

# SCIENCE

FRIDAY, JULY 3, 1914

THE SERVICE OF MEDICINE TO CIVILIZATION<sup>1</sup>

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*Fellow Members of the American Medical Association:* I wish to express my appreciation of the honor conferred on me in being called to officiate as your president at this time. I had been content to serve in the ranks, and I have regarded this position as too honorable to be sought, or to be lightly regarded when spontaneously bestowed. During my term of office I will give you my most devoted service.

In ancient times, civilization was born, grew for a few generations and fell into decay. In all instances it was local and covered only small areas. Its habitations were oases in the world-wide desert of ignorance and superstition, and after an ephemeral existence all were buried in the sand. Relatively small bodies of men occupying salubrious regions developed the elements of science and for a few centuries flourished. Their superior knowledge gave them dominion over their less fortunate neighbors, who were converted into slaves. Conquest brought disease and the local civilizations were obliterated by contagion. History is replete with instances in which triumphant heroes have brought to their rejoicing countries with their prisoners of war invisible and intangible agents of death, which have ultimately vanquished the victors.

The Egyptians of the Pharaohs drained the land, built aqueducts, disposed of their dead hygienically, reared temples and cities, maintained law and order, developed

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<sup>1</sup> President's address before the American Medical Association, at the sixty-fifth annual session, Atlantic City, June, 1914.

the elements of literature and science and devised and employed simple machinery. In speaking of the ancient Egyptians, Diodorus says:

The whole manner of life was so evenly ordered that it would appear as though it had been arranged by a learned physician, rather than by a lawgiver.

Herodotus declared ancient Egypt the healthiest of countries, but filled with physicians of whom

one treats only the diseases of the eye, another those of the head, the teeth, the abdomen or the internal organs.

Writing of a later time, Gibbon said:

Ethiopia and Egypt have been stigmatized in all ages as the original source and seminary of the plague.

It is evident that in the time of its great civilization Egypt was salubrious; coincident with the decline in the learning and wisdom of its people, it was visited and desolated by pestilence. That Egypt had lost its salubrity as early as the period of the exodus of the Israelites is shown by many passages in the Bible in which the chosen people are threatened with the diseases of Egypt if they neglect or violate the laws. Moses, "learned in all the wisdom of the Egyptians," codified his sanitary rules and regulations in the form of religious rites and ceremonies and thus secured their observance among the faithful even down to the present time.<sup>2</sup>

The Greek developed the most glorious

<sup>2</sup> Neither the papyrus of Ebers nor that of Brugsch throws any light on the problems discussed in this article. Indeed the value of both these papyri was at first overestimated. They are now regarded as compilations and consist largely of lists of remedies and furnish no information concerning epidemics or their effects upon the people, except to indicate that hookworm or bilharzia infection, one or both, at that time (about 1500 B.C.) afflicted the Egyptians. These parasites may have contributed to the deterioration of the people; this is a suggestive possibility.

civilization of antiquity because he was the most ardent student of science, but he was unable to cope with malaria and bubonic plague, and his descendants have been in bondage to malaria for nearly twenty-four centuries. The medicine of Hippocrates, the wisdom of Socrates, the philosophy of Plato, the plays of Aristophanes, the laws of Pericles and the science of Aristotle could not save the Greek from the degrading effects of disease, and under its withering influence the civilization of this great people slowly but surely decayed. Its matchless marbles were thrown into the waste, its magnificent temples were allowed to crumble, its altars were deserted, its literature became insipid, its philosophy lost its virility, its science was forgotten and the children of this blighted civilization were sold in the slave markets of Rome and in later generations paid tribute to the Slav and the Turk. There certainly were eminent Greek scientists and physicians for centuries after Hippocrates, but they were not products of Greek soil. They developed in Asia Minor, Egypt, Italy and elsewhere. It is of interest to note in this connection that malaria, according to Jones, was introduced into Greece in the fifth century, B.C., and the fourth century showed the decline of Hippocratic medicine. Neuburger says:

The sons and grandsons of Hippocrates, as well as his immediate disciples, Apollonios and Dexippos, were at the head of that series of physicians who laid emphasis upon theoretical conjecture and gave to medicine in the fourth century B.C. its speculative coloring.

Taken with the fact that other departments of learning showed similar retrogression at the same time, this sequence between the introduction of malaria and the trend of medicine toward speculation is worthy of record. That pestilence aided the barbarians in the final desolation of Greece is indicated by the following quotation from Thumb:

At a time when the German tribes began moving, that is to say, at the end of the third century A.D., a gradual immigration of Slavonic tribes into the Balkans began; their invasions became more and more frequent, since the Goths chose Western Europe as the goal of their conquering expeditions and left to the Slavs an open passage into the Balkan countries. But a real Slavonization of some Greek territories took place only in the eighth century, and attained its highest point when a horrible plague in 746 depopulated the Greek territories.

I am aware of the fact that some have objected to considering the present inhabitants of Greece as descendants of ancient Greeks. The former have been designated as "so-called Greeks," "a bastard people," "a mosaic of Vlacks, Arnauts and Slavs." Some years ago Fallmerayer made the very positive statement that "no drop of ancient Greek blood flows in the veins of the modern Greek." Thumb has shown the absurdity of these statements and declares that cranial measurements, local names, customs and religion show that while some admixture with the Slav has taken place, the modern Greek is a lineal, and on the whole a fairly pure descendant of those who established the greatest civilization of antiquity. Modern Greek Christianity is only a modification of ancient Greek paganism, in which gods have been supplanted by saints.

Charon the old ferry-man in the underworld is to-day the god of death; he conducts the souls in a dreary procession to his realm. As in antiquity, a copper coin is put into the mouth of a dead person as a fee for the ferry into the other world. The ancient Moirai or fates (to-day, Mires) still determine the fate of the new-born child, spin and cut the thread of life. The bride is conducted into her new home, the dead are buried with ceremonies which the Greeks used already two thousand years ago. A sick person seeks recovery by laying down to sleep in the church of a saint, like those persons who once made a pilgrimage to the temple of Asklepios in Epidaurus. The Greeks of to-day are descendants of the ancient Hellenes, not in the sense in which every modern Greek could trace his origin back to an ancient Athenian or Spartan, but in the

sense that in the modern people ancient blood flows largely and in some districts almost purely, and still more in the higher sense that the modern race shows a development of the Greek population of the ancient world.

The broken remnants of older civilizations found refuge and asylum in the salubrious climate of the Italian peninsula and soon its hillsides were covered with vines and olives while its plains and valleys bore abundant harvests. Rome was built and her empire promised to extend to the remotest parts of the world, but the ancient Roman contributed but little to science, and we are told by the historian that

a pestilence raged for fifteen years (251-265) and carried off one half of the inhabitants of the empire.

The seat of civilization was moved to the shore of the Bosphorus, but the lamp of science was well-nigh extinguished and the clouds of the middle ages enveloped the world and shrouded its inhabitants for more than a thousand years.

A fabulous and formless darkness overcame the fairest things of earth.

If one reads the history of the decline of the Roman Empire, he can hardly fail to see that disease was an important factor in that retrograde movement, which involved the greater part of the then known world. Jones and Ross find the earliest reference to malaria among the Romans in the comedian Plautus, who died 184 B.C., and they quote Terence, who died 159 B.C., and whose language is explicit in showing not only the prevalence of malaria, but also the recognition of the different forms. From that time on, reference to the wide prevalence of malarial diseases, not only in the open country, but also in the city, is frequent and definite. Jones says:

There is then, every reason for supposing that malaria was unknown in Italy in early times, was well known at the beginning of the second century

B.C., and that it gradually became more common during the next two hundred years. If this be so, it is at least a plausible conjecture that it was introduced by Hannibal's Carthaginian mercenaries. Africa seems to have been the original home of the disease, and it is probable that some of his troops were infected. The constantly repeated devastation of Italy in the second Punic war should be sure to turn a large part of it into marshy land, thus affording a convenient breeding-place to the mosquitoes which were infected by the malarial patients among the Carthaginians. The similar condition of Attica during the closing years of the fifth century B.C. offers a striking parallel. This opinion does not rest on mere conjecture. We are told by Livy that in the year 208 B.C. a severe epidemic attacked Italy. It did not cause many deaths, but resulted in much lingering disease, that is, most probably, chronic malaria.

Malaria, however, was not the only disease which contributed to the degeneration of the Roman people. I have already referred to the pestilence of the third century, which is said to have destroyed half the inhabitants of the vast empire within fifteen years. This certainly was not malaria. Moreover, this was not the first great pestilence which afflicted the Roman Empire. Neuburger says:

The "plague," so called by Galen or Antonine, was first introduced from Syria by the Roman army. . . . The extraordinary contagiousness of the epidemic is emphasized in all contemporary reports. There appear to have been a variety of simultaneous manifestations, the descriptions indicating afflictions chiefly resembling small-pox or dysentery, but adequate criteria on which to express an opinion are wanting. The "plague" commenced 165 A.D., claimed innumerable victims and lasted at least fifteen years.

Jerome writes: With peace, order and good government a curious lethargy fell on the warrior state deepening into a coma in which it died so quietly that neither the contemporaries nor we moderns can fix the date of the disease. The fact, however, finally became apparent when the phenomena of decay were indubitable and the world, deprived of the master, fell back helplessly into a condition hardly more advanced than in the ages before its subjection, save that it had the imperishable memory of Rome to give it hope, direction and courage.

In the fourth century the seat of government was removed to Byzantium. It is probable that this change was, in part at least, determined by the insalubrity of Italy. Early in the fifth century Rome was pillaged, but the real conquerors of Rome were not the Goth and Vandals, but malaria and the plague. Disease continued to devastate Italy. Creighton says:

About the year 668 the English archbishop-elect, Vighard, having come to Rome to get his election confirmed by the pope, Vitalianus, was soon after his arrival cut off by the pestilence with almost all who had gone with him. Twelve years after, in 680, there was another severe pestilence in the months of July, August and September, causing a great mortality at Rome and such a panic at Pavia that the inhabitants fled to the mountains. In 746 a pestilence is said to have advanced from Sicily and Calabria and to have made such devastation in Rome that there were houses without a single inhabitant left.

From that time on the plague periodically spread over Italy until the seventeenth century, while malaria has been in continuous possession down to our own time. We are told that the epidemic of 1348 reduced the inhabitants of the Eternal City to 20,000.

We are familiar with the graphic description of the plague in Florence by Boccaccio, who wrote:

Such was the cruelty of Heaven, and perhaps of men, that between March and July following, it is supposed, and made pretty certain, that upwards of a hundred thousand souls perished in the city only, whereas, before that calamity, it was not supposed to have contained so many inhabitants. What magnificent dwellings, what noble palaces were then depopulated to the last person, what families extinct, what riches and vast possessions left, and no known heir to inherit, what numbers of both sexes in the prime and vigor of youth—whom in the morning neither Galen, Hippocrates nor Esculapius himself, but would have declared in perfect health—after dining heartily with their friends here, have supped with their departed friends in the other world.

There are but few passages in literature so tragic as the short record of the plague

of the fourteenth century begun by the friar of Kilkenny, but soon interrupted by his death:

I friar, John Clyn, of the order of Friars Minor and of the convent of Kilkenny, wrote in this book those notable things which happened in my times, which I saw with my eyes, or which I learned from persons worthy of credit. And lest these things worthy of remembrance should perish with time and fall away from the memory of those who are to come after us, I, seeing these many evils, and the whole world lying, as it were in the wicked one, *among the dead, awaiting death*—as I have truly heard and examined, so have I reduced these things to writing; and lest the writing should perish with the writer, and the work fail altogether with the workman, I leave parchment for continuing the work, if haply, any man survive, and any of the race of Adam escape this pestilence and continue the work I have commenced.

That the period of the Byzantine Empire (395–1453) was one of general degeneracy is shown on every page of the historian. It produced no literature of merit, and “the study of nature was regarded as the surest symptom of an unbelieving mind.” Neuburger says:

The Byzantines merely followed the downward path. Surfeited with tradition, which made modes of thought appear inevitable, because customary, filled as a nation with overweening self-conceit, fed by the glories of the Græco-Roman past, they neither could nor would destroy the historic bridge nor replace the crumbling ruin with a new edifice. It lay outside the sphere of their interests to enter into that conscious emulation of antiquity which, emphasizing the growing contrast between past and present, and eliminating the obsolete and the inert, is the essence of mental cultivation. Forgetting that it was the free development of the national spirit which constituted the greatness of the past, they went so far as to smother its liveliest expression by denying, in their rigid adherence to Attic speech, all part in literature to the language of the people. The more incapable did the Byzantines become of grasping the spirit, the more tenaciously did they cling to the letter—a reflection of the mania for titles and ceremonies in political life—and thus they dragged the inanimate mechanism, the dry bones of antiquity through a thousand years, instead of erecting a new edifice on the foundations of antiquity.

The physician and historian, Procopius, in his account of the great pestilence in the reign of Justinian “emulated the skill and diligence of Thucydides in the description of the plague at Athens.” Of this epidemic Gibbon says:

In time its first malignancy was abated and dispersed; the disease alternately languished and revived; but it was not till the end of a calamitous period of fifty-two years, that mankind recovered their health, and the air resumed its pure and salubrious quality. No facts have been preserved to sustain an account, or even a conjecture, of the numbers that perished in this extraordinary mortality. I only find that during three months, four and at length ten thousand persons died each day at Constantinople, that many cities of the east were left vacant, and that in several districts of Italy, the harvest and the vintage withered on the ground. The triple scourge of war, pestilence and famine afflicted the subjects of Justinian, and his reign is disgraced by a visible decrease of the human species, which has never been replaced in some of the fairest countries of the globe.

This epidemic spread over the whole of Europe and it took more than a century to reach England, where “it fabled long after in prose and verse as the great plague of Cadwallader’s time.” Then for quite a thousand years it reaped its periodic harvests as often as immunity was lost in new generations.

The historian, as a rule, confines his descriptions to martial and political events and consequently gives a wholly erroneous idea of true conditions. Gibbon says:

If a man were called upon to fix the period in the history of the world, during which the condition of the human race was most happy and prosperous, he would without hesitation, name that which elapsed from the death of Domitian to the accession of Commodus (from 96 to 180 A.D.).

Noah Webster, in his work on epidemics and pestilence, quotes the preceding with the following just comment:

It is certain that, at this time, the Roman Empire was in its glory, and governed by a series of able and virtuous princes, who made the happiness

of their subjects their principal object. But the coloring given to the happiness of this period is far too brilliant. The success of armies and the extent of empire do not constitute exclusively the happiness of nations; and no historian has a title to the character of fidelity, who does not comprehend, in his general description of the state of mankind, moral and physical, as well as political evils.

Let us make brief inquiry into the diseases of this "most happy and prosperous" period. It was preceded by, it began in, continued in, and closed in pestilence. That the plague was endemic in Italy at that time and that it developed in epidemic form with each increase in susceptible material there can be no doubt. Of the epidemic of 68 A.D. Tacitus says:

Houses were filled with dead bodies and the streets with funerals; neither age nor sex was exempt; slaves and plebeians were suddenly taken off, amidst the lamentations of their wives and children, who, while they assisted the sick, or mourned the dead, were seized with the disease, and perishing, were burned on the same funeral pyre. To the knights and senators the disease was less mortal, though these also suffered in the common calamity.

About this time the plague appears to have spread over the whole of Asia, northern Africa and Europe. According to Short, the deaths from this disease in Scotland between 88 and 92 A.D. amounted to not less than 150,000. This was probably not less than one fourth, possibly one half, the population of Scotland at that time.

In the year 80 A.D. the deaths from the plague in Rome at the height of the epidemic numbered 10,000 a day. It is estimated that the population of Rome at that time was somewhat more than one million. Exacerbations of the disease in Rome are recorded for the years 102, 107 and 117 A.D. According to Short, 45,000 died of the plague in Wales in 114. The year 167 A.D. is noted for an unusually severe outbreak of the plague at Rome, where it continued

for many years. In the year 173 A.D., the Roman army was threatened with extinction by disease, and special epidemics, or rather exacerbations of the epidemic, prevailed in Rome in 175 and 178 A.D. That the "happy and prosperous" period was followed by a continuation of the plague is shown by the following quotation from Herodian:

A great pestilence raged throughout Italy at that time (about 187 A.D.), but with most violence in the city, by reason of the great concourse of people assembled from all parts of the earth. The mortality among men and cattle was great. The Emperor, by advice of physicians, retired to Laurentium, on account of the coolness of the place, which was shaded with laurels. It was supposed that the fragrance of the laurels acted as an antidote against the contagion. The people in the city also, by the advice of physicians, filled their noses and ears with sweet ointments and used perfumes, etc.

Under the spell of the historian we have been inclined to regard the period when the greater philosopher, Marcus Aurelius Antoninus, sat on the throne of the world, as the golden age. Let us therefore listen to a few words from his personal attendant, courtier and historian, who writes:

Unless he, M. Antoninus, had been born at this juncture, the affairs of the empire would have fallen into speedy ruin; for there was no respite from military operations. War raged in the east, in Illyricum, in Italy and in Gaul. Earthquakes with the destruction of cities, inundations of rivers, frequent plagues, a species of locusts ravaging the fields; in short every calamity that can be conceived to afflict and torment man scourged the human race during his administration.

It is estimated that during the dark ages the average of human life was less than twenty years. A high birth-rate was necessary to keep the race alive, but notwithstanding this, Europe was sparsely inhabited. At the time of the Norman Conquest the inhabitants of England numbered between two and two and one half million, probably nearer the former, for they had

not reached the greater number a hundred years later. Creighton says:

It would be within the mark to say that less than one tenth of the population was urban in any distinctive sense of the term. After London, Norwich, York and Lincoln, there were probably no towns with five thousand inhabitants.

Indeed, urban life, as we now know it, was quite impossible in this age of pestilence and would soon become so again were the functions of preventive medicine relaxed.

Most of the great epidemics of the middle ages were designated as *pestilentia* or *magna mortalitas*. In the most deadly visitations the bubonic plague is so accurately described that there can be no doubt about its identity, but it must not be supposed that the people enjoyed any high degree of health even in those periods when this contagion languished on account of exhaustion of susceptible victims. Ergotism, under the name of Saint Anthony's fire, was endemic in France and adjacent territories; Normandy was filled with lepers, but Christ's poor were not confined to that country. England was regarded as the special home of hunger, but abundance was a stranger to the masses in every land. The mysterious sweating sickness, apparently brought to England with Henry Tudor in 1485, developed in five distinct epidemics which were characterized by the fact that the mortality was greater among the rich than among the poor. Typhus, known as *morbus pauperum*, prevailed largely in the jails, on ships and among the squalid inhabitants of the cities. Even the discovery of America carried to Europe the scourge of syphilis, which was spread over Italy by the soldiers of Charles VIII., and within a few years reached the most distant parts of Europe. Smallpox appeared in England in the sixteenth century, having journeyed, according to the most reliable au-

thority, all the way from the Orient. That tuberculosis, diphtheria, dysentery and other diseases, still with us, prevailed during the middle ages is shown by the records, but they were overshadowed by the higher mortality of those mentioned above. Improved agriculture has extinguished the fire of St. Anthony, except in the most benighted provinces of Russia. The great fire in London in 1666 destroyed the infected rats and relieved England of the bubonic plague, which had been endemic in that country since 1349. Something more than one hundred years later the discovery of Jenner robbed smallpox of its horrors, wherever vaccination is properly enforced. The investigations of Howard improved the sanitation of jails and work-houses, and did much to eradicate typhus.

The claim has been advanced that the infectious diseases have benefited the race by the destruction of the unfit. This idea I have combated most vigorously since our study of typhoid fever in the army in 1898. My colleagues and I found that out of 9,481 soldiers who had previously been on the sick report and could not be regarded as possessing standard health, 648, or 6.8 per cent., contracted typhoid fever; whereas, out of 46,384 men who had no preceding illness, 7,197, or 15.3 per cent., developed typhoid fever. More than 90 per cent. of the men who developed typhoid had no preceding intestinal disorder. Under ordinary conditions the strong, busy man, especially the one whose activities demand wide excursions from his home, is more likely to become infected than the one whose sphere of action is more limited on account of infirmity. The reason for this is too obvious to need statement, and it follows that more men than women and more adults than children have typhoid fever. Moreover, the case mortality is greater among the strong, because death in the infectious dis-

eases is often due to the rapidity with which the invading organism is broken up by the secretions of the body cells and the protein poison made effective. From this I have concluded that contagion, like war, destroys the very flower of the race. This view is sustained by the historians of the pestilences of former times.

Thucydides in his description of the plague at Athens says:

Moreover, no constitution, whether in respect of strength or weakness, was found able to cope with it; nay, it swept away all alike, even those attended to with the most careful management.

Procopius in his account of the Justinian epidemic states that youth was the most perilous season, and females were less susceptible than males.

Cogan, in describing the outbreak of typhus at Oxford in 1577, writes:

The same kind of ague raged in a manner over all England, and took away very many of the strongest sort, and in their lustiest age, and for the most part, men and not women and children, culling them out here and here, even as you would choose the best sheep out of a flock.

In his account of the plague of 1665 in London, Boghurst makes the following statement:

Of all the common hackney prostitutes of Luteners-lane, dog-yard, cross-lane, Baldwins-gardens, Hatton-gardens and other places, the common criers of oranges, oysters, fruits, etc., all the impudent drunken, drubbing bayles and fellows and many others of the *rouge route*, there is but few missing—verifying the testimony of Diemerbroech that the plague left the rotten bodies and took the sound.

Like testimony comes from an account of the plague at Moscow:

Drunkards and persons of feeble temperament were less subject to attack.

Davidson observed that typhus fever was more frequent among the robust than the weak. He states that out of 429 cases the spare and unhealthy taken together made

only about 17 per cent. He adds that the death-rate among the poor was one in twenty-three, while among the well-to-do it was one in four. The greater mortality of typhus among the higher classes has been noted by Barber and Cheyne and by Braken.

Hurty, nearly a century ago, wrote:

A fever which consigns thousands to the grave, consigns tens of thousands to a worse fate—to hopeless poverty, for fever spares the children and cuts off the parents, leaving the wretched offspring to fill the future ranks of prostitution, mendicancy and crime.

Creighton says:

The best illustrations of the greater severity and fatality of typhus among the well-to-do come from Ireland in times of famine, and will be found in another chapter. But it may be said here, so that this point in the natural history of typhus may not be suspected of exaggeration, that the enormously greater fatality of typhus (of course, in a smaller number of cases) among the richer classes of the Irish families, who had exposed themselves in the work of administration, of justice, or of charity, rests on the unimpeachable authority of such men as Graves, and on the concurrent evidence of many.

A surgeon in the British navy at the time of William III and Anne tells how he was led to practise bleeding in fever as follows:

I had observed on a ship of war, whose complement was near 500, in a Mediterranean voyage in the year 1694, when we lost about 90 or 100 men, mostly by fever, that those who died were commonly the young, but almost always the strongest, lustiest, handsomest persons, and that two or three escaped by such natural hemorrhages, which were five or six pounds of blood.

The middle ages were indeed dark physically, intellectually and morally. Here and there, now and then, some man of genius towered above the general low level of his contemporaries and not infrequently he paid dearly for his audacity. For some centuries the Arab, especially in Spain, stood out alone as the torch-bearer of science, and he, when driven back into the



insalubrity of Northern Africa, lapsed into barbarism. Neuburger writes:

Fortunately the fate of medieval medicine was not dependent on Byzantium alone. An admirable illustration of the doctrine of conservation of energy is afforded by the fact that, with the decline of intellectual energy at home, a contemporaneous development of Greek medicine took place abroad, which, if at times misguided, was yet full of vitality, whilst the medical art of the newly arisen world of Islam reached a height unsurpassed during the middle ages.

In the greater part of Europe, ignorance and disease held full sway. In the midst of great calamities "the will-o-the-wisp of superstition is an irresistible attraction and offers the only ray of hope." Strong men, neglectful of their earthly duties, betook themselves to secluded places and lost themselves in dreams of a heavenly paradise. Mysticism, fanaticism and superstition dominated all conditions of men. Rulers, illiterate, immoral and even incestuous, occupied palaces while the masses died of starvation. The history of the time is a record of diseased, degenerated, demented man. There can be no doubt that disease has overthrown civilizations in the past, and there is no surety that it may not do so again. The recent outbreak of the plague in Manchuria and its more recent appearance in Cuba are not without their warnings. It remains to be seen if those who control our government have the intelligence necessary to protect our country against the invasion of pestilence. The failure to provide for camp sanitation in 1898, the behavior of California officials on the finding of plague in San Francisco and the general indifference of national and state authorities toward the eradication of disease discourage the hope that intelligent patriotism is widely distributed among us. As a contemporary of Mr. Dowie and Mrs. Eddy and as a citizen of a country in which the osteopath and chiropractic flourish, I

feel some embarrassment in speaking of the fanaticism and ignorance of the dark ages.

The history of medicine is that of mankind. Born in naked ignorance, bound in the swaddling-clothes of credulity and nursed on superstition, medicine has had its savants and its fakers, its triumphs and its failures, its honors and its disgraces. It has attracted and still attracts to its ranks men of the purest motives and those who are impelled by the basest desires. It can be said without fear of contradiction that medicine has done more for the growth of science than any other profession, and its best representatives in all ages have been among the leaders in the advancement of knowledge, but the average medical man conforms in intellect and character to the community in which he lives. The food of the faker is ignorance and he thrives where this commodity is most abundant. The uncontrolled fool moves to his own destruction. This is the only way in which nature can eliminate him. A wise government protects its incompetents from medical and other fakers, but such government can exist only where wisdom predominates.

A study of epidemics shows that in the presence of widespread contagion mankind in the mass tends to revert to the barbaric state. This is the unvarying testimony of all authorities, medical and lay, secular and religious, who have made the records. The historian Niebuhr, in discussing the report on the plague in Athens by Thucydides says:

Almost all great epochs of moral degradation are connected with great epidemics.

F. A. Gasquet, abbot president of the English Benedictines, in his history of the black death, writes:

The immediate effect on the people was a religious paralysis. Instead of turning men to God, the scourge turned them to despair, and this not

only in England, but in all parts of Europe. Writers of every nation describe the same dissoluteness of manners consequent upon the epidemic.

A Venetian historian notes the general dissoluteness which followed the disease and its effects in lowering the standard of probity and morals. Covino of Montpellier bears testimony to the baneful effects of the scourge on the morals of those who escaped, and concludes that such visitations exercise the most harmful influence on the general virtue of the world. William of Nangis, in his history of the plague in France in 1348, concludes with the following:

But alas! the world by this renovation is not changed for the better. For people were afterwards more avaricious and grasping, even when they possessed more of this world's goods than before. They were more covetous, vexing themselves by contradictions, quarrels, strifes and law-suits.

Many similar references could be given, but these suffice to show that disease breeds ignorance, immorality and strife. Our inquiries into the influence of disease on civilization, however, have brought out the fact that people living in comparative health have within a few generations made beginnings, at least, some, highly creditable, in government, literature and science. The Hellenic tribes of Greece built up their wondrous civilization within a few centuries. It is true that Rome was not built in a day, but the seven hills were covered with houses and temples, the great aqueducts brought abundant supplies of pure water from the mountains and the wonderful sewers remain as evidence of sanitary skill, and all this was accomplished in a relatively short period measured in the history of the race. The world moved forward at a rapid pace with the dawn of science in the last century. It is not extravagant to prophesy that with ten centuries of freedom from disease, both inherited and

acquired, the world would be regenerated and the superman be born.

It is not necessary to turn to history for examples of the degrading effects of disease on man. We see it to-day in the physical inferiority, intellectual weakness and moral irresponsibility of those peoples who are still under the domination of malaria and kindred diseases. My illustrious predecessor in this office, Dr. Gorgas, has demonstrated what scientific medicine may accomplish in these pestilential regions, and it is within reason to look forward to the time when the tropics may supply choice locations for civilized man. In like manner the valleys of the Tigris and Euphrates are being reclaimed and Babylon and Nineveh may again become seats of learning and culture. The modern sanitarian is quite competent to rebuild the home in which the cradle of civilization was rocked.

After the last epidemic of the plague in London in 1665 the death-rate, so far as it can be ascertained, fell to between 70 and 80 per 1,000. During the next century it fell as low as 50, but fluctuated greatly with recurring epidemics of typhus and small-pox. In the nineteenth, it gradually and quite constantly decreased and is now about 14. In 1879-80, the first year in which the mortality statistics of the United States possess sufficient accuracy to be of any value, the death-rate in the registered area was 19.8; in 1912 it was 13.9—a decrease of 30 per cent. During the same time the mortality from typhoid fever has decreased 50 per cent.; that from scarlet fever 89 per cent.; that from diphtheria 84 per cent.; that from tuberculosis 54 per cent. Hoffman states that had the death-rate for tuberculosis in 1901 continued there would have been 200,000 more deaths from this cause from that date to 1911 than actually did occur, or the actual saving of lives from

death by tuberculosis accomplished in that decennium averaged 20,000 per year. A battle in which 20,000 are slain stirs the world at the time and fills pages of history later. Preventive medicine measures its successes by the number of lives saved, and 20,000 a year preserved from death from one disease is no small triumph. In the last century the average of human life has been increased fifteen years and this increase could be duplicated in the next twenty years if the facts we now possess were effectively employed.

Hoffman further states that the addition to the material wealth of this country secured by the reduction of deaths from tuberculosis within ten years amounts approximately to 6,200,000 years of human life, covering its most productive period. Medicine discovered the facts which have made this great work possible and has directed their application. With evidence of this kind before them, will our lawmakers listen to those who demand recognition as practitioners of medicine without proper qualification?

The further developments of medicine, both curative and preventive, depend on scientific investigations. The public is the beneficiary and should in every way encourage medical research. By the application of discoveries already made, the burden of disease has been lightened, sickness has become less frequent and less prolonged, a greater degree of health has been secured, the efficiency of the individual and of the nation has been increased and life has been prolonged and made more enjoyable. The federal government and the states should sustain and promote scientific research. That government is the best which secures for its citizens the greatest freedom from disease, the highest degree of health and the longest life, and that people which most fully secures the enjoy-

ment of these blessings will dominate the world.

Medicine consists of the application of scientific discovery to the prevention and cure of disease. All else which may go under the name of medicine is sham and fraud. Without advancement in the physical, chemical and biologic sciences there can be no progressive movement in medicine. Scientific knowledge is gained only by observation and experiment. Before the time of Jenner, we are told by the historian, it was unusual to meet in London one whose face was not marked by smallpox. There was a popular belief that one who had cowpox was immune to smallpox. Jenner put this belief to a scientific test and the result was the discovery of vaccination, and this secured the abolition of this disfigurement and a marked reduction in mortality.

In 1849, a village doctor, with a crude microscope, studied the blood of animals sick with anthrax and compared it with that of healthy ones. He discovered the anthrax bacillus. This work was extended by Davaine, Pasteur, Koch and others, and from this the science of bacteriology has been developed. The particulate causes of many infectious diseases have been recognized, isolated and their effects on animals demonstrated. Many of the mysteries of contagion have been revealed and the conditions of the transmission of disease made known. The fundamental principles of preventive medicine have been developed into a science which is to-day the most potent factor in the progress of civilization.

Finlay suspected a certain mosquito to be the carrier of the virus of yellow fever. Reed and his co-workers demonstrated the truth of this theory and the work of Gorgas has freed Havana from the pestilence and the construction of the Panama Canal is an accomplished fact.

We are sorry for the Greek, whose bodily health, mental strength and moral sense were depressed by the invisible and insidious organisms of malaria, and truly his memory deserves our sympathy. He had no microscope, and how could he detect or even suspect that the mosquitoes which had annoyed his ancestors for generations had armed their lancets with deadly poison brought from Africa? The Greek had never heard of quinin and the other cinchona alkaloids. He did not know the land whose forests were even then elaborating those products, which, centuries later, were of greater value than gold to man, and proved to be an essential help in the uplift of mankind. Laveran discovered the *Plasmodium malariae*. Ross studied its life history and the fetters of this disease, which has so long retarded the progress of man, have been broken. Mitchell and Reichart investigated the poisonous properties of snake venom. Sewall immunized animals with it. Ehrlich studied the similar bodies, abrin, ricin and diphtheria toxin, and von Behring and Roux gave the world antitoxin, the magical curative value of which has greatly reduced the mortality from this disease. The experiments of Villemin demonstrated the contagious nature of tuberculosis, long suspected and frequently denied. The diligent research of Koch resulted in the recognition and isolation of the causative agent, and since this discovery the mortality of the Great White Plague in Europe and the United States has been diminished more than half, and it is within the range of sanity to look forward to the time, when the former "Captain of the hosts of death" will be known only by the fearful records he once made in the history of man's struggle to be relieved from the heavy tribute paid to infection.

We boast of a great civilization, but this is justified only within limits. Science

more nearly dominates the world than at any time in the past. Learning permeates the masses more deeply, but credulity and ignorance are widely prevalent. In this country of nearly one hundred millions, there are thousands whose greed impedes the progress of the whole, tens of thousands whose ignorance retards their own growth, and other thousands who live by crime and procreate their kind to feed on generations to come. We have our schools, colleges and universities, while our almshouses, insane asylums and penal institutions are full. In our cities we see the palatial homes of the ultra rich, the splendid temples of trade and commerce, the slums of want and poverty and the homes, both rich and squalid, of vice and crime. No nation in this condition can be given a clean bill of health. Our hill-tops are illuminated by the light of knowledge, but our valleys are covered by the clouds of ignorance. We have not emerged from the shadows of the dark ages. The historian of the future will have no difficulty in convincing his readers that those who lived at the beginning of the twentieth century were but slightly removed from barbarism, as he will tell that the school, saloon and house of prostitution flourished in close proximity; that the capitalist worked his employees under conditions which precluded soundness of body; that the labor union man dynamited buildings; that whilst we sent missionaries to convert the Moslem and the Buddhist ten thousand murders were committed annually in our midst, and that a large percentage of our mortality was due to preventable disease.

Evidently there is much to be done before we pass out from the shadows of ignorance into the full light of knowledge. In this great work for the betterment of the race the medical profession has important duties to perform. I do not mean to

imply that the uplift of mankind devolves wholly on the medical man. The burdens are too many and too diversified, the ascent too steep and the pathways too rough for one profession to hope to reach unaided the high plateau we seek. Moreover, other callings have no right, and should have no desire, to shirk the moral responsibilities, which rest alike on all. But in past ages, medical men have been the chief torch-bearers of science, the only light in which man can safely walk, and we must keep and transmit to our successors this trust and honor. I know of no scientific discovery, from the ignition of wood by friction to the demonstration of the causes of infection and the restriction of disease, which has not sooner or later assisted in the betterment of the race. It may be added that nothing else has so aided man in his slow and halting progress from the pestilential marshes of ignorance to the open uplands of intelligence.

In so great a work as the eradication of preventable disease, all intelligent people must cooperate. The law must support by proper enactments, and these must be enforced with justice and intelligence; it must recognize that the right to enjoy health is quite as sacred as that to possess property; that to poison men in factories and mines, to pollute drinking-water supplies, to adulterate foods and to drug with nostrums is manslaughter. Religion must teach the sanctity of the body as well as that of the soul, that ignorance is sin and knowledge virtue, that parenthood is the holiest function performed by man and that to transmit disease is an unpardonable sin. The teacher must know hygiene as well as mathematics. The capitalist must recognize that improvement in health and growth in intelligence increase the efficiency of labor. There never has been a time when scientific medicine has had so

many and such efficient and appreciative helpers as it has to-day. Our sanitary laws are for the most part good, but their administration is weak, on account of ignorance. The pulpits of the land are open, for the most part, to the sanitarian. The respectable newspapers are most effective in the crusade against quackery and disease. The philanthropist has learned that the advancement of science confers the greatest and most lasting benefits on man.

There is a moral obligation to be intelligent. Ignorance is a vice and when it results in injury to any one it becomes a crime, a moral, if not a statutory one. To infect another with disease, either directly or indirectly, as a result of ignorance, is an immoral act. The purpose of government is to protect its citizens, and a government which fails to shelter its citizens against infection is neither intelligent nor moral. To transmit disease of body or mind to offspring is an unpardonable sin. In a reasonable sense it is worse than murder, because it projects suffering into the future indefinitely.

That medicine has become a fundamental social service must be evident. To return one incapacitated by illness or injury to the condition of self-support benefits not only the individual, but the community, inasmuch as it increases its productive capacity. Infirmary is a direct burden on the individual and scarcely less direct on the community. Weakness in any part diminishes the strength of the whole. It is a fully established principle in social economy that wide-spread intelligence and growth in knowledge are beneficial to the state.

It was in full recognition of this that the framers of the Ordinance of 1787 wrote into that immortal document:

Religion, morality and knowledge being necessary to good government and the happiness of

mankind, schools and the means of education shall forever be encouraged.

The Territory of the Northwest, the government of which was provided in this ordinance, was at that time a vast waste of forest and prairie, furnishing a scant and precarious subsistence for savage tribes and attracting to its borders a few of the most hardy sons of civilization. The knowledge for whose growth and diffusion the wise provision was made, has drained the malarial marshes, converted wild prairie and tangled wood into fruitful orchards and fertile fields, dotted the whole area with neat villages, reared great cities, linked all parts with steam and electric roads, and provided comfortable homes and abundant food for millions. The men who wrote the Ordinance of 1787 left a great inheritance which is temporarily in our possession. Let us write into this great document:

Every ill which can be relieved shall be removed, and every preventable disease shall be prevented.

The wisdom of our fathers has secured for us a greater measure of health and a longer term of life; let us do as well for those who are to possess this fair land in the next generation. Let us live not only for ourselves and the present, but for the greater and more intelligent life of the future.

Not myself, but the truth that in life I have spoken  
Not myself, but the seed that in life I have sown  
Shall pass into ages—all about me forgotten,  
Save the truth I have spoken, the things I have done.

All things are relative and health is no exception. With a greater degree of health among all, religion will become more effective for good, morality will have a deeper significance and a wider application and knowledge will multiply and distribute its blessings more widely.

In the further improvement of the phys-

ical, mental and moral conditions of the race, medicine should continue to be a leader. There is no other calling so essential to this movement, and in order to more thoroughly fit itself for this important task the profession should first of all look to its own betterment. The medical man should possess intelligence of high order, manifest industry without stint and show the highest integrity in all he does. That it is the aim of this association to attract to its colors men possessing these qualifications and to deny admission to others is shown by the advance in the standard of medical education, the enforcement of medical registration laws and the denunciation of every form of medical charlatanism. In all these directions the profession has the support of the more intelligent men in other callings. The improvement in medical training secured within recent years in this country is without a parallel in the history of education. The requirements for admission to the medical schools have been rapidly advanced and standardized; the number of medical schools has been reduced from 166 to 104 by obliteration and combination, much to the improvement of all, and a far better class of matriculates has been secured. The courses of instruction have been lengthened and made more scientific. Each good medical school is doing more or less of research which is not confined to laboratory investigators, but is fast finding its way into hospitals. Indeed, some of our clinical men are now making most valuable contributions. Every medical man should have much of the spirit of research. It is the pabulum on which medicine feeds and without it the profession atrophies and starves. It is the glory and strength of the profession that it is not bound by dogma and pays no heed to ipse dixits. I have no sympathy with the idea that medical research should be

largely relegated to special non-teaching institutions. These have their function and we rejoice in their foundation and support and hope that they may multiply, but the man who is devoid of the spirit of scientific investigation has no place in medicine as student, practitioner or teacher, and the most elaborate medical training without opportunity for scientific observation is barren. Besides, opportunities for medical discovery should be widely distributed. Science makes no provision for an aristocracy. There can be no papal bulls issued in the domain of medicine. The workers must be many, all must be free to pursue knowledge in their own way, and all must be compelled to prove their claims, for "life is short, art is long, opportunity is fleeting, experiment fallacious and judgment difficult."

In this work of self-improvement the profession has had the aid of the more intelligent law-makers and administrators. In carrying out these progressive changes there has been much sacrifice of money and personal pride by many members of the profession. Large schools have willingly submitted to marked reduction in the numbers of their students and consequently in financial support. A medical education costs more in time and money than that demanded by any other profession, and the emoluments of the average practitioner have decreased as preventive medicine has become more effective. No other profession pays so heavily the great cost of eradicating the infectious diseases, but this is the function of medicine and no sacrifice should be regarded as too great. While intelligent medical men have been leading the crusade against greed, ignorance and disease, our legislative halls have been crowded with the representatives of sects, cults and charlatans demanding legal recognition. If I mistake not, herculean efforts will be made

in the near future to lower the standards demanded of the medical practitioner. These endeavors have been promised aid from those who have heavy financial backing, but if we are worthy of the trust which we bear, we shall not yield. We must appeal to the good sense of the people for whose welfare we labor. We must show what scientific medicine has done for the public good and point out the greater things it may do with increased opportunity. It must be admitted that in the crusade for the restriction of tuberculosis many physicians have manifested but little interest. This is shown by their slowness to employ methods of early diagnosis and consequently by their failure to recognize the disease in its curable stage, also by their unwillingness to comply with the laws of notification. It is an undeniable fact that there are many medical men who know less about hygienic measures than the more intelligent of the laity. With advancing knowledge among the masses these professional fossils will be correctly labeled and properly shelved in the local museums of antiquities.

I believe that medicine is now attracting excellent young men. It should appeal to this class. It does not point the way to great financial reward, but it offers a service unsurpassed by any other calling. The historian tells us:

For the Roman patriot the only worthy stage was the forum or the battlefield; every other pursuit was left in the hands of slaves and could not free itself from the taint of servitude.

Modern medicine offers a field in which the advancement of knowledge, the improvement of health conditions and the saving of lives are the measures of success.

Preventive medicine, still in its youth, has accomplished great things. As I have stated, within the past thirty years in this country the mortality from tuberculosis

has been reduced more than half and with scarlet fever and diphtheria the results have been more striking. Within the past ten years the average life has been increased four years. Great epidemics which once devastated continents are no longer known in the more intelligent parts of the world. In fact, it may be said that the death-rate is now an excellent measure of intelligence. In 1911 the death-rate in London was 15 per one thousand, while that of Moscow was 27.3. Preventive medicine is the keystone of the triumphal arch of modern civilization, and its displacement would precipitate mankind into relative barbarism. Should the health administrators of any great commercial center fail, for even a few months, to exercise the function of restricting disease, the history of the epidemics of the middle ages might be repeated. Great things have been done, but greater tasks lie before us, and their accomplishment depends on the scientific wisdom of our profession and the intelligence of the people. Without the harmonious adjustment of these forces the greatest efficiency can not be secured. While the mortality from tuberculosis has been reduced half in the past thirty years, we must not assume that the total eradication of this disease will be accomplished in the same number of years. Only the more progressive members of the profession have taken the initiative, and only the more intelligent members of the community have responded. Intelligence and the sense of moral responsibility must grow as the work proceeds. It remains for all who have the welfare of the race at heart to plan wisely and carry forward courageously the campaign against greed, ignorance and disease.

The sanitarians of this country seem to be in harmony in regard to the general procedures to be followed. These are embodied

in bills recently introduced in the legislative assemblies of a number of states. In New York an excellent bill was passed and its operation is now being inaugurated under the directorship of Dr. Biggs, whose long and effective service in the city of New York demonstrates the wisdom of his selection. I regard it as highly fortunate that the operation of this new and important law is to be directed by one so well qualified.

My own ideas are embodied in the "Amberson bill" of the Michigan legislature of 1913. Among the provisions of this bill the following may be mentioned: The state is to be divided into health districts. In each such district a health commissioner is to be appointed for a term of four years. The fitness of the commissioner is to be determined by the State Board of Health after examination. The salary of the commissioner varies with the population of the district, but in most instances would run from three to six thousand dollars. There is to be an additional appropriation for laboratory expenses and for carrying out the purposes of the act.

It shall be the duty of the health commissioners to be vigilant in the work of disease prevention and the conservation of the public health, and to enforce all health laws of the state and health ordinances of their respective localities, together with all rules and orders of the state board of health; to collect and report to the state board of health morbidity statistics and to make a monthly report of the work done by them in narrative form to the state board of health and in such tabular form as may be prescribed by the state board of health. Copies of such reports shall be retained by each commissioner in permanent record books. They shall make such sanitary inspections and surveys of the district as may be required from time to time by the state board of health or by the city for which appointed, or by resolution of the board of supervisors of each county. They are hereby authorized and invested with the power to enter on and inspect private property at proper times in regard to the possible presence, sources or cause of



disease, to establish quarantine and in connection therewith to order whatever is reasonable and necessary for the prevention and suppression of diseases; to close schools, churches, theaters, or any place of public assemblage, to forbid public gatherings in order to prevent or stay epidemics; to collect statistics concerning insanity, feeble-mindedness, tuberculosis and other infectious diseases; to inspect slaughter-houses and markets of all kinds where food is sold. They shall inspect at least once each six months and make a sanitary survey of the publicly owned buildings and institutions within their respective jurisdiction and shall keep a report thereon as part of the records of their office. They may inspect any school buildings or grounds within their jurisdiction as to sanitary conditions and shall have power to close any school when the sanitary conditions are such as to endanger or imperil the health or life of the pupils attending the same. They shall include all such sanitary inspections in their monthly reports to the state board of health. They shall at all times be subject to the orders of the state board of health in the execution of the health laws of this state and may perform any duty where required by the state board of health, or any member of said board acting for the entire board, which might be performed by said board of health or an officer thereof.

Further duties of the health commissioners are defined in the bill, and I have given only enough to show the purpose and scope of its provisions.

The successful operation of such a law would require the highest class of sanitarians. They must possess intelligence, industry and integrity. They must be devoted to their work, remembering that the Father of Medicine said:

Where love of mankind is, there also is love of art.

With these qualifications I believe that such a law might be operated with great benefit to the people. Is the medical profession of this country prepared to do this work? I believe that many of the recent graduates of our best schools are fitted for this highly important function. They may need special training in the courses in pub-

lic health now being inaugurated. If I mistake not, our profession will soon have wide opportunity to demonstrate its usefulness in this direction. If the public makes this demand, preventive medicine will have the opportunity to do a patriotic service which has never come to any profession at any time. With proper facilities and helpers, such commissioners might within a few years become acquainted with the conditions surrounding every permanent resident within his jurisdiction, and with properly qualified administrators of the law much might be done to abate disease, improve health, increase efficiency, eradicate the venereal diseases, stamp out vagrancy, pauperism, prostitution, alcoholism and crime. Crime is a disease due to heredity or environment, one or both. We now permit it to breed and multiply in our midst. Its causes must be determined and eliminated and its habitations must be discovered, disinfected or destroyed. We have heard too much about the rights of the individual; let us know more about his duties. Too much stress has been laid on the sacredness of private property and too little on the duty of all to contribute to the welfare of the whole. Preventive medicine has demonstrated in a practical way the force of the biblical statements that no man liveth to himself alone, and that every man is his brother's keeper. Preventive medicine is the most potent factor in the socialistic movement of the day with which every good man feels himself more or less in sympathy; besides it is at the same time the most powerful weapon against the anarchy with which some would threaten us.

If preventive medicine is to bestow on man its richest service, the time must come when every citizen will submit himself to a thorough medical examination once a year or oftener. The benefits which would result from such a service are so evident to medi-

cal men that detail is not desirable. When recognized in their early stages most of the diseases which now prevail are amenable to treatment. The early recognition of tuberculosis, cancer, diabetes, nephritis, heart disease, etc., with the elimination of the more acute infectious diseases would add something like fifteen years to the average life, besides saving much invalidism and suffering. The ultimate goal of science is the domination of the forces of nature and their utilization in promoting the welfare of mankind. Science must discover the facts and medicine must make the application for either cure or prevention.

The local health authorities for which the bills referred to make provision must be supervised by State Boards of Health or State Commissioners. Many of our State Boards of Health are already doing much, but this is little compared with what they might do. They should be absolutely free from party dictation, should be made up of men both qualified and interested and their executive officers should be distinguished for their knowledge of sanitation. Their appropriations should be greatly increased, for health is a purchasable commodity. Pure water, pure food and even pure air cost money, but they lead to health, which is worth more than gold to both the individual and the state.

Our present national health service is doing most excellent work. It demonstrated its strength in eradicating the plague in California and the suppression of yellow fever in New Orleans. It has charge of the administration of the laws affecting the admission of immigrants, so far as their health is concerned, and it performs this service well. The Public Health Service is now investigating the pollution of certain rivers, studying trachoma in the mountains of Kentucky, pellagra in South Carolina and the spread of typhoid fever in certain

districts. The Hygienic Laboratory at Washington has made valuable researches in addition to the routine work of the examinations of vaccines and serums. This bureau should be developed into a department with a member in the cabinet. The study of contagion in our midst is quite as important as anything within the range of the activities of the Departments of the Interior, Agriculture and Commerce and Labor. Our health relations with other nations concern us quite as much as our trade relations. The one thing above all others against which our doors should be shut is disease, whether it be of plant, animal or man, whether it be of body, mind or morals. The highest function of the state is not to make millionaires out of a few importers or to find profitable investments for its surplus wealth in foreign lands, but to advance to the highest degree the health, intelligence and morality of its citizens.

In each state there should be a hygienic laboratory equipped with able men supplied with facilities for the study of sanitary conditions and for the prosecution of scientific research. The Hygienic Laboratory at Washington should be developed into a great institution for research which would improve the conditions of life. The greatest asset of any nation is the health of its citizens and the people who secure this in the highest degree will dominate the earth for the dominion of the superman, when he comes, will extend from pole to pole, not by force of arms, but by example and education.

*Younger members of the profession:* One who is soon to be mustered out of service, on account of disability and old age, salutes you. An old soldier who has served in the ranks for nearly forty years steps from his decimated regiment, lifts his cap and cheers you, as you pass by in your new dress and armed with weapons of greater efficiency

than were known when he enlisted. The cause is the liberation of the race from the bonds of superstition and ignorance and it is a glorious one. The contest began before the genus *homo sapiens* came into existence. Countless generations have served their time, some well, some ill, and have passed into oblivion, but their partial victories have made you stronger and placed on you a greater responsibility. Your intelligence is greater, your judgment is sounder and your effectiveness has been increased. Where the past has failed or only partially succeeded, your success will be greater. But the battlements of ignorance still bristle with heavy-fire guns. Only a few of the outposts of the enemy have been captured. It is for you to do and then like all your predecessors to die. You stand to-day within the firing-line. Go on courageously and when eons of the future have become the past, the superman, born out of the struggles of his predecessors, will demolish the last citadel of ignorance and vice, and firmly plant on the highest peak of the mountain of knowledge the flag of human progress and when the silken banner shall unfold, there shall appear on it this legend: *Pro gloria omnium nationum et hominum honore.*

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A FOSSIL HUMAN SKELETON FROM GERMAN EAST AFRICA

At a meeting of the *Gesellschaft naturforschender Freunde* in Berlin on March 17, 1914, Dr. Hans Reck made a preliminary report on a discovery that is of special interest to anthropologists. Dr. Reck was attached to a geological expedition that had been sent out to survey a parallel running through the northern end of German East Africa, as well as to collect for the Geologic-Paleontologic Institute of the University of Berlin and the Paleontological Museum at Munich.

The discovery in question was made in Oldoway hollow or gorge on the eastern margin of the Serengeti steppe. The Oldoway gorge lays bare a series of tufaceous layers that had been deposited in a freshwater lake. Five deposits can be distinguished stratigraphically as well as paleontologically. In the lowest deposit fossil remains are rare, the chief specimen being a part of a rhinoceros skeleton. The second deposit is rich in fossil mammalian remains, including the human skeleton. Remains of two types of fossil elephant, both different from the living *Elephas africanus*, were especially abundant; the skull of a hippopotamus was also found in deposit number two. Bones of the antelope appear for the first time in the third deposit, which also contains bones of the elephant. Elephant remains are dominant in the fourth deposit; fish bones are also abundant. The fifth and latest of the deposits is the richest of all in fossils. It is characterized by an antelope and gazelle fauna similar to that now living on the Serengeti steppe. In this deposit Reck found no elephant remains.

The change in fauna represented by the series corresponds to a change in climate. The climate of the upper horizon was similar to that of to-day; while the elephant, rhinoceros, hippopotamus, crocodile, and fish of the lower horizons bespeak a damp woodland climate that was probably synchronous with the Würm glacial epoch in Europe.

The human skeleton, as has been said, came from the next to the lowest horizon (No. 2). It is not only in a good state of preservation, but is likewise practically complete. The skeleton was found some three or four meters below the rim of the Oldoway gorge, which here is about fifty meters deep. The skeleton bore the same relation to the stratified bed as did the other mammalian remains and was dug out of the hard clay tuff with hammer and chisel just as these were. In other words the conditions of the find were such as to exclude the possibility of an interment. The human bones are therefore as old as the deposit (No. 2).

An attempt to determine the age of the