An Address ON THE STUDY OF TROPICAL DISEASES.

DELIVERED AT THE OPENING OF THE WINTER SESSION
OF THE LONDON SCHOOL OF TROPICAL
MEDICINE.

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NEARLY three years ago, on December 7th, 1903, an address was delivered in this place by Sir Patrick Manson, whom I may without impropriety designate as the Brahma and Vishnu—the creator and sustainer—of the London School of Tropical Medicine. In that address Sir Patrick Manson described the origin, progress, and prospects of the institution, and indicated its objects, achievements, and requirements. The school, which was opened on October 3rd, 1899, had then completed the fourth year of its existence. An aggregate of 355 students had undergone instruction during thirteen sessions, and evidence was produced of good work accomplished in the hospital and school, and by many of its alumni who had utilized to advantage the lessons, theoretical and practical, which they had been taught.

During the three years which have elapsed since that address was delivered the school has continued to prosper. The aggregate of students who have attended during twenty-one sessions has increased to 617. Of this number 235 belonged to the Colonial Medical Service, for whose benefit and for the benefit of the colonies in which its members were destined to serve the school was originally designed and organized, under the administration and personal initiative of that great Colonial Minister, the Right Honourable Joseph Chamberlain; 18 medical men employed by the Foreign Office, 29 officers of the Indian Medical Service, 7 of the Royal Army Medical Corps, 4 of the Royal Navy Medical Service, 1 of the Indian Civil Veterinary Department, and 33 medical officers serving under other Governments have passed through the School, making a total of 327, or 53 per cent. of the whole; 71 medical missionaries and 219 private students, or 290 non-officials (47 per cent.), have availed themselves of the opportunities of studying tropical diseases afforded by the school. The large proportion of non-official students fully confirms the wisdom of the founders of the school in extending its benefits to all medical men, and I may add women (for the aggregate includes 40 ladies), interested in tropical diseases, and mostly intending to practise in the tropics.

The demand for admission into the school has been well maintained, and the entries for the present session have been, I learn, unprecedentedly large. A specially satisfactory feature in the statistics of attendance is that the number of students taking the full course of three months is on the increase. The status of the school has been strengthened by its affiliation with the University of London and the admission of tropical medicine as a sixth alternative subject for the M.D. of that University. The school course has also been recognized as entitling students to undergo examination for the Cambridge Diploma of Tropical Medicine and Hygiene. Thirty-two students of the school have succeeded in obtaining this diploma, and one student has gained the London M.D. taking tropical medicine as the optional subject. Special arrangements have been made for instruction with reference to the examination for the London degree and Cambridge diploma. The rich experience of tropical and other diseases available in the Dreadnought Hospital has been placed at the disposal of medical graduates by the establishment of the London School of Clinical Medicine, and the services of eminent physicians and surgeons have been secured for imparting instruction in that institution.

Of the transformation which has taken place of a branch hospital into a well-equipped medical school, I have had opportunities of personal knowledge. Some twelve years ago I paid several visits to the Royal Victoria and Albert Docks Branch of the Seamen's Hospital Society. About 20 patients were accommodated in the rooms of a small

building. The patients whom I saw were seamen of many nationalities, who had been admitted from vessels trading with the tropics, and suffered from diseases contracted in warm climates. The arrangements for their comfort and cure were excellent. The place was occasionally visited by medical men interested in tropical pathology; but no means of systematic instruction existed. There was a small room in which microscopic and bacteriological observations were made and demonstrations given of malarial and other parasites; but the work was necessarily limited to the clinical needs of the hospital. Recently, under the guidance of Sir Patrick Manson, I visited this institution—hospital and school—as it now exists. The hospital has been enlarged and can accommodate 50 patients. The new wards are spacious, clean, and well ventilated, fitted with every appliance, and supplied with every requisite for the treatment of the sick. The school building adjoining the hospital, with its large and well-stocked laboratory, lecture room, museum, and library, is well adapted and provided for the instruction of 40 students; and, in addition to accommodation for the staff, provides quarters for 12 students, who are thus enabled to devote the whole of their time to their studies and practical work. The arrangements are well suited to their purpose, and reflect credit on all concerned; but they are by no means complete, and the school must be looked upon as in a state of adolescence and immaturity. Effort and money are still necessary to enable it to accomplish all the good which its promoters and well-wishers desire.

It is satisfactory to know that the expenses connected with construction and organization have, through the liberality of the Seamen's Hospital Society and the public, been fully defrayed. Conspicuous in the roll of benefactors is the name of the Honourable Bomanji Dinshaw Petit, of Bombay, who contributed 100,000 rupees to the school. Mr. Petit is evidently endowed with the liberal disposition of his family. His cousin, Sir Dinshaw Manakji Petit, Bart., among other benefactions, founded a veterinary hospital in Bombay, and contributed a large sum for a similar purpose when the Bengal Veterinary College, in whose creation I was deeply interested and concerned, was established in the year 1892. It is also gratifying to learn that the London School of Tropical Medicine is free of debt and able to pay its way; but in order thoroughly to fulfil its twofold object of education and research, the school needs further extension and development. The laboratory is not large enough for present requirements, and additions are necessary for special purposes. With the exception of the Craggs Scholarship, no provision has been made for promoting and supporting research where it can most profitably be carried out, namely, in the tropics. Adequate remuneration is not given to lecturers and instructors, and the fees payable by students are high, and capable of considerable reduction.

For these and other purposes more money is wanted. Sir Patrick Manson, in the address to which I have referred, estimated that £100,000 were required to place the school on a satisfactory and permanent basis. I understand that of this sum about £40,000 have been received. The remaining £60,000 would form an endowment which would expand the operations and enhance the usefulness of the School. Surely the wealthiest city and busiest port in the world may reasonably be expected, when the want is known, to contribute handsomely to the support of an institution whose work is designed to mitigate the loss of health and life, which interferes so greatly with the industry and commerce of our tropical colonies and dependencies, and causes such a waste of time, labour, and money. The wealth of London and of England is largely drawn from the colonies and from the carrying trade connected with them; and any agency or institution, which ministers to the promotion of health and prolongation of life, and thereby cheapens production, barter, and transport, is deserving of encouragement and support. So that motives of benevolence and self-interest combine to advocate the claims of the school to such liberal endowment as to make it worthy of the city and country, and thoroughly competent to carry out those objects and operations whose aim is to benefit humanity and promote civilization.

The necessity of special instruction in the diseases of

tropical countries does not require argument or proof. As these countries have their peculiar flora and fauna, of which no general teaching of botany and zoology or special study of the plants and animals of temperate regions can supply a knowledge, so there are in the tropics special manifestations and modifications of disease regarding which pathology and nosology, as taught in the medical schools of this country, afford very little information. The analogy is by no means a strained one, for the pathology of the present day is largely concerned with botany and zoology, and includes a study of vegetable and animal life. This fact has been wisely recognized in the scheme of instruction arranged in this school. Through the liberality of the colonies the subjects of protozoology and helminthology have been added to the curriculum of study—a novel and important departure which merits commendation and imitation. The study of vegetable microbes is included in that of the diseases with which they are associated; but to complete the teaching of parasitology there is one subject which ought to be systematically developed, namely, pathological entomology. Insects, more especially blood-sucking insects, the mosquito and tsetse fly for example, have been found to fulfil an important function in the conveyance of infective disease, and the harbouring and transmission of disease germs, and knowledge on this subject imperatively claims to be imparted and extended. Recent observations indicate that leprosy is spread by insect agency, and cholera, enteric fever, and plague are very probably similarly transmitted; but on these and other cognate points additional light is required. I trust, therefore, that a pathological entomologist will in the early future be added to the staff of the school.

The trend of modern investigation and thought has forced into the forefront the fascinating subject of comparative pathology, which has followed naturally but somewhat tardily on comparative anatomy and physiology. The researches of recent years, conspicuously as regards tropical diseases, have revealed a community of suffering and a reciprocity of infection and protection between man and the lower animal creation which have invested medical science with fresh interest and endowed it with larger power. In this connexion it is pleasing to note that an agreement has been concluded between the London School of Tropical Medicine and the Royal Veterinary College, Camden Town, by which students of either institution may attend the other; and an interchange of demonstrations has been arranged. The inquiries and experiments which have made comparative pathology what it is have been beneficial to both man and beast, and are capable of becoming more so—a point which is strangely overlooked by those who from laudable but short-sighted motives decry some of the methods by which our knowledge of influences, disabling and destructive, affecting animal life is advanced. Physiologists and pathologists have been accused of callous selfishness and cruelty in subjecting the lower animals to experiment for the purpose of furthering medical science and improving medical art; but in investigating tropical diseases men have themselves in numerous instances incurred risks to health and life without hesitation. The true causation of yellow fever was discovered through the agency of volunteers who readily subjected themselves to dangerous hazards in disproving the old doctrine of infection by fomites and proving the fact of communication by mosquitoes. In working out the problem of malaria human experiment has also been largely resorted to, as in the two crucial tests which were applied by members of this school. In 1900 Drs. Sambon and Low braved the perils of the Roman Campagna during the fever season, and by protecting themselves from mosquito bites escaped the maladies which prostrated the unprotected inhabitants of that malarious tract; and in the same year Patrick Thurburn Manson and George Warren contracted ague in London by allowing themselves to be bitten by mosquitos which had been fed in Rome on plasmodium infected blood. Similar risks, fatal in some instances, have been run in investigating Malta fever, cholera, and plague, and among recent medical martyrs the names of Lazear, Myers, Dutton, and Tulloch deserve special and regretful record. The study of comparative pathology is peculiarly needful in the tropics where, under a different environment, life, and conspicuously parasitic life, is more exuberant than in temperate regions, and the

struggle between the higher and lower life, between the things and forces that make for development and construction and those that make for decadence and destruction, is more keen and stringent.

The facts and laws of comparative pathology lead up to the higher reaches of transcendental biology and furnish new illustrations of the law of survival of the fittest which the genius of Darwin formularized and his industry so amply exemplified and established. It is important to note, however, that in this struggle the issue depends on circumstances and conditions, and is fortunately subject to the dominance of mind. The survival is not necessarily of the higher organism. In a state of uncontrolled nature the parasite is apt to obtain the mastery, the lower life to flourish at the expense of the higher; and this is specially true of the tropics with their luxuriant vegetation and teeming animal life. There the lower life is rampant and the higher heavily handicapped in the contest. But when the earth is, according to the Divine command, subdued for the use of man, when the primeval forest is cleared, the swamp drained, the desert irrigated, when crops serviceable to man are cultivated, and native races trained to agriculture and commerce, educated and civilized; when ignorance, poverty, and filth are diminished or abolished, the parasite is at a disadvantage, physique and health are improved, and life is prolonged.

The salutary effect of drainage, cultivation, and cleansing is well illustrated by the banishment of malarial disease from England. Epidemics of dysentery which used to rage from time to time are no longer heard of; typhus and relapsing fevers are seldom met with; plague and leprosy have receded eastward, and cholera has latterly been held at bay. In India there has also been a marked improvement in public health in consequence of undertakings such as railways, canals, waterworks, and drains, which were appreciatively referred to by the Right Honourable John Morley in his recent speech in the House of Commons. I could, did time permit, cite numerous instances of the abatement of the incidence and mortality of fevers and fluxes in Indian towns by means of sanitary reforms, particularly vaccination, the supply of pure water and improved drainage and conservancy. I see no reason why health should be worse and life shorter in tropical than in temperate latitudes, when the conditions which affect vitality and longevity are properly understood and made the subject of proper control. In a word, what is required in the tropics for healthy existence is reclamation, economic and sanitary, and these should go hand in hand. To this end the efforts of the whole community, not of medical men and sanitarians only, but of every member of the population, are required, and sanitary education should be made universal and compulsory. As a step in this direction, I am glad to learn that Sir Patrick Manson is preparing a catechism of tropical hygiene which he proposes to place in the hands of persons proceeding to the tropics, and make the subject of examination as a condition of service.

The marvellous progress which has taken place during the last quarter of a century in our knowledge of the nature and causation of disease, to which the study of tropical diseases has so materially contributed, has radically revolutionized our notions regarding pathological processes. We have been compelled to widen our view and to devote more attention to the environment. Important as is the study of the host and his environment, hardly less important is that of the parasite and its environment. It is essential now that the life-history of both should be worked out and the conditions affecting both beneficially or prejudicially. Disease is no longer looked upon as a malignant entity, but as a mode of salutary resistance to noxae; and such processes as fever and inflammation are found to be protective and curative in their purpose and effects rather than of themselves deleterious. This view proclaims the supreme importance of a study of the noxae, as well as of the disturbances of health and function to which they give rise. The matter assumes an intenser interest when we consider that there exist in the animal body materials whose office it is to destroy the noxae—to kill the microbe and antagonize the poison elaborated by it. The existence of these materials and of their power constitutes a startling instance of that adapted prevision commonly called design which pervades

nature, and whose most subtle and conspicuous manifestation is in the working of the human brain. To develop and strengthen these resistive and curative elements in the animal organization is one of the chief, if not the chief, object of medical science; and—greatest marvel of all—we are learning to use pathogenetic micro-organisms for this purpose, just as in the septic tank system we are employing saprophytic microbes to hasten the return of matter which has ministered to organic life to inorganic forms, and thus to accelerate the process of decomposition, the intermediate products of which are so apt to be dangerous to health. The preparation of protective and curative vaccines and serums is engaging the attention of our most able and advanced pathologists. Even cancer, which seems to belong to the category of the infective granulomata, is being diligently experimented on from this point of view, with results which offer some promise of eventual success. The principle which underlies the great discovery of Jenner is, after the lapse of over a century, obtaining new and remarkable applications; the familiar formulae, *vis conservatrix naturae* and *vis medicatrix naturae* are undergoing incarnation, and the intuitions of our forefathers are being converted into material facts.

In offering these observations I have, I fear, been wandering among the hazy heights of generalities; but on an occasion such as the present it seems fitting to survey the field of work as a whole—its extent, condition, and capabilities—rather than examine minutely the tilth of some particular portion of it. Generalization is a delightful exercise, and speculation, or, as Tyndall phrased it, the scientific use of the imagination, is capable, when rightly and cautiously employed, of guiding and aiding inquiry. If we can find “tongues in trees, books in the running brooks, and sermons in stones,” we may reasonably expect to discover philosophy in epiphytes, wisdom in worms, and, I may add, “good in everything.” But the process of generalization is prone to become, when misused, both misleading and unproductive and is apt to be beguiling. It is so much easier to think out than to work out a problem. No better illustration of this has ever been furnished than in that land of ideals and shams, India. The genius of James Lumsdaine Bryden in the early sixties sought to extract pathology and etiology from arithmetical units and aggregates of units; and strange doctrines concerning pandemic waves, aerial conduction and convection and forces cosmic, telluric and climatic, became rampant. It is fair, however, to Bryden's memory to state that his chief achievement, the discovery of the great prevalence of enteric fever in the European army of India, was based on an intelligent study and interpretation of cases and *post-mortem* examinations recorded by medical officers. The *reductio ad absurdum* of Bryden's visionary views was accomplished by James MacNab Cunningham, who, with a logical Scotch mind, showed unwittingly how they led to scepticism and nihilism. But, ever since the arrival of the English in India, there have been men who investigated the diseases of the country by clinical methods. The names of Johnson, Twining, Annesley, Webb, Martin, Goodeve, Morehead, and Chevers, merit prominent remembrance in this regard. Their work possesses great value, but it was too exclusively devoted to the subject of disease, and the environment was neglected. A new era of systematic practical observation was opened by the deputation of Timothy Lewis and David Douglas Cunningham, in the year 1870, to investigate cholera by the methods which they had learned in the Army Medical School, Netley, which was an early pioneer in the special study of tropical diseases, and in which, from first to last, clinical and practical systems of study were followed. It is education of this sort that has fitted men like Bruce, Ronald Ross, Leslie, Roberts, Leishman, and Donovan, to accomplish work which has revolutionized tropical medicine, and, under the stimulating influence of Professor (now Sir) Almroth Wright's instruction, numerous observers, among whom I may specify the names of Lamb, Rogers, Liston, Douglas, Bannerman, Buchanan, Christophers, James, and Greig, are now engaged in fruitful researches in India. Lewis and Cunningham did excellent work in many directions; but the methods which have been instrumental in adding so materially to our knowledge, particularly staining, pure cultivation, and animal experimentation, did not come into full use in

their time. The Government of India has now responded to the demands of modern medical science, and has resolved to establish laboratories for clinical aid and pathological research throughout India. Many of these are already in existence and active operation. The Pasteur Institute at Kasauli has been converted into a central research laboratory under the direction of Lieutenant-Colonel Semple, another disciple of Wright; the King Institute at Guindy, in Madras, under Lieutenant Christophers, is fully fitted for vaccine, bacteriological, and pathological investigations; the plague research laboratory in Bombay, organized by Haffkine, and Hankin's laboratory at Agra, are available for all kinds of inquiries, and Lingard's laboratory at Muktesar is devoted to similar studies in veterinary pathology. Other institutions of the same kind are being established, and in time every large hospital in India will no doubt have its laboratory. Laboratory work has, in short, become absolutely indispensable not only for researches but for routine hospital use. The day of vague epidemiological phantasies has departed, and in the dawn of the new day we desecrate the hopeful substitution of facts for formulae; and in place of the theoretical babblings of the past we may reasonably expect in the future demonstrations of things.

To those who are about to commence their studies in this school I offer hearty congratulations on the excellent opportunities they possess for fitting themselves for the responsible duties of their future career. My own experience enables me to bear thankful testimony to the priceless benefit which I derived during my twenty-six years' service in India, from the vivid pictures of tropical disease which Maclean presented to us at Netley, and the sound lessons conveyed to us in the lecture room, wards, and laboratory, regarding their prevention and treatment. Since the year 1865 our knowledge of tropical diseases and of the means by which they are most profitably investigated has undergone a startling advance. I realized this acutely, when, in 1897, I was appointed to occupy the chair of Military and Clinical Medicine, which Maclean had so ably filled; and so rapid did this advance continue to be that, during my eight years' tenure of that office, I found it necessary from term to term materially to alter my lectures—to modify, to cancel, and to add. You are fortunate in being inheritors of the great accession to our knowledge of tropical pathology and hygiene which recent years have brought. There is hardly a subject which has not undergone illumination. Malaria, cholera, plague, leprosy, yellow fever, Malta fever, filariasis, ankylostomiasis, trypanosomiasis, kala-azar—to catalogue some brilliant examples—have been investigated with diligence and success. Their special causes have been demonstrated, and important indications for their prevention and treatment supplied. But great as have been the triumphs, much work still remains to be done on these and other subjects. The more we know the more we want to know. As the circle of knowledge widens the horizon of ignorance also seems to extend. The etiology of dysentery is still very obscure, and the relation of its different forms to hepatic abscess; we are still in ignorance regarding the causation of beri-beri, sprue, dengue, epidemic dropsy, infantile biliary cirrhosis, and many of the infective granulomata; and the strange terms “ponos,” “goundou,” and “ainhum” require pathogenetic explanation. Why is the native of India relatively immune to the infection of enteric fever? Why do dysentery and beri-beri break out in the lunatic asylums of temperate regions while the general population remains exempt? What is the relation between hill diarrhoea and sprue, whose symptoms are almost identical; and between kala-azar and Delhi boil, which appear to be caused by the same micro-organism? Why is the embryo of *Filaria nocturna* absent from the blood in elephantiasis, which appears in the great majority of cases to be caused by filarial infection? These are a few examples of problems which still await solution. This school has already sent forth many earnest and successful workers, among whom Low, Daniels, Castellani, Bentley, Wise, Balfour, and Philip Ross deserve special notice; and the inspiration and training which you will imbibe and undergo here will stimulate and qualify you to follow their footsteps. The assimilation of knowledge is very precious, but the acquisition of aptitude for increasing knowledge is much more so. But,

while discovery and invention are objects of high and laudable ambition, few are gifted with the power of productive original research, and it is very remarkable how meagre are the really permanent contributions to science of even the most gifted. Still it is open to every one to aid in some manner and measure, however humble, in the building of the temple of medicine. Permit me finally to remind you that the main purpose of your lives as practitioners of the art of medicine, as it is the prime motive and glory of your profession, is to promote the welfare of man—to prevent and cure disease, to relieve suffering and prolong life. In striving to accomplish these ends you will earn gratification and gratitude even if you fail to gain fame or fortune.

An Address ON UNIVERSITIES AND MEDICAL EDUCATION.

DELIVERED AT THE OPENING OF THE MEDICAL DEPARTMENT, UNIVERSITY OF LEEDS, OCTOBER 1ST, 1906.

BY

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F.R.S., ETC.,

LORD CHANCELLOR'S VISITOR IN LUNACY.

It is exactly forty years since I was first brought into the world of the Leeds School of Medicine by your present Professor of Obstetrics, Mr. Charles Wright. It was, I well recollect, a bright October afternoon in 1866, when Mr. Wright, the son of my esteemed colleague on the staff of the West Riding Asylum, the late Dr. Wright of Wakefield, a fine specimen of a fine type—the old English physician—showed me with some pride over the then new and recently opened buildings in Park Street. Modest these buildings were, with a semi-ecclesiastical suggestiveness in their lancet windows; cramped and ridiculously inadequate they would now be considered, but they were a marked advance on the original schoolhouse in East Parade, and, taken in connexion with the new infirmary which was opened in the following year, placed the Leeds school, as regards class-room and hospital accommodation, in a position, I suppose, superior to that of any other provincial school of medicine in the kingdom at that date.

In these school buildings in Park Street in 1867 and in several subsequent years I was privileged—and you will pardon me if I am egotistic for a moment—I was privileged to deliver a course of lectures on mental diseases, as far as I know, the first course on that subject ever delivered in a provincial medical school in England, to groups of students whose intelligence, attention, and forbearance I gratefully recall. The course, in these days not obligatory, was always popular and exceedingly well attended, and that I am now inclined to attribute, not so much to my own eloquence or instructiveness, or to the intense interest felt in medical psychology, as to the fact that it was copiously illustrated by diagrams and tables—lantern slides were then unknown—prepared for me by a lunatic artist under my care who insisted on executing them in brilliant colours and in adding ornamental borders of an allegorical description. The success of the course was also perhaps in some measure due to the fact that it ended in a dance at the asylum in order to impress upon the medical mind the utility of terpsichorean exercises in the treatment of insanity.

Fifteen years after I had severed my professional connexion with the West Riding, which I did in 1876, I was invited by the teaching staff of this school to deliver an address at the opening of the session, and on October 1st, 1891, I came back here to find the school in honourable and prosperous partnership with the Yorkshire College of Science, and, as is the wont of prosperous people, removed to more commodious and better furnished quarters. Another fifteen years have sped their course, and I find myself here again, on the invitation of my medical brethren, to assist at the opening of the session of what is no longer a detached medical school or the department of a college, but a faculty of a university,

which although hatched but yesterday is already fully fledged. I have been in touch, if I may so say, with the Leeds Medical School during the three great stages of its evolution: its boyhood, its adolescence, and its maturity, and as a disinterested—perhaps I should rather say as an interested—spectator I have recognized its fitness and efficiency in every stage, and congratulate it now on the ripe perfection to which it has attained. At every stage it has been a stronghold of medical and surgical science and practice, manned by men of masterly ability, whose doughty deeds stand conspicuous in the history of the healing art. To-day it commands advantages such as it never before possessed, but these, I think, consist, not so much in the superior calibre of its teaching staff (for strong and accomplished though your professoriate undoubtedly is, it would be difficult to beat the men of the past) as in its increased numbers, in the division of labour that has taken place, in the allocation of the more strictly scientific subjects to teachers exclusively engaged in them and free from the distraction of private practice, in the introduction of the tutorial system, in the creation of laboratories splendidly appointed, and in the cultural associations obtained by its incorporation in a university.

The oldest and best organized department of the new University, the Medical School, exhibits striking modern developments, but these sink into insignificance when the University of Leeds is regarded as a whole. Surveying its progress since 1874, when the first stone was laid in faith and hope, but without much cash in hand, and the Yorkshire College was started with three professors, up to its present magnitude with a Court, a Council, a Senate, four faculties, thirty-one professors, lecturers, demonstrators, and assistants *ad libitum*, and a revenue of £45,000 a year, it almost seems as if an Aladdin's lamp had been rubbed over this murky city, conjuring up a palace of learning in a night.

I have just come from the birthday celebrations of a great northern university, noble for its achievements, vigorous as ever, that has been growing for four hundred years, and to compare the University of Aberdeen with that of Leeds is to realize that the thoughts of men have been quickened as well as widened “with the process of the suns,” and that we have exchanged the pack-horse and the pillion for the limited mail and the motor-car. And yet, perhaps, the contemplation of this magical creation at Leeds, and of recent expansions, too, at Aberdeen and other universities, is calculated to give us rather an exaggerated idea of our own munificence and to encourage unjustifiable self-complacency. Great liberality has been displayed, but I question whether, in proportion to our means, we have been more generous in our support of the higher education than were the benefactors of bygone days. I am not at all sure that this age of science with its colossal wealth has done more for the endowment of learning than did the ages of faith in their chill penury; indeed, I am inclined to think that we vaunt ourselves unduly both on our bountifulness and on our perspicacity in the application of the funds we subscribe—

Not only we the latest seed of Time,
New men, that in the flying of a wheel
Cry down the past, not only we who prate
Of rights and wrongs, have loved the people well.

Centuries ago gifts were given for the promotion of objects equivalent to those which modern universities hold in view, which, considering the pecuniary resources of those who gave them, should put our most open-handed modern millionaires to shame. As early as the beginning of the seventh century the Anglo-Saxon mind, as we learn from the speech which Bede has preserved for us in his account of the conversion of Edwin to Christianity, was consumed by an ardent desire to comprehend the phenomena of the universe, and ever since then it has from time to time, and under various conditions, subsidized the study both of natural science and theology. It is curious to note how what we regard as our new departures have been anticipated by our remote ancestors. Technical education would, I suppose, be reckoned essentially a nineteenth-century discovery, but I find in the delightful history of the Voyagers by Professor Raleigh of Oxford that Richard Hakluyt—Shakespeare's contemporary, to whom we owe much clear insight into the “spacious times of Great Elizabeth”—explicitly advocated it 300 years ago as the best means of maintaining and extending the trade of the country by enabling us to obtain