bulkheads stop this erosion at a level fairly even with their tops, and in conjunction with groins are believed to provide the most efficient protection.

The whole problem of beach protection is so influenced by financial considerations that although it is generally possible to predict what structures will best preserve a given beach, it is often impossible to adopt them, because of the cost which may be prohibitive to a small community. In such cases a cheaper substitute must be used. At Long Beach more expensive structures might have obtained better results, but those erected performed valiant service in cutting down the destruction to a minimum.

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SCIENTIFIC BOOKS

A HISTORY OF OUR TIMES[1]

IT has been suggested that the universities should establish a new series of courses, dealing with the additions to human knowledge and experience within the past decade or twenty years. Such a plan, if fully and adequately developed, would serve the needs of innumerable busy people who wish to keep in touch with at least certain aspects of the progress of the world. To some extent the universities already minister to such needs, especially in their summer schools and extension divisions. But after all, comparatively few can take advantage of what is offered, and there is no comprehensive organization of the whole field of modern knowledge in any school.

What the schools have not done, and perhaps can not do, has been attempted by the editor and staff of the Encyclopaedia Britannica. The volumes before us purport to describe what has been significant in human affairs during the last fifteen years. Not only material events, but also the stuff that dreams are made of: those aspirations of the mind, vague or well defined, which motivate our lives. In this gigantic undertaking the editor has certain advantages over even the largest university. He can command a faculty so eminent that it represents on the whole the present competence of our species. Instead of requiring attendance in the classroom, he sends his message to the people of the world, and the most isolated student may have it all at his service. He offers a mirror to mankind, reflecting good and evil, success and failure, hope and despair. We have toiled and struggled, these fifteen years; what has it all amounted to? Well, here it is: let each man sit in judgment on himself and his kind.

[1] The Encyclopaedia Britannica. The Three New Supplementary Volumes. London and New York. 1926.

Surely the educational consequences must be very great. Whatever faults may be found, and they are doubtless many, it must be said that a vast mass of essentially accurate information is made the common property of all peoples. That, at least, ought to make for better understanding and more willing cooperation. It is perfectly true that in the perspective of time present values will be strangely altered. Posterity will criticize our judgment of many things. But judge we must, and whatever imparts wisdom to this judgment is worth our earnest attention.

It is not very difficult to discern wherein the present volumes will appear ill-proportioned to later generations. They really constitute a sort of newspaper *in excelsis*, a summary of what may be expected to interest the readers. Hereafter it will be said of many matters that they were properly subjects of popular concern at the time, but their significance was mainly ephemeral. Of others it will be said that they never deserved the attention they received. In his prefatory note the editor states that one of his main purposes has been "to escape from the passions and prejudices and shattering discords of the war period—to revive and enhance that intellectual cooperation between distinguished authorities of every nation, that civilized community in the sphere of intellect, which the war temporarily destroyed, but which throughout the century before 1914 it was the increasing object of the Encyclopaedia Britannica to nourish." Nevertheless, in looking through the volumes, one is struck by the inordinate space given to the various details of the war, and to methods of warfare. Such titles as "Victory, Advance to" and "Western Front" are intelligible only because recent events dominate our minds. Probably this excessive dominance of the war motive and war interest will be distasteful to a large number of readers, and yet it may be defended on the ground that it has to do with the prime concern of a large part of the civilized world during the period under review. As a contribution to history, it is of great value to have the events of the war accurately described as they could not be during the conflict. Not only are the facts now given with reasonable completeness, but the temper of the articles is fair and well considered. It may well be that the principal effect will be to create, not a warlike spirit, but a sense of humiliation and disgust that such things should have been possible. The personal biographies also depart widely from encyclopaedic standards, and stand rather on a journalistic basis. There are detailed accounts of many politicians, moving picture actors, and the like, who will be quite forgotten after a few years. Thus Mary Pickford gets three inches of space, Fabre only an inch and a half. This is not

due to the existence of a biography of Fabre in a previous volume, although there had been references to his work. Posterity will see by these notices wherein our interests lay, only of course the actual public interest in and knowledge of Mary Pickford as compared with Fabre is very much greater than the proportions cited might suggest.

To the reviewer it seems that when we consider the presentation of science and art in the volumes, the extraordinary progress and development of science contrasts strangely with what appears to be an actual degeneration of the arts. If it is said that this opinion has no basis, as coming from one unskilled in the arts, I venture to maintain that even a scientific man has a right to criticize artistic productions. Both science and art seek to interpret nature. Scientific workers, in spite of many errors, approach ever nearer to the understanding of reality, not merely of material objects but of mental processes. When we turn to the article Sculpture, and see anatomically incorrect figures seriously presented as offerings of the dominant modern schools, we surely have the right to ask, what is the matter with the mentality of those who see the human body in this distorted form, and actually prefer ugliness to beauty? If the modernist in art then claims that the idea of beauty changes, and is purely subjective, we reply that to us there is also an objective standard of beauty, expressed in the perfection of a type according to its form and function. It is this response to objective reality, this harmony with nature, which seems to us to be the test of sanity. Turn again to the article "Stage and Stage Production"; it is illustrated by a colored plate which merely exhibits the sloppy eccentricity of a certain school of painters. Fortunately, no actual stage setting ever could present such an appearance to the human eye. So it is with some of the other arts, as any reader can find out for himself. On the contrary, the scientific articles, while technical, amaze one by the revelation of progress and the achievements of the human mind. Is it not possible, should it not be possible, to utilize these great powers in other directions with similar success? If so, certainly not by following fads, but by long-continued and patient labor, for small material rewards.

One other matter of editorial policy deserves discussion. It has been the plan, again departing somewhat from traditional usage, to have the articles written by representatives of the several topics or interests, regardless of whether we may be supposed to agree with their opinions. The complexity of modern knowledge is such that an editorial orthodoxy is hardly possible. Consequently, to the surprise of many, the article on Lenin is by his associate, Trotsky. It seems to me to be a very good article, giving an account of Lenin's activities to which no one should object. But when we come to the article on Mrs. Eddy, we wonder whether we shall be presently told that "the Encyclopaedia Britannica states" that "beyond cavil or question, her life was an illustration and a demonstration of her proposition that prayer, watching and working, combined with self-immolation, are God's gracious means of accomplishing whatever has been successfully done for the Christianization and health of mankind." The truth is, the Encyclopaedia is a platform in the ordinary, but not in the political sense; it is a place from which specialists give their opinions, but these opinions must not be considered to have any particular editorial sanction.

One result of this free—we had almost said irresponsible—editorial policy is a frequent relief from the ponderous gravity of the traditional encyclopaedia. Not that there is any unseemly levity, but writers appear to feel free to say what they think without the sense of compromising the universe. This imparts freshness and sincerity to many articles, making them very good reading.

It is out of the question to review many of the articles separately, but a few comments are possible. The great earthquake in Japan, misnamed "the Tokyo earthquake," as it was more severe in Yokohama, is not at all adequately discussed. In the account of Sir Charles Eliot, it is not mentioned that he is one of the leading authorities on nudibranchiate mollusca. Entomology is treated only in its economic and medical aspects, and zoology is confined to a consideration of the vertebrates, mainly fishes. Hardly any attention is given to the cultural aspects of natural history, or to the advancement of our knowledge of the out-of-doors. To this extent I think it must be said that the treatment of the biological sciences is seriously inadequate. The summary of biology (J. Arthur Thomson) is extremely good, remarkable equally for the breadth of treatment and the number of striking discoveries recorded. Evolution is by no less than six different representative authors. The section "Theory of Organic Evolution" (T. H. Morgan) is especially noteworthy for its concluding paragraphs on the relation between modern views and the opinions of Darwin. It was not possible for Darwin to make an analysis of the different types of variation and their consequences, as we can to-day. Some of his reasons for evolution no longer appear valid, but others have taken their place. "Thus what the theory of natural selection lost in one direction it gained in another, and the probability that evolution has taken place by the selection of chance variations is as great as at the time when Darwin advanced his theory of natural selection." Bateson on Genetics and J. Arthur

Thomson on Heredity are important and worthy of their distinguished authors. Household Appliances, well illustrated, shows what physical science and invention have done to make life easier and more convenient. India (several authors), Russia (Arthur Ransome) and the United States (several authors, but especially A. Bushnell Hart) appear to me to be among the greatest successes of the Encyclopaedia. I was disappointed in the article on Siberia, which does not even mention the American Expeditionary Forces, though these are cited in the article "Japan." "Immunity" (Sir A. E. Wright) is a very important and of course very modern article. The article on Indians, North American (C. H. Burke) shows that, contrary to a popular misconception, the Indians are increasing in this country. "Influenza" (S. L. Cummins) raises very interesting questions concerning the origin and nature of the germs causing pandemic outbreaks. "Intelligence Tests" (E. L. Thorndike) are discussed in an interesting but suitably cautious manner. Sir Arthur Keith gives a detailed account of what is known concerning the evolution of man, concluding with the suggestion that the study of hormones is very significant in this connection. "Mendelism" is by Bateson, as was most appropriate. "Paleontology," while excellently done, suffers from inadequacy in certain directions. Thus the author has never heard, apparently, of Tillyard's great discoveries among fossil insects, which throw so much light on the evolution of the various orders. The Pan-Pacific Union and the various Pan-Pacific meetings of recent years are overlooked, though certainly of international importance. We suspect that the article "Petrograd" does not do justice to that city, but hope to find out personally in the course of next summer. "Population" (A. M. Carr-Saunders) is full of significant statistics. "Protozoology" (C. Dobell) is very interestingly written, and deals with a rapidly advancing subject. "Relativity" (J. H. Jeans) and its "Philosophical Consequences" (Bertrand Russell) are explained as clearly as the nature of the subject permits. "To the relativist the essential background to the picture of the universe is not the varying agitation of a sea of aether in a three-dimensional space but a tangle of world lines in a four-dimensional space. Moreover, it is only the intersections of the world lines that are important. An intersection at a point in the continuum represents an event, while the part of a world line which is free from intersections represents the mere uneventful existence of a particle or a pulse of light." But as a writer recently urged in another case, when we have decided "what is it?" we should then ask "what of it?" Can ordinary people derive any pragmatic values from these considerations? This is the question which Bertrand Russell undertakes to answer.

He holds that, in time, the theory of relativity "may considerably modify the ordinary educated man's picture of the universe, possibly with far-reaching results." But when he assures us that the "space-time" frame of reality "is known only in its abstract mathematical properties; there is no reason to suppose it similar in intrinsic character to the spatial and temporal relations of our perceptions as known in experience," he is excluding it from the realm of practical truth. The four-dimensional, space-time conception makes no difference to our actual situation, or to our conduct, unless it menaces our sanity. It is a relief to turn from these abstractions to the delightful article on Sargent by Julie Helen Heyneman. It is a type of many sympathetic biographies in the volume; others are those of H. G. Wells and Bernard Shaw. "Sex," by Bateson, is a very valuable summary. "Tissue Culture" (Alexis Carrel) sets forth the extraordinary successes of this method, which is nevertheless said to be "still in its infancy."

Summing up our impressions, it may be said that the work has on the whole been admirably conceived and executed. While nearly every critical reader will see some things he wishes were different and some statements he believes to be erroneous, it is obvious that such imperfections could not well be avoided. It is a very great thing to have given so nearly true a picture of a period so filled with important events, so complex in the interrelations of these events. The general conception is on liberal lines, and we are not made to feel that there is any undue dominance of ancient prejudice or superstition, though there are undoubtedly large concessions to modern fashions. Even in scientific work, fashion is potent, and the important thing of to-day may not seem so important to-morrow. This is not without its advantages; thus the Mendelian fashion has certainly led to concerted investigations all over the world, and here and there more intensive, cooperative work with results of the highest importance. Yet there are different aspects of biological science waiting to have their innings, and some day these will occupy the field. No doubt the Encyclopaedia will have a large part in fostering a broader interest, in enabling us to see the wood as well as the trees, and this in itself is a very conspicuous service. Yet its elaborate analysis clearly invites synthesis, and it may be that some genius will weave the essence of it all into a great epic having universal appeal. Whether this is possible or not, we may at least conclude by hoping that the success of the undertaking will be so great that the publishers will feel justified in issuing such volumes at intervals of fifteen to twenty-five years indefinitely, thus taking stock of man's business in this world.

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