The greater remedy seems to be more of a plain generous week-day religion of deeds, rather than a Sunday religion of words; less hypocrisy, haughtiness, lying and suspicion, and more decency and good will amongst peoples, in place of smug pedantic theology.

But do not blame the chemists for what will happen if irresponsible, tactless politicians or writers continue needlessly to arouse the worst feelings in other nations. Pin pricks hurt as much as stabs. But after the harm is committed the chemist as well as the soldier and the sailor has no choice left but to do his part and to help straighten the mess into which they have been drawn by the silliness or boorishness of others.

In the meantime these reproaches recklessly hurled at us should not make us lose faith in the noble purposes of our real mission. At the recent meeting of the British Association for the Advancement of Science, one of Britain's most distinguished physicians stated that every town in the world owes a statue in gratitude to Pasteur, the great French chemist. The rôle of chemistry is essentially constructive; to make this world more comfortable, happier and better to live in, to elevate the human race. Never has our field along these lines been more promising than today. I am not one of those who tends to exaggerate the benefits of chemistry in the creation of thousands of new synthetic dyes except for the enormous fund of new chemical knowledge we have gathered thereby and which has helped immensely in other more valuable directions.

In the meantime our fickle and over-dyed world now seems to have been supplied abundantly enough. Incomparably more promising fields beckon us to better endeavors. Amongst those fields none is more inspiring than that of the biochemist. Biochemistry, one of the younger branches of our science, has been confronted by many handicaps and its progress has been necessarily slow. It is still harassed by great experimental obstacles, but the newer revelations, technique and methods of other departments of science are now being used there to excellent advantage. Lately the study of the chemistry of endocrine glands seems to open the most startling possibilities.

If our predecessors in science scarcely ventured to foresee the realities of the present in what were then called visions or idle dreams, what dreams of the future may we indulge in if the mere chemical functions of some gland may make a man good or bad, strong or feeble, intelligent or stupid, peevish or happy, courageous or cowardly, generous or greedy?

Shall the biochemist become gradually a factor in the elimination of our houses of correction, our poor houses, lunatic asylums, as well as in the organization of our educational institutions? Who knows?

L. H. BAEKELAND

THE NEEDS OF PUBLICATION IN TROPICAL MEDICINE[1]

A CRITICAL survey of all the publications in the world devoted to tropical medicine would be an attractive and desirable achievement, but it is more of a project than I can undertake at present, and instead a few observations are submitted on the records of the English-speaking countries. These records are, of course, only a small part of the expression of creative racial energies in our civilization as a whole. They are of great significance, however, because many social as well as individual failures in the tropics have been due to the neglect or lack of scientific medicine, while many successes can be credited to its cultivation.

Practically all our special records in tropical medicine have been born in the last thirty years. In other words, we are in the midst of a movement and can not fully appreciate just what is going on. The message of science, however, is that man's life on this globe is more or less in his own hands, and it is indicated to see, if possible, in what direction we are traveling.

In view of the proved economic value of scientific medicine in the tropics, it might be thought that adequate avenues of expression would be provided. It might be thought that the recording of the precious workings of consciousness would be a first consideration. Such, however, is not the case. While a good deal has been done along these lines, too often immediate results and financial and administrative factors are given precedence. Scientific records are apt to be the last to be established and the first to feel the cut of economy. For example, it has been reported that some of the medical records of the Panama Canal Zone have been discontinued as not necessary for the operation of the canal. Again, when a study has been made, an author often has difficulty in placing his work. If finally placed, it may be delayed many months in publication and the author may have to share the expense. Many publications are operating on a slender margin, and editors have a difficult time between pressure for reduction of expense, on the one hand, and on the other the demands of the subject for adequate and dignified expression.

What is to be said about this situation? If scientific medicine is really so valuable in tropical civilization, its fruits should be guarded and treasured.

Of course scientific publication, like everything else, must in a measure make its own way in the struggling world. There is a healthful and saving

[1] Read at the International Conference on Health Problems in Tropical America, at Kingston, Jamaica, under auspices of the Medical Department of the United Fruit Company, July 23–31, 1924.

element in the struggle for existence, but it should not be necessary to fight over the same ground indefinitely. Now that the scientific approach has proved its value and possibilities, it should be made easier rather than obstructed.

In surveying the situation, we come sooner or later to the responsibility of the individual worker. Before asking the world to accept our currency, we should see to it that it has a par value. There is a constant need for the self-criticism and self-discipline which Pasteur so often insisted on. Scientific work has now a certain place, but many workers abuse the privileges of their position. They string their stories out to an unconscionable length. They take side trips up blind alleys and substitute egotism and personal idiosyncrasy for the serious and noble ideals of conscious effort. In recording scientific work, it is impossible to make a cinematograph of every move in the laboratory or at the bedside or in the operating room. The world can justly demand that the worker furnish only the really valuable and significant products and that the wastebasket be duly patronized.

Granting that some struggle for existence is desirable and that the individual worker plays the game fairly, what can reasonably be expected in this field of human endeavor? A brief survey of existing means of publication will bring out some of the possibilities.

Records of tropical medicine can be classified as follows:

(1) Articles in general journals or publications. Some of Ross's first work was reported in the *Lancet* and in the *British Medical Journal* and Reed's first report was in the Proceedings of the American Public Health Association. Of course, any general journal is willing and eager to publish important papers from any field of medicine, but the significance of some work is not always apparent at first and much solid work has no general appeal. The editor of a general journal can not be expected to give much space to exotic subjects. There are, of course, some general journals published in the tropics or subtropics which help the situation. The drawback to these journals is that they are apt to be local in circulation and therefore to have a somewhat limited if not a precarious existence.

(2) Special journals, which may be subdivided into (a) Popular journals, (b) research journals.

The best all-round journal is the *Journal of Tropical Medicine and Hygiene,* founded in August, 1898, as a monthly and now published as a bi-weekly. It had its struggles at first, but now seems well established. It contains editorials, personal notes and some reviews, as well as regular articles. This journal has for years been a welcome arrival to many physicians in the tropics. A counterpart in American literature would be desirable.

Most of the journals, such as *Annals of Tropical Medicine,* the *Indian Journal of Medical Research,* the *Philippine Journal of Science* and the *American Journal of Tropical Medicine,* can be called research journals in the sense that they present chiefly studies of subjects rather than clinical experiences and contain little or no personal matter, editorials or reviews. The subject of reviews will be taken up later, but it is believed there is a place even in these journals for personal notes and for occasional editorials.

Efficiency and progress depend on specialization, and specialists require some medium of expression. This is best secured through special publications. The stimulating effect of special journals is well known. But, of course, there is a limit to the support of such publications, and one of the great troubles of the present is that there are so many special journals struggling to exist in various fields of medicine that they overlap and compete with each other and eventually some of them have to drop out. Some 1,900 journals are received each year at the Army Medical Library. This is a larger number than would be allowed as necessary by a super-censor of scientific matters. The field of tropical medicine is large enough to support certain media of expression but not large enough for much competition. Cooperation rather than competition is needed with specialization within the field. By a gentleman's agreement or otherwise, certain kinds of work should appear in certain kinds of publications.

(3) Reports of organizations, like the Isthmian Canal Commission and the United Fruit Company, which contain much valuable material mixed in with other matter of less general interest. If these publications are to have the best standing as professional publications, the scientific material should not be buried with administrative and statistical matters but should be dignified as in the latest report of the United Fruit Company by a separate section, and in many instances summaries should be published in standard journals. Attempts to curtail these publications, like the recent one on the Canal Zone, should be resisted with all our influence. Once started, these reports become indexes of progress and afford an important means of yearly comparison which should by all means be perpetuated.

(4) Government reports. Some government reports, such as those of India and the British Colonial Office, are standard scientific publications and are issued in suitable form. More often, however, scientific data are effectively concealed in a husk of routine matter. Another way of burying data is to put it in a confidential report. Other reports are so

inconclusive that they are appropriately buried in the files. Anything of significance should be brought out into the daylight of current information, either in an established series of scientific reports or in recognized scientific journals.

(5) Bulletins of institutions and schools, like those of the Wellcome Research Laboratories and the Liverpool School of Tropical Medicine.

These can be classed as standard publications, and members of the staffs of these institutions are fortunate in such facilities. But many series of bulletins have come to an untimely end and remain dumbly on library shelves like the blind ends of extinct lines in charts of organic evolution. Scientific medicine has a survival value in our civilization which should be reflected in our records.

(6) Proceedings of the societies, congresses and conferences. These serve a most useful purpose. The proceedings of the Royal Society of Tropical Medicine are a model of interest and technique of publication. The records of congresses and conferences are mines of information if sufficiently distributed and not too long delayed. The plans for the record of this unique conference show the fullest realization of the title of this paper.

(7) Abstracts. The material scattered about in the various publications which have just been roughly outlined evidently needs to be brought to a common focus. This is wonderfully accomplished by the *Bulletin* of the Tropical Diseases Bureau. It is difficult to praise this publication too highly. Practically every written record is reviewed, and in addition the reviewers often give a critical opinion of the work. This seems to me a much needed feature in abstracts, but one seldom attempted. Of course it can be abused, but a fair criticism by a competent reviewer would help keep our records straight. The editors are to be congratulated on this work. Another most valuable feature is the summaries which are given in each subject at intervals by experienced workers. Altogether this abstract journal is all that could be hoped for and makes the ordinary fragmentary review section seem inadequate. This bulletin can not be competed with nor dispensed with. The Referate of the German *Centralblatt* attempts something of the same kind, but it is questionable if they can reach again the position they held before the war.

(8) Although this survey is concerned with the publications in English, reference should be made to the bi-weekly Spanish edition of the *Journal of the American Medical Association* which has been issued since 1920. The *American Journal of Tropical Medicine* since its foundation in 1921 has also published summaries of each article in Spanish. It is difficult to say just how valuable these measures are, but they stand for an attempt to recognize the important place that Spanish civilization holds in Pan-America.

(9) Some mention should be made of books. This field is well covered for general use by Manson's classical work and Stitt's condensed manual. For reference, we have Castellani and Chalmer's encyclopedic work and Archibald and Byam's "System." The cost of the latter work, however, about $40.00, suggests some of the difficulties which editors and publishers face in covering this field. Valuable as books are in their place, they can not replace other publications any more than a letter can replace a telegram. Even journals can not keep up with the rapid developments, and parts of books are obsolete before publication, and new editions are regularly needed.

It will be noted that a number of these publications have the support of institutions and this is very necessary in these days of increased cost of illustration, tabulation and publication in journals. Several of these journals, however, are simply struggling individual journals. If you will allow a personal remark, it is a matter of record that the secretary-treasurer of the American Society of Tropical Medicine and the editor of the journal each receive $25.00 a year for their labors. It is encouraging to note that philanthropic support of medicine is beginning to include publications as well as buildings.

After all, the individual is the conscious unit and while mass effort and equipment are justly emphasized, the battles of science are fought and won or lost by the struggling personality. The individual worker should be encouraged by prompt and adequate publication. On the other hand, the editor must see that the urge of the ego does not interfere with the social aim to be achieved by the work.

In short, my argument is for increasing recognition of and organization in publication in tropical medicine. Along with expenses for buildings, laboratories, physicians and workers, the budget should provide for means of record and transmission. Folklore methods have no place in science. When a new institution or school is founded, means of publication should be carefully considered. If the budget is sufficient for a permanent series of bulletins, these should be provided for. Otherwise, existing agencies should be used.

In the swirl of modern life an emphasis on ideals and standards is more than ever needed. Medicine has too great a mission to allow itself to drift in the matter of records. There should be regular ways of record from the first flicker of an idea in the brain of the worker, through the society or journal to the abstract journal and the world at large.

The author of "The Grand Strategy of Evolution," in a striking passage on humanity as an organism, the new social Leviathan, says:

> The universe is its habitat, the earth its den, and the

earth like an egg, is a well-provisioned residence. In the narrow cleft, between the more substantial earth and the blanket of its enveloping atmosphere, it lives and moves and multiplies; riding free the currents of terrestrial circulation; creeping into inviting valleys; crossing nature's bridges as they emerge; and following up the favoring shores of ancient causeways; spreading out where life is easier in denser racial spots and larger sprawling patches; linked over no-man's land by thread-like filaments of interlacing traffic; or intermingling hostile bloods, and merging spots and patches into one, the living film at last grows around the world, shutting in its cosmic heritage. East then meets west, and north meets south on common territory.

As this process goes on and man becomes more conscious of his destiny and more able to control it, how necessary it is that consciousness applied to physical and mental ills of the vast tropical zone shall have sufficient means of record. How urgent is the need for the encouragement of the individual worker in the hot countries by adequate publication of worthy efforts! Such are the motives which should animate our editors in their particular labors.

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MUSICAL ECHOES

THE description of "Analyzed sounds in nature," by Professor Alexander Forbes (SCIENCE, July 4, 1924), calls attention to a very interesting and very beautiful phenomenon. It has remained until now practically unknown. The description in the poem of Emerson, which Professor Forbes quotes, is both of fine literary quality and also scientifically precise; but the reader would scarcely infer from it that the fact referred to is a definite thing in nature, distinct from the ordinary echo, and well worthy of search by every lover of nature who wanders among the hills.

My interest in this matter was first aroused during a visit to Sicily in 1900. There, at Syracuse, is a quarry in which, as we know from the history of the Greek wars, were confined 7,000 "beautiful Athenians" captured from the invading army sent at the instigation of the demagogue Alcibiades. From death there only those escaped who, as slaves to the Syracusans, could recite passages from the then fashionable plays of Euripides. In the wall of this quarry is hollowed out a cave of a peculiar trumpet shape, large below, but narrowing and curving upward to a small opening at the upper level. Here (by tradition) was wont to come the tyrant Dionysius, who a few years later established the empire of Syracuse over all Sicily and southern Italy, and himself as its master. Listening at this small opening he could hear distinctly not only the groans but every whispered secret of his political enemies imprisoned in the quarry and cavern below. The cavern is called the "ear of Dionysius." The lower chamber of this enormous trumpet is entered from the floor of the quarry and is (or was 25 years ago) closed by a wooden door. Slamming this door or even clapping his hands, the guide demonstrated the extraordinary reverberations which for some time afterward rolled about the cavern. These reverberations were of quite different quality from the original sound causing them; they were musical tones with suppression of all mere noises. He also asked that some member of the party of sightseers sing a scale or a bar of a few notes; and thereupon occurred, not an echo in the sense of a reproduction of the original sounds of the voice; instead it was as if on a mighty organ in a cathedral many stops had been opened in various combinations and sequences.

Two years later, during a summer vacation at Mt. Desert on the Maine coast, the climbs among its hills afforded me opportunities for observing the phenomena of analyzed sounds, or musical, or spectral echoes in nature. Indeed, the search for positions in which they could be elicited added interest and pleasure to the walks and climbs equal even to that of the scenery. It is well known to all who visit the romantic mountains, lakes and fjords of Mt. Desert that there are at several points quite perfect mirror echoes. Every sound, harsh or musical, is thrown back sharp, distinct, absolutely unaltered and scarcely diminished by the distance. At some points these mirror echoes are multiple and yet clear cut and unaltered. Such echoes are devoid of beauty or of interest in the present connection, except that they may serve sometimes to suggest that others of the prismatic and musical variety may be found in the neighborhood. Often, however, the latter, which are more numerous and yet harder to find, are not associated with any sharp or mirror echo. In the spectral echoes all harshness or mere noise disappears; and only the tones and overtones swell and linger hauntingly. They are purer in musical quality than any notes made by an orchestra in a concert hall; they are only to be compared to the reverberations of such an organ, or of a splendid human voice intoning, in such a vaulted and many columned minster as that of Chartres.

Some of the conditions for such acoustic spectra and the rich chords, which come back from the cliffs, when a scale of notes or a bar is shouted at them, seem to be a wall not quite at right angles, very rough and broken, sometimes with several distinct cliffs. Trees are generally present on the talus slopes below the cliffs, and even in crevices and on ledges between the bluffs; but I am doubtful of their playing any considerable part in sorting out the tones and