persistence of the smouldering embers of the virus in interepidemic periods. For the human louse, probably a relatively recent host of the Rickettsiae, is even more susceptible than man. It sickens and dies usually within twelve days, always within two weeks. Where does the virus persist between outbreaks? How are the interepidemic cases engendered?

An approach to the answer to these questions was furnished a few years ago by a study of the isolated cases of typhus which occur every year — here and there — in the United States. These cases occurred under conditions in which louse transmission could be excluded, and a search for other sources of infection was begun. The result was the discovery of typhus virus in rat fleas and then in the rats themselves. The epidemiological cycle seemed complete. Domestic rats carry the infection. In them it is perpetuated by transmission from rat to rat by rat fleas and by rat lice. Rat fleas will feed on man when driven to seek a new host by death of the old one — a

¹ We omit, as having no direct bearing on the matter under discussion, any description of heartwater fever — a South African disease of sheep, which is caused by Rickettsiae and transmitted by ticks.

in at most twelve to fourteen days after feeding on infected blood. It is of course possible that the virus might have passed from sailor to sailor in a succession of typhus cases during the voyage. But had this occurred it would have been a serious matter, and it is likely that a record would have survived. In this connection there is an amusing observation of Oviedo, which we quote from Cowan. He observed that when the ships entered the tropics on their way to the Indies, the lice abandoned the sailors and attacked them again at the same point on their return. The observation is questioned by one of the supplementary writers in Cuvier's *History of the Insects*. Cowan thinks that there might be a certain amount of apparent truth in it, since heat and abundant perspiration are unfavorable to the propagation of the body louse. On the other hand, it is much more likely that in the hot weather the sailors took off their clothes, and that thereby the body louse was largely discouraged; but head lice, also capable of carrying the disease, would have remained. We have found head lice plentiful in Arabian populations in North Africa in the middle of the summer, and while not as abundant in warm countries as in the colder ones, head lice may thrive under a variety of climatic conditions. It is, for the reasons mentioned, however, unlikely that infected lice could have been transported alive on the first stages of the voyages to America.

While such transportation of the disease could, therefore, be questioned, it is not impossible that the virus may have been imported with ship rats or mice. As we have seen, the black rat has been present in Western Europe

certainly since the twelfth century. It was present in France and therefore with all likelihood in Spain in the early thirteenth century, its presence in France being clearly set down in the "Roman du Renart" and in the two similar ballads, "Renart le Nouvel" and "Renart le Contrefait," which date from the late thirteenth and early fourteenth centuries. In rats, the disease can be kept going indefinitely, and may easily have survived voyages even longer than those of the Spaniards. If in this way the disease may have become endemic in Cuba, between which and many parts of Spain there was frequent communication during the early sixteenth century, it might readily have been carried from Cuba to the coast of Yucatan and Mexico. The first real epidemic in Mexico was not until 1576. Bernal Diaz, under Grijalva, left Havana on February 8, 1517, in a ship which took twenty-one days to reach the coast of Yucatan. This expedition did not proceed to Mexico proper, but went on to Florida, where half of the Spaniards were killed by the natives. Cortez left Havana on February 10, 1519, and arrived on March 12 at Tabasco, having touched Cozumel in Yucatan, and then went on to San Juan de Ulúa, or Vera Cruz, where he landed on the day before Good Friday. After that, frequent voyages were made, and it is not possible to exclude the transportation of infected rats and their distribution from the coast to the high plateau, where the transmission of the disease to individual human beings by the first rat flea might easily have started an epidemic among a lousy population, even as it does now.

As I Remember Him

THE BIOGRAPHY OF R.S.

The informal biography of a physician who was also a philosopher, a poet, and a good friend, told with refreshing honesty by the author of "Rats, Lice And History."

BY
HANS ZINSSER
AUTHOR OF "RATS, LICE AND HISTORY"

fowl pox among the angels, paradise were paradise indeed. Except for the infected angels, we had all these things, more or less, in Tunis for a little while.

I went to Tunis entirely on Nicolle's account. For years we had been in correspondence. In 1915, we had a rendezvous for work together in the Balkans, but the French Government needed him at that time and our meeting was postponed. Already, even then, he was beginning to stand out as one of the great living bacteriologists — with no contemporary peers, in my judgment, except Bordet, Landsteiner, and Theobald Smith. The World War and the intervening period of concentration on theoretical problems had, for ten years, carried me away from the fields of work in which he had gained distinction. But in 1928, again returning to problems of typhus fever, I wanted to see him. Differences of opinion had arisen, new methods had been devised, and correspondence was unsatisfactory.

It was the beginning of a friendship that started in our heads and soon extended to our hearts. North Africa is an Eldorado for the student of infectious diseases. There are Malta fever, *fièvre boutonneuse*, relapsing fever, typhus, kala-azar, leprosy, malaria, and odds and ends of tropical infection that come up from the oases in the south. There were many things to learn and much to discuss, and I was especially interested in trying to overcome some experimental difficulties by transmitting typhus to monkeys with human lice. Nicolle received me with open arms. He gave me a laboratory, a technician, and all the materials I needed — even to a supply of bearded Arabs, who furnished the insects. Best of all, he gave me his friendship.

Nicolle was one of those men who achieve their successes

CHAPTER XIX

Tunis — Nicolle; portrait of a great scientist and scholar. With the usual digressions

I

How fervently I have often wished that my parents had been pious Christians and that, in the plastic years of childhood, before I had learned to think, my mind had been molded in the comfortable belief in a life after death! How pleasant it must be to look placidly forward to rejoining, in heavenly surroundings of one's own imaginative preference, those who have made our lives on earth richer and happier. The thought of death would be considerably mitigated for me by the expectation of seeing again — among others — Charles Nicolle, and renewing for a piece of eternity those summer evenings at Sidi-bu-Saïd where, as the cooling breeze came up from the sea, we walked together chatting of relapsing fever, trachoma, dysentery, brucellosis, Carthaginian archaeology, Roman mosaics, mediaeval legends, French encyclopaedists, and many other things dear to our hearts. And heaven might do worse than appear like Sidi-bu-Saïd, with the evening sun golden on the quiet waters of the Gulf of Bizerte and a cloudless sky darkening over the high shore where Carthage once stood. And if, together, we could have a small celestial laboratory and discover a few avian diseases like psittacosis, roup, or

by long preliminary thought, before an experiment is formulated, rather than by the frantic and often ill-conceived experimental activities that keep lesser men in ant-like agitation. Indeed, I have often thought of ants in observing the quantity output of "what-of-it" literature from many laboratories. I once watched a swarm of ants, on a lazy summer afternoon, and wondered why they had acquired the reputation for sagacity attributed to them by sentimental entomologists. One ant, I observed, was carrying a weighty bit of straw from one place to another, obviously making heavy weather of it. Instead of going around grass-blades and sticks, he laboriously climbed over the tops of them, then painfully fell off and trudged onward — passing on the way, and even finding at his destination, bits of straw quite equal in beauty, size, and conformation to the one he had packed so strenuously over obstacles. My impression was that this ant was making a fool of himself. Yet there are bacteriologists and, for that matter, many people in other callings just like my ant.

Nicolle did relatively few and simple experiments. But every time he did one, it was the result of long hours of intellectual incubation during which all possible variants had been considered and were allowed for in the final tests. Then he went straight to the point, without wasted motion. That was the method of Pasteur, as it has been of all the really great men of our calling, whose simple, conclusive experiments are a joy to those able to appreciate them. For there is an "art" of experimentation which is as elusive of definition as the art of color, sound, or letters. Indeed, there is a Pegasus for science as there is for the arts; and he, like his mate, spreads his wings only when he feels on his flanks the thighs of one whom the gods have appointed to ride him.

In the case of the louse discovery, Nicolle had carried out no more than a half-dozen decisive experiments after years of observation of the disease and its epidemiology. In this instance, the experiments were easily confirmed. In some other matters his reputation was rather damaged than otherwise by this habit of doing just enough work to convince himself and not carrying through far enough to convince others. He was one of the first, if not the first, to assert — on the basis of a meagre experimental material — that epidemic influenza was a virus disease, and it was so described in French textbooks some ten years before the cultivation of the virus proved him right. Like other superb experimenters — Pasteur among them — he was always precise in his observations, but less interested in the theories based upon them. Practically all the work he did was of an intensely practical nature, suggested by the problems he encountered in the field and at the bedside. Next to his typhus discoveries, his greatest service was the determination of *infections inapparentes*, the fact that animals may contract many diseases and transmit them without showing any — or only very slight — symptoms.

Apart from his scientific distinction, however, Nicolle was of the stuff of which the French Encyclopaedists were made. I have seen his cultural scope approached only by a few Frenchmen and an occasional German of the old school — a type of learning that cannot be acquired by study alone, but represents the ripening of gifted minds that are attracted by everything about them worthy of interest.

Nicolle was novelist, philosopher, and historian. His day began at five A.M., when he sat down to write until seven-thirty. These were the hours that produced his essays and his prize novel. Then a frugal breakfast, and work in the laboratory

until eleven. The heat then sent us to our rooms until three, a period of the day when the entire town of Tunis went to sleep; even the camels lay in the shade of the hedges, and the wandering bands of Arabs rested near the wells, sleepily scratching themselves. Although, as far as the camels were concerned, the above is not strictly accurate. They are strange and — to a horseman — mysterious beasts. I have seen some of them in the suffocating heat of an African summer noon lie in the sun, not ten feet from the shade of a green hedge, eating a stick of wood with all signs of sybaritic enjoyment.

After three, we all worked again until seven, and in the evening we wandered out to Sidi-bu-Said or Carthage for dinner near the shore, with good food, passable Tunisian wine, and amiable conversation.

Those evenings linger in my mind as among the most happily peaceful I have spent. Either Nicolle chose his men with unusual sagacity, or it just happened that he attracted kindred spirits. Burnet, now his successor, distinguished for studies on leprosy and Malta fever, was the author of a highly intelligent book of literary criticism. The entomologist was a poet; and one of the assistants a classicist who in his leisure hours was studying Roman archaeology. The conversation covered wide ranges from French literature to Arab architecture and Roman art. It is this wide scope of cultural interests in many people quite as competent as our own in their special fields which started me thinking about the superiority of the French and the former German secondary education over our own. I have met men, old and young, of these nations all over the world, and have often been impressed by the fact that, unlike most of our own compatriots of high specialistic learning, they showed signs of a richly cultivated intellectual sub-

soil. At the officers' mess on a French auxiliary steamship, I once took part in a conversation which started with Diderot and Lamartine and then, through Bergson, passed on to William James, the second engineer and the purser locking horns on *Science v. Metaphysics*. A discussion of this kind would be unthinkable under similar circumstances among American or English seadogs, perhaps for the good of our naval services. However that may be, as conditions are now, I believe it is wise for an American specialist to conceal his extraneous interests until eventually they die of inanition, lest he be regarded as eccentric and incompetent.

Subsequently I saw Nicolle almost every year. We spent hours with his friend the Père Delattre, head of the White Fathers and most learned on Carthaginian excavation. This old gentleman and his order again aroused in me that deep admiration for certain activities of the Catholic Church, to which I have been so often reluctantly constrained in spite of my utter lack of philosophical sympathy with its tenets. The White Fathers, so-called from the Arab burnous which is their costume, are trained in the Carthage monastery and then sent to Equatoria, whence only a fraction of them ever return. Like their colleagues of the various orders I later met in China, they are keenly alive to medical problems and carry physical as well as spiritual comfort to the interior. Delattre himself was an urbane, learned, and kindly gentleman whose friendship alone was worth the journey.

In subsequent years Nicolle and I explored the historical corners of Paris and of Rouen together, and when separated we wrote to each other once every month. In Rouen he showed me the house of Corneille, the residence of Flaubert's father, surgeon to the Hôtel Dieu, and a bawdyhouse that was in-

stalled in an ancient nunnery, which amused him greatly. We saw the old Abbey where part of *Manon Lescaut* was written, and the garden pavilion on the Seine where *Madame Bovary* was created, a page or so a day. He introduced me to an old man who had known the Bovary's first husband, the apothecary, the one whose feet were always cold in bed; and to another who had had a speaking acquaintance with *Boule de suif*; for it appears that, to the town's consternation, both *Flaubert* and *de Maupassant* took many of their characters from their neighbors in Rouen. There was another friend who had spent his lifetime determining precisely where *Jeanne d'Arc* was burned — about ten metres away from where it was supposed to have been. For this correction he has his bust of bronze in the public square.

I was with *Nicolle* and his family for a week at Nice a short time before he died. With him died one of the last great figures of the French school that took off from *Pasteur*, *Roux*, *Chamberland*, and *Metchnikoff*. *Bordet* is the only survivor of this breed of giants. For me, *Nicolle's* death was the end of something that I knew was irrecoverable. It was of the same order of sorrow as had been the death of my father.

There was much to be learned in Tunis besides typhus. *Burnet*, then *Nicolle's* *Sous-Directeur*, was studying Malta fever, a disease which, though conveyed in goat's milk, may possibly spread by a variety of indirect ways, such as in blowing dust, a manner of transmission which may also explain — though it has not been demonstrated — the mass infections with dysentery of troops marching in desert countries. The organism of Malta fever possesses a curious and still unexplained excessive degree of infectiousness. Laboratory workers who handle it almost invariably become infected sooner or later,

though — with similar technique — they may work with cultures of typhoid or dysentery indefinitely without accident. The same thing is true of another bacillary disease common in America — tularaemia. In neither case are the principles determining this extraordinary tendency to infect quite clear. I was particularly interested in *Burnet's* work because the bacillus of Malta fever had been shown by *Alice Evans* to be almost indistinguishably related to the bacillus of Bang, which causes abortion in cattle and, conveyed by cow's milk, produces a form of undulant fever which is increasingly common on the European continent and in the United States. There is a third member of this unpleasant family, which passes to man from hogs. Between them, they have presented bacteriological and epidemiological situations which are being slowly unraveled, but still offer fascinating problems. It was conversations with *Burnet*, moreover, that aroused my interest in the epidemiology of leprosy, to which I was later to devote a certain amount of time.

I learned much from him about the leprosy situation in the Near East and was confirmed in a conviction that I had long held in regard to epidemiological work in general, and which I later applied with some success in typhus studies. In leprosy we still lack certain fundamental data concerning conditions of transmission and factors of susceptibility. And since, in this disease as in tuberculosis, no reliable prophylactic methods are in immediate (or even remote) prospect, any reasonable efforts of control must be based on elucidation of transmission. There is little hope of gaining such knowledge by going, as many investigators have done, to centres where large numbers of cases exist and where, in consequence, the paths from case to case are obscured by tangles of interwoven and confusing trails. The ideal setup for such investigations is a region in which

there is chronic prevalence with relatively few cases, and where, as a result, it is possible to trace the contacts of early cases with some accuracy, possibly even into the preceding generation. It was as a direct consequence of these conversations with Burnet that, when later I became interested in the Leonard Wood Memorial for the Study of Leprosy, I decided to spend some time at Carville, Louisiana, with the able leprosy students of the United States Public Health Service, Drs. Hasseltine and Johansen, who gave me access to records which showed that the ideal situation for the study of leprosy existed right here in certain regions of the United States. While on the Southern borders and the Florida coast there is leprosy which undoubtedly has come to us from Mexico and Central America, there are areas and villages in the Cypress swamp regions among the Cajuns where the disease — brought with the people from Acadia in 1755 — is chronically prevalent in sparse concentration, ideal for precise epidemiological scrutiny.

2

Flaubert once came to Tunis for local color when he was writing *Salammbô*. As a result, he put American cactus hedges into ancient Carthage. As a matter of fact, these were not brought to North Africa until the time of Maximilian's adventure in Mexico. Now the cactus borders all the roads, and the wandering Bedouins live on cactus pears when they can't get anything else.

These roaming bands aroused my curiosity to penetrate south, for North Africa soon casts a spell over one that grips the imagination. But don't be afraid that I am going Robert Hichens on you! There were no romantic adventures, except that I spent a few bibulous evenings with a young Russian

engineer and his two lady friends, exploring the walled Arab quarters, and with them was received in the home of a wealthy Arabian date planter. But Arab houses have been described ad nauseam. I did not get into any harems. The Russian, one of the poor expatriated upper class, glad to escape with their lives and to find frugal livings in the four corners of the world, was employed in a phosphate mine between the southern oases of Gabes and Tozeur. It has been a mystery to me, in my wanderings after the World War, why there has been so relatively little feeling for the exiled White Russians. There has been a laudable and entirely justified sympathy for Jewish expatriates, Spanish communists, and for the Chinese, with organized relief and humane propaganda. But of all the unfortunate exiles whom the dreadful brutalities of the modern world have victimized, I have seen none more miserable nor, on the whole, so appealing as these abandoned people. I have run into them in all corners of the world, — in Africa, in France, in China, Manchuria, and Japan, — utterly demoralized by suffering, only a few capable by intelligence and training to remake their lives on the old standards. My young Russian engineer was one of these. He invited me to visit him, and I traveled along the coast through Sousse and Sfax, the Hadrumetum and Taparura of Roman founding, later stronghold of the piratical lords of the Mediterranean. Wherever I went, I was impressed with the wisdom of French colonial policy. In every town, the old walled Arab quarters were surrounded by developing French settlements — the Arabs living and doing business as they pleased, the French establishing schools, developing agriculture, and in no way dispossessing the native populations. Many young Arabs go to French schools, learn the language, and, absorbing French customs,

become Frenchmen. With the older ones, customs and religion limit social intercourse. But there is none of the White God attitude of the British, and much less of the business exploitation with which Americans go among foreign populations. The native Jews are referred to as "Israelites," and that alone gives them a dignity that they rarely enjoy among other nations. It appeared to me that the French gave the natives in their colonies a sense of being an important part of the empire and not a mere helotry. In the oases, the fertile, cultivable land was left to the Arabs, who were — at Tozeur at least — the rich proprietors. At Gabes, on the coast, there was a strong garrison of Spahis and native infantry, for it is on the border of the Italian possessions, and even then Mussolini was casting covetous eyes on Tunisia. The Russian and I went swimming at Gabes in a surf warmer than our bodies, rolling across white sand. With us at the time, bathing by military order, were a company of coal-black native troops driving camels and donkeys into the waves ahead of them. I rode a borrowed camel and got seasick.

One of the sanitary problems which the French manage very badly is that of venereal diseases. In France itself conditions in these matters are bad enough, but here in the colonies the situation was heart-rendingly dreadful. In the Arab quarters there are narrow streets set apart for prostitution. On either side there are open doors leading to small rooms containing bed, washbasin, and a chair or two. At the doors sit women — black and white and all colors between, native and European, drab, dreadfully pitiful, unspeakably pathetic. Coal-black native soldiers and all kinds of nondescript "white" sportsmen enter these rooms. The doors close and one turns away with nausea. My feelings as a sanitarian were engaged primarily with the physical effects of this traffic in gonorrhoea, syphilis,

and Nicolas-Favre disease. But I half rejoiced in these penalties for the gorillas — a sort of revenge for the desperate degradation of the poor women.

At Gabes I met the leader of a caravan that had come in from the south. He was a fine-looking old cutthroat — tall, bearded and dignified, swathed in cloth which seemed to me far too hot for the climate. They told me it kept out the sand and the "heat." It did not keep in the smell. Yet in spite of all these superficial differences I was again reminded of the essential brotherhood of man by the fact that this fellow was the spitting image of a distinguished professor of pathology in Boston, except that his aroma was not one of formalin and xylol. He spoke some French, and we talked horses. He showed me some of his, and almost dared me to ride a fascinating little white barbe, because I had "talked big" — as I often do when it comes to horseflesh. The little thing — it was only about fifteen hands — promptly ran away with me, out of the oasis into the desert, heading in the general direction of the French Soudan. When I got almost out of sight of the palm trees, I managed to turn him around and steer him where the sand was softest, and finally he got tired. We came back to the camel enclosure at a walk. The old man wanted to give me the horse for a thousand francs. But what I wanted to bring home was a camel — only the American consul stopped that, when I suggested it, because of a camel disease which was under quarantine. How I should have enjoyed showing up in full regalia at the Groton Hunt on a camel!

I should like to have seen more of my new friend, but I had to get back to Tunis to finish my work, via Kairouan, the sacred city where the "mosque of a thousand pillars" is built with marble columns stolen from the Roman villas on the site of

Carthage. On the way, I passed through El Djem, where the stone coliseum surrounded by desert, easily large enough to hold two or three thousand people, is impressive of the enterprise of Roman penetration and suggests that Roman Africa must have been fertile enough to nourish much larger populations than it can accommodate to-day. Much might be written about Roman Africa, where, under the vigilant valor of the Third Legion, a civilization was developed that gave Rome great soldiers, administrators, and scholars — among them Fronto, the rhetorician and tutor of Marcus Aurelius. This knowledge induced me to buy in a Tunis bookshop and read the great Emperor's *Meditations*, which had deeply impressed me in my youth. This time, though he still impressed me, he also gave me the feeling that he must have been a trying prig.

The thought which puzzled me, after seeing these monuments of past glory and realizing that Rome and the Vandals had been displaced by a vigorous Arab civilization, was the suddenness with which Mohammedan culture had been arrested after the twelfth century. For several hundred years these conquerors had represented the flower of human thought in medicine, philosophy, mathematics, and even in tolerance. Yet suddenly all this stopped. It remains a problem for the historian. Nicolle thought the answer was polygamy. "How can a man with four wives do any constructive thinking?" It is not as simple as this, and remains a mystery, especially since the Moslems under Mansur, in the eighth century, were familiar by translations with Aristotle, Euclid, Plato, Hippocrates, long before Greek thought had been rediscovered in Europe. They just didn't go on to a Renaissance. It is one of those problems that make endless opportunity for pleasant discussion,

but it is just as insoluble as the mystery of the origin of syphilis.

I flew back across the Mediterranean, stopping at Ajaccio for gas. It was like a ride on the magic carpet. At eight A.M., in an African city — camels, Arabs, and the Atlas Mountains on the horizon. At seven in the evening, in a dinner jacket in the restaurant of a gay hotel at Antibes.

3

On the voyage home from Marseilles, I traveled on one of those small steamers that make regular round-the-world trips from West to East, stopping at many ports along the route at which freight or passengers can be picked up. Since she sailed under the American flag, during prohibition, it became necessary to take aboard a large case of assorted bottles. This fact, and the accident that my cabin was forward, quite close to that of the ship's doctor, contributed to a rapidly progressive friendliness between myself and this odd specimen of the medical profession, who, like a good many navigating doctors I have met in various parts of the world, was a brilliant man who might have been successful in almost any branch of the profession had he not been utterly incapable by temperament and habit of settling down in one place for longer than a few months. His considerable talents were not only wasted, but gradually deteriorated under the routine of relatively unimportant occupations, very little professional stimulation, and too much drinking with people like me.

The crew on this boat were Chinese; the officers American youngsters, the oldest apparently not over thirty years; and the captain a typical old Norwegian sailor, with squat figure and sea-battered face. Since the officers could speak no Chinese, the crew was presided over by a Number One Boy, who at

tended to hiring and firing and, on deck, transmitted the English orders to the crew. There was a curious and unusual life below decks, therefore, which led to all kinds of odd occurrences. One of the things that needed constant watching was "dope" smuggling by the Chinese sailors. On a preceding trip, the doctor told me, a Chinaman had been murdered. The smuggling of opium into American ports was a tempting source of easy money, and before every landing it was the duty of the doctor to go through the forecastle and detect, if possible, odd caches of what might be opium. On the trip of which he was telling me, there had been a violent quarrel in one of the watches, during which a young Chinaman was badly beaten by a boatswain. When the ship arrived at Boston and the customs officers came aboard, they undertook as usual a thorough search of the crew quarters, and questioned a number of Chinese boys, with the help of the Number One. This procedure rarely led to results. On this occasion, however, the boy who had been beaten in some way attracted the attention of the chief customs officer, who took him into a stateroom, apparently for search. Shortly afterwards the inspector came out, summoned one of his officers and a policeman, and proceeded to the pantry, where he lifted two of the floor boards in the corner and dug out a large consignment of opium.

The ship left for New York at midnight, and at about four o'clock in the morning, off Point Judith, the doctor was called from his bed and found the young Chinese boy lying on the forward steerage deck with his throat cut from ear to ear. It was useless to try to find out who had done it. Such investigations among the Chinese never lead to anything.

They buried the boy at sea, after leaving New York on the way to Panama. The doctor said they sewed him up in canvas

and weighted his feet with scrap iron. The captain read the usual service, and they threw him overboard. But they had made the bag too big. The little Chinaman slipped down toward the iron weights and a large air space formed in the upper part of the sack. "As long as I could see him," the doctor said, "the poor damn Chinaman was standing on the waves upright, as though he were trying to run after us." It frightened the Chinese crew into a condition of jitters that lasted for the rest of the voyage. It was at dusk that the burial took place, and the walking corpse was still visible as darkness closed in. For days they seemed to believe that the ship was being followed, and at the first Eastern port the Number One Boy, the quartermaster, and half the crew deserted.

4

During the winter following my first visit to Nicolle, my collaborator, Castaneda, and I made considerable progress in demonstrating that the little rods seen in infected guinea pigs by Mooser were actually *Rickettsiae* — that is, the causative agents of typhus. The demonstration depended, among other things, upon a method of preparation which was not very easily repeated. The French had failed in confirming us and Nicolle, with whom friendship played no rôle when it came to scientific opinion, had written a paper casting doubt on our findings. Correspondence was unsatisfactory, and the matter fundamental. So I took passage on the *Île de France*, packed the instruments I needed for inoculation en route, and carried a hamper of a dozen guinea pigs (disguised as an ordinary hand-bag) into the ship. My purpose was to keep the virus going in the animals and to demonstrate our results to Nicolle, who was at that time in Paris, and to other colleagues at the

Pasteur Institute. This was easily arranged by cable. But to carry typhus-infected virus on a passenger steamer was another matter and, once installed in my cabin, I was considerably worried. My plan was to keep the guinea pigs under my bed, bribe the room steward to bring me *salade* and vegetable scraps, and when it became necessary to pass blood from the diseased to the healthy animals, to do this on the edge of the washbasin and then throw the dead guinea pigs and the infected instruments out of the porthole. This plan was feasible, but depended on a number of unforeseeable circumstances such as the steward's cooperation and silence, and the hazards of possible official room inspections. I decided, therefore, that when the ship had passed Sandy Hook and there was no longer any chance of putting me off, I would wander out to the office of the *Medécin Chef*, look him over, and — if he appeared a sensible sort of fellow — make a clean breast of the whole business and enlist his assistance.

I proceeded to do this. The surgeon's door happened to be open and, behind the desk, I saw a familiar figure. He looked at me, jumped out of his chair, and kissed me on both cheeks, shouting "Ah! *Mon cher ami!*" It was Bohec, the jolly Breton, my old copain of the *Touraine*, with whom I had crossed during the war and with whom, in the ensuing years, I had spent merry evenings both in New York and in Le Havre. He had just been transferred and this was his first voyage on the *Île*. The rest was easy. Unlike most ship's surgeons, Bohec is a keen student of laboratory medicine. He gave me a private room in the sick bay for my animals and assigned an orderly to their care. I made my transfers on his operating table and, later, he helped me through the customs. Nicolle was easily

convinced, and generous in saying so. In such matters I found the French rather more ready to acknowledge an error than other nations. It is a part of their inbred passion for logical thought rather than a higher sense of morality.