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JOHN ERICSSON was a man with the best of brain-power, with confidence in himself, who lived at a time when the world was ripe for what he could best do. He was essentially a great mechanical engineer. And not only was he fortunate in the age in which he lived, but he was wise in his choice of a place of residence. The fate of mechanical inventions is like that of the seed in the parable: the invention must fall on a proper soil, and be nurtured by favorable circumstances of time and place, in order to bloom into success. Thus Ericsson was early led from his home in Sweden to England, where he found a congenial environment till the conservatism of the English Admiralty drove him to this country. He was a man accustomed to carry through to useful perfection any scheme which commended itself to his mind; and, having confidence in himself, he found criticism difficult to endure. He knew he was right in his propeller for steam-vessels, and quickly left the country which refused to adopt it for America, where within two years the new device was in use on forty-two vessels. He knew he was right in his "Monitor," and was mortified and indignant at the hesitation of the American naval board in giving him a contract for building the first of this class of war-vessels. His work in each of these cases was not simply the devising of a form of propelling apparatus which would be better than the old side-wheel, or of a form of ironclad which was the best there was at the

time; but every mechanical detail of the "Princeton" and of the "Monitor" received some improvement at his hands.

Such was the man, and such was his work. He had the perseverance, the capacity to appreciate the importance of details, and the confidence in himself, which lead to success. And what was his reward? Doubtless he received considerable payments for much of what he did; but in the case of the "Princeton" it is said the government is still his debtor, and in that of the "Monitor" he received only the amount due him on his contract. As an inventor who supplied the government with an all-important engine of war, he received not a cent. Nor would he listen to the suggestion frequently urged on him by congressmen and others, that Congress should be asked to recognize his claim, and to provide for it. The Legislature of New York passed a resolution, thanking him for his services to the country, which he insisted on freely giving; and these resolutions he highly prized. Ericsson is said not to have cared for money, and this would certainly seem to be true.

The respect shown at his funeral was such as is seldom seen at that of any private citizen. The streets in the neighborhood of his late residence were crowded from the early morning hours with thousands, who for four hours passed through the house to pay homage to the departed genius. New York is a place full of human beings,—so full that each pays little or no heed to his neighbor; yet the great respect for this man of science and of action was shown in the number and character of those who followed his remains to their resting-place, in the uncovered heads as they were borne along the busy streets, and in the impossibility of admitting to Trinity all that wished. Ericsson was a man who could have endeared many to him, but he had a strong sense of duty to his work, which induced him to make few friends. This final homage of the unmindful crowds of the great city was to his genius well applied.

PUBLIC HEALTH A PUBLIC DUTY.

THE address of President Charles N. Hewitt, at the sixteenth annual meeting of the American Public Health Association, was full of suggestion, and contained many valuable propositions. It was entitled "Public Health a Public Duty," and dealt with the organization, powers, and relations of local, State, and National boards of health. In reviewing the work of the association, and the progress made in sanitary science during recent years, he said:—

"As secretary of one of the oldest of the State boards [Minnesota], I had the honor of an election as an original member of this body, and have known its history since. In my own State, beside, I have been missionary at large, and served as the organizer and counsellor of many a local board, and as sanitary inspector and health-officer as well. I have seen our organizations grow from two feeble boards with ill-defined powers, in 1872, to over fourteen hundred, united under a common code of law, with largely increased powers, duties, and funds. There is not to-day in Minnesota a community, however small, without such a board in direct communication with the State board.

"The State boards of health have increased from three in 1873, to thirty-one in 1888. Largely through their efforts, popular knowledge and confidence have grown from the tentative methods of the past to the demand for, and more liberal support of, sanitary organization and positive work. More and better legislation, great sanitary engineering works, and a bountiful crop of private enterprises in the same direction, are among the evidences that our field is widening and our responsibilities increasing. We have seen the early examples of efficient State executive organization become a living force in many more of the States and Canada. Various departments of modern science are our willing helpers. Microbiology has opened up great stores of discovery, and awakened great hopes, which we trust may not fail. We have seen the be-

ginnings of international co-operation for the crushing-out of cholera, yellow-fever, and other epidemics, which must in the near future become a beneficent reality, taking its place with arbitration, in international disputes, as the most valuable victories in our century.

"The first essential of any sanitary authority," Dr. Hewitt says, "is executive power, and its systematic use in the regular and scrupulous performance of every-day duty, as defined in the law and suggested by every-day experience. This almost self-evident proposition is constantly neglected in legislation for organization, and is very frequently violated by boards of health, who seem to favor the popular idea that an exceptional occasion is necessary to the highest exercise of their power, and infectious diseases of the classical type are their selection, with a proper admixture of panic. Panic is no advantage any longer, if it ever was, as a help to sanitary organization and work. Infectious diseases are not the leading causes of our sickness and mortality. It is only in the exceptional severity of plagues like yellow-fever, as it has prevailed in Florida, for example, that infectious disease counts the most victims in the sickness or death roll. That epidemics prevail at all, in our time and country, is somebody's fault: for, if there is one thing more than another that modern hygiene ought to be able to do, it is to forefend their attack, or control them if they effect a lodgement; and boards of health and health-officers have to learn that the most public and pronounced activity, after the invasion of infectious disease, is no substitute for the quiet, unobtrusive work which, in daily faithfulness, would have detected the first case, and controlled its spread. Another pressing need is a better classification of causes of death, for sanitary purposes, to which should be added causes of sickness and of permanent ill health from disease. At present our professional nomenclature is as vague sometimes as the popular one. Cholera-infantum and heart-disease are little more accurate than 'too weak to live,' a common popular cause of death under one year. The general divisions of the English registrar-general's tables are the best known, but some of the subdivisions are not satisfactory. Isolation has become so important and efficient an aid in the control of many diseases, that it is time to devise some changes in our customary methods which shall insure more thoroughness, with the least interference with the liberty of the family. It is a serious matter to restrain the bread-winning power of a laboring man or of his self-supporting children; and it is a still more serious matter to shut up a suspected family, sick and well, in a small house, when the removal of perhaps a single patient might save the rest, or some of them. The isolation home, under various names, is the ideal method of us all; but, if we had one always available, people must be educated to its use. We need it most for diphtheria and scarlatina. Another essential is an apparatus, not too expensive or elaborate, or too heavy for easy movement on wheels, for disinfecting clothing, bedding, and the like, by steam. One to which steam could be supplied by the boiler of a thrasher-engine would serve our country districts, and the same could be used where steam-boilers are available elsewhere. It could be taken to the infected house, charged, closed, and moved to the nearest available boiler, connected, disinfected, and discharged of its contents, with no danger, and at trifling expense. Still another need in this connection is a ready way of disinfecting the sick-room while occupied. Its essential feature should be the removal of the infected air and dust, disinfecting both as they escape, and the introduction of fresh air, so that quantity, temperature, moisture, and movement may be as required by the sick, but all to be done with the most complete protection of the well. The means must be easy, comparatively inexpensive, and available in the average houses of the laboring population. The stove, stove-pipe, or chimney, affords the available means in such houses in cold weather. In warm weather the open fire, gas, or kerosene, might serve to provide the means for exhausting the foul air and introducing that of the open in its place. Add to the simplest form of apparatus (the open fire or stove-pipe exhaust), cleanliness, fresh air, sunlight, thorough inunction, and boiling water for infected clothing of the sick and attendants, and you have a method almost everywhere practicable, which will reduce the danger from such diseases to the minimum, and the mortality as well.

"The very large mortality from non-infectious disease, under

five years of age, is, in the light of our present knowledge, no longer tolerable; and boards of health should move now, and positively, for its material reduction. By the last census this mortality was 43.7 per 1,000 of living population for the whole country, while in thirty-one registration cities it was 88.4 per 1,000. The mortality under five years to total of all ages was given as 39.8. The deaths under one year were, for the whole population, 120.9 in 1,000 living, while for the cities it was 267.5. This does not tell the whole story, as the statistics are estimated to fall from 15 to 30 per cent below the facts. We have no means of accurately estimating the sickness rate which accompanies this mortality, but may assume that it is enormous.

"Another subject of increasing importance, and which ought to receive the immediate attention of the State boards, is the sanitary relation of certain diseases of animals as communicable to man, notably tuberculosis, trichinosis, and glanders; and the increasing possibility that diphtheria and scarlatina may belong to the same class. The relations of the diseases of the cow to the influence of milk as food are attracting wide-spread attention, and, as affecting a very important infant food, deserve an attentive study with reference to sanitary control. On this subject, popular and certain professional opinion has, as usual, gone to extremes. From the use and even advocacy of distillery-milk, some have come to refuse the purest supply except after boiling, and their foolishness has been an acceptable and pecuniary advantage to the manufacturers of the proposed 'substitutes for cow's milk' which fill our markets and are tried on our children. The importance of the subject has resulted in making the control of infectious diseases of domestic animals one of the duties of the State and local boards of health, as in Minnesota, where the experiment has proven eminently successful and satisfactory.

"For the Nation and the States, the most urgent lesson is organization and efficient co-operation: for this last experience [of the epidemic of yellow-fever in Florida] but adds another to the accumulated evidence of the near past, that no State or province on this continent can afford to be any longer without a board of health officered by experienced men, who have the confidence of the people and governments they serve; supplied with unquestioned legal authority and sufficient money; and provided with every recognized means for dealing directly, and to the best advantage, with any disease of men or domestic animals threatening, or actually invading, the State. It must also, and for the same reason, have authority and funds to act with similar authorities of other States, in mutual co-operation, for State and national defence. It will not do to forget the established fact, that epidemics are now to be looked upon as evidences of the failure of public health, in organization or administration. That they occur, or spread, is presumptive evidence, when properly qualified authorities exist, that they neglected to take the needed measures, or were unable to take them. I see no escape from this conclusion, except it be shown, in any case, that prevention or control was beyond the resources of our art.

"A central State authority, organized and equipped as proposed, will find itself unable to do efficient preventive or restrictive work without thoroughly organized local sanitary authorities in every township, village, and city; and, further, each local board should have the same powers, and proportionate means, as the State board, in the locality it serves. Enforcing the common law, and independent in all purely local administration, the local authorities should be a unit for common purposes, under the State board, of which the control of infectious diseases is a conceded example.

"There are now in the United States thirty-one State boards of health. The first was organized in 1869, and others as well, before any attempt at national organization was made. Some of these boards are fully equipped with legal powers and funds for the work we have found laid out for them. The rest, with varying degrees of speed, are coming on to the higher level necessary for efficiency, and all are growing in usefulness and experience.

"State boards of health are established and recognized forces to-day; and any national organization attempted must, to be successful, be a development from them in form and function, for the purpose of carrying over to the nation, as a whole, the sanitary succor which the best of the State boards afford to the populations

they serve. A national board of health must first supply the national need proven to exist, by the conjoined efforts of the efficiently organized State boards, and fill up the full measure of that work within the national boundaries. So established, in the same dignified relation to the National Government that such State boards bear to the governments of the several States, it is prepared to perform the twofold duty, beyond our borders, which results from our present knowledge of the modes of approach and attack of infectious diseases. It must protect the nation, first, by a thorough knowledge of the character, location, and movements of such diseases abroad; second, by preventing, by the best-known methods, the shipping to this country of infected persons, animals, or things; third, by insisting upon competent sanitary service on board ship, with the best facilities for preventing, controlling, and crushing out any form of infection discovered on the passage out; fourth, by providing that the sanitary authority at the port of entry shall be fully informed of what is known of the sanitary history of the ship and her lading, up to the date of arrival, with later telegraphic report from the American consul and health-officer at the port of departure, if necessary.

"It is a fact that to-day, if it will, our government may learn all that is here proposed, by locating competent health-officers at the foreign shipping ports, whence our greatest danger comes, and might keep the seaboard quarantine authorities fully posted in these important particulars. As to those local authorities, it is time to call a halt in the criticism of their work till all sides in the controversy can be heard; or, better still, till health-officers of inland States can visit and see for themselves. Until the State boards agree in organization and powers, and in proper relations to local boards, the re-organization of the National Health Service upon a sufficient and permanent basis will be difficult, if not impossible."

THE RESOURCES OF THE NYASSA REGION, EAST COAST OF AFRICA.

FOR a number of years two English companies have been carrying on a profitable trade in the Nyassa and Tanganyika region, which, however, has recently suffered a severe check by the uprising of the Arabs against European influence. In a recent number of the *Journal of the Manchester Geographical Society*, Messrs. James Stevenson and E. O'Neill, consul of this district, give some interesting reports on the state of affairs and on the resources of this country, from which, and from some observations of other travellers, we take the following notes. Mr. Stevenson's paper is accompanied by an interesting sketch-map, reproduced here, showing the extent of the ravages of the slave-trade and the caravan routes in this region. The map will be of interest as supplementing the general map of Africa showing the extent of the slave-trade, published in *Science* of Dec. 28, 1888.

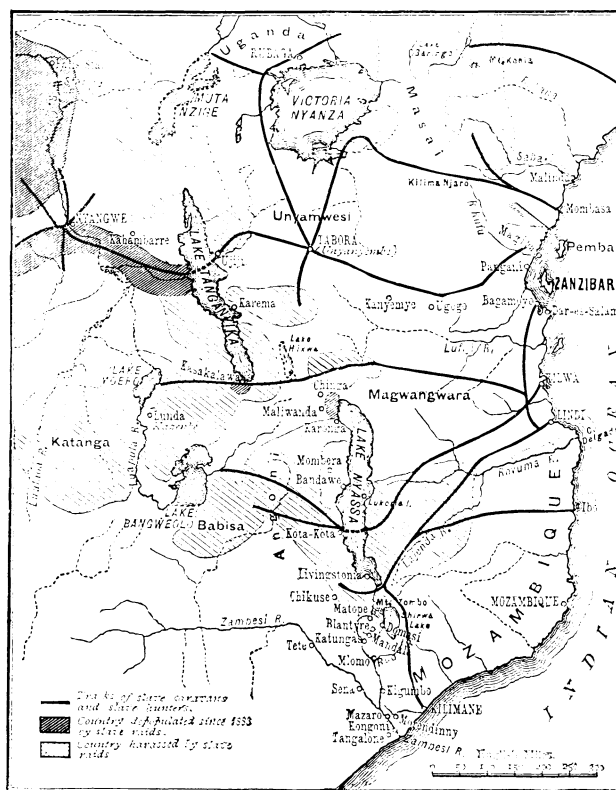
The produce of the Nyassa region, and the methods of trading, are well described by Mr. O'Neill. First in importance among the objects of trade is ivory. To this most valuable of all exports, — putting aside for the present any possible supply of minerals, — trade must chiefly look for an immediate return on its capital. Perhaps there are no better elephant-hunting fields in Central Africa than the great marshes of the Shire River and on the west coast of Lake Nyassa. The supply from these might be largely increased, to the benefit of trade, the country, and the people generally. The Arab slave-dealer is the chief collector of ivory in this country, with the tusks of which he loads his slaves, obtaining thereby cheap and profitable carriage to the coast. The British trader upon the Nyassa obtains but a fraction of the whole amount collected, — just so much as the Arab chooses to part with to enable himself to renew his supply of barter-goods, and to resume his collection in the interior. While the operations of the British trader on the Nyassa are confined to his station on the shores of the lake, he plays the dignified rôle of a storekeeper to Arab traders, where they may renew their store, and be relieved of a journey to the coast.

Much has been said of the check given to the slave-trade by the taking-up of the ivory on the Nyassa from the hands of the Arab collector, thus obviating the necessity for slave-carriage to the

coast. But it is certain that a very slight blow is struck by this means at the slave-trade. Little good will really be effected until the collection in the interior is also carried out by the whites, and the Arab trader is undersold, and thus peacefully ousted from the collecting-field. The British trader has every advantage on his side. Water-carriage should place his goods upon the Nyassa cheaper than they can be carried there overland by the Arabs, who have also to contend with the high percentage exacted from them for advances by the Indian trader of Zanzibar or Mozambique.

Next in importance to ivory must be placed India-rubber, in which the country west of Nyassa, stretching towards Lake Bangweolo, is undeniably rich; but comparatively little is collected, as the natives know little of the value of the plant, and have never been taught to collect it. Its export might probably be indefinitely increased by the same means which would help to extend the ivory-trade.

There are many other products indigenous to the country, but few of those known are able to bear the present cost of carriage to



the markets. When the country comes to be better known, the number of more valuable products will be undoubtedly increased. Consul O'Neill says in regard to this point: "How completely valuable products may remain hidden until some chance brings them to light, I can instance by the case of *Strophantus Kombe*, of which some specimens were sent by me to the Foreign Office in 1881. A demand for it as a drug for heart-disease shortly after sprung up, and, its existence in this country having been thus proved, I was able to start its collection in the Shire and Nyassa districts and in the Gaza country. The first consignment home proved to be so valuable to the collectors, that soon a rush was made to collect it, and the natives were quickly taught to bring down the pods in large loads. In the same manner we may hope other valuable products will come to light, and more profitable exports found than the oil-seeds which now form the staple articles of production on the coast and the lower Zambezi and Shire Rivers."

To estimate justly the probable development of this region, it must be remembered how slow and gradual has been the development of trade on the African coast. When the British Indian traders, to whom, a little more than a century ago, the Portuguese viceroy of India granted a monopoly of the trade of East Africa, arrived on