college presidents has brought into being will serve to make his mantle fall heavily upon him who must now take it up. To bear it as it has been borne will prove no easy task.—*Boston Evening Transcript.*

SCIENTIFIC BOOKS

ELIOT AND THE AMERICAN UNIVERSITY[1]

FORTY years ago, there was chosen to the presidency of Harvard College, a young professor of chemistry, who had none of the qualities then commonly supposed to be necessary in the position which he held. He was not a clergyman, not a teacher of philosophy, not venerable and not spiritual, merely young, industrious, clear-sighted, scholarly and fearless. Harvard College was in those days only a small institution, chiefly for boys, "a respectable high school where they taught the dregs of learning," as its most popular teacher then described it. Still it was the best we had and our own "our oldest, richest and freest university," even as it is to-day.

In 1868, the young president found an institution of the old type, with some most charming and gifted professors, and others dry as dust. Its work was all elementary in character, the subjects taught were held to be of unequal value, the Greek and the Latin standing in official precedence. Of advanced study there was little, and that little existed in the unique personality of Louis Agassiz and of Asa Gray. It was essentially a boys' school, and a school of the type which forces set tasks on unwilling youth. One of the graduating class of 1873 said to the present writer, at the time that in his class there were but two men (J. W. Fewkes was the other) "who had any interest in natural history or in anything else." Doubtless this was an exaggerated statement, but it represented fairly the attitude of the college boy in those days of prescribed courses and text-book recitations in elementary subjects. In those days, too, the professional schools had no foundation in science or in culture, and the instruction given in them was guiltless of pedagogic methods or ideals. In almost all departments of Harvard College advanced education was a grind rewarded by a degree. The degree was a badge of social and intellectual achievement, not a disclosure of the secret of power.

To change all this was not an easy task, and the young president had grown middle-aged before the greater part of his work was achieved. He rightly interpreted his position as representing in no sense a fact accomplished. It was of necessity a continuous struggle; a struggle for greater means, for better men and for higher ideals. An American university is never finished.

Fortunately for himself and for the nation, Dr. Eliot has lived to wear out all opposition; he has seen Harvard College made over after his own fashion, and he has seen it lead the race in a long procession of institutions, one and all endeavoring to follow in its trail. The various impulses of originality in other institutions, notably those originating with Andrew D. White, at Cornell, and with Daniel C. Gilman, at Johns Hopkins, have been absorbed by Harvard, and in general carried to the greatest success yet possible under American conditions. To Cornell we owe originally the doctrine of the democracy of studies, the idea that no one shall say which subject or which discipline is best until we know the man on whom it is to be tried. To Johns Hopkins we owe the idea that advanced work in any subject has a greater culture value than elementary work in the same or other subjects. Both these doctrines have found their place in the elective system at Harvard.

In the lectures on university administration at Northwestern University, President Eliot explains in detail, in simple undramatic fashion, the plan of his work at Harvard, its methods and its results. That the most successful of college administrators should regard the methods which he has himself used as typical and desirable, is natural enough. If other methods had seemed better, he was perfectly free to use them. This volume is therefore an exposition of what Harvard actually is, and the reasons why it is so, in so far as these depend on administrative methods of

[1] "University Administration," by Charles W. Eliot, Boston, Houghton, Mifflin Co.

any sort. The book is the best of reading for college men, and to the college president it is a veritable hand-book full of suggestiveness on every page.

The board of university trustees at Harvard numbers seven, with the president of the university as the executive head. This number is most favorable to the management of business, and this relation the one most likely to insure devotion and continuity in executive affairs. The disadvantages of large boards, of honorary, ex-officio and absentee trustees, clearly appear in the light of Harvard's experience with a better way. The importance of beginning with young men appears here as elsewhere, and with this Dr. Eliot has the significant remark, "Strangers will, as a rule, not make so good trustees as the children of the house."

In the suggestions as to professors' salaries, Dr. Eliot is rather conservative, especially as regards the younger men, although the professor is better paid at Harvard at present than in any other American college or university. The instructor, he thinks, should begin on the amount a young unmarried man can manage to live on. After a few years of annual appointment, a permanent position with a small increment should be given, and still later, as assistant professor, he should receive a sum on which he may marry but without luxury or costly pleasures. At forty, if growth goes on, the teacher may hope for a professorship, and a full salary at fifty or fifty-five. One difficulty in all this comes from the fact that growth is largely conditional on travel, and travel is a "costly pleasure." To starve a man until he is forty is not to provide for a productive career for the fifteen years that follow.

In all financial matters, President Eliot has been preeminently practical, and the paragraphs relating to the business affairs of the college are thoroughly wise and pertinent. The exclusion of the college president from initial responsibility in these matters is a mistake, and one which has been adopted in too many of our institutions.

The coordination of the influence of the alumni, as represented by the board of overseers at Harvard, is a matter on which Dr. Eliot justly lays especial emphasis.

In the development of the faculty at Harvard, stress has been laid on the individual teacher rather than on the department. As a result of this the department or group executive appears rather as a servant or representative, than as a director or manager of his colleagues. The president stands in the same relation to all the various groups. The system, in vogue in many institutions, by which the professors are brought together into groups under the headship of some dean, who rules over them, the dean in turn ruled over by the president, has never taken root at Harvard. Deans, or sub-executives, are doubtless necessary in large institutions, but they should not be created until they are needed. Above all, what is needed by the executive in all branches is not so much authority to execute as the power and the duty to initiate. Nowhere is the necessity for the concentration of initiative so important as in the duty of the nomination of professors. President Eliot shows clearly the reasons why formal faculty initiative fails in this regard. But there are good reasons why formal faculty acceptance of such nominations is also most desirable. No professor should be added to the faculty against the sober judgment of those who may be his colleagues.

President Eliot devotes one optimistic chapter to the consideration of the greatest of his educational innovations, the elective system. This system has everywhere and of necessity replaced the classical system, which considered but two or three of the many phases of scholarship and life. For Greek-minded men, to use Emerson's phrase (and a very noble type of men they are) the classical training gave a basis of scholarship on which later studies could build to advantage. But the great body of our youth of promise are anything but Greek-minded, and the old classical course opened to them no door worth their entering. The elective system opens many doors and admits many types of men. No two men need exactly the same sort of training for their own best development. The student is a better judge of his own needs than

any group of educational philosophers who have never known him. Here, as elsewhere, the student learns from his own mistakes. Moreover, the elective system brings the student in contact with the best teachers he knows, and the teacher in turn is refined and stimulated by the students who have chosen his work. To the patchwork courses which followed the break-up of the classical system, the elective courses are in every way to be preferred. The mind is made strong by the continuous study of something, and in prescribed courses made up of odds and ends unrelated to any central purpose, thoroughness in any line is impossible. At the present time there is a distinct reaction against the elective system, but not in favor of any other system which has been actually under trial. The elective system will not make scholars out of rich and idle lads whose only interests in college are in games and social pleasures. Once in a while such a one is reclaimed, but the percentage is too small to justify the effort. The elective system is as good as any other system for such as these, but no system will make a man out of a boy who has himself no interest in the process. It is the duty of the college to withhold its degrees from idlers of whatever class. To give the titles of higher education where the substance is lacking is to cheapen our own work. The remedy for slipshod college work is found in the scholarship committee, rather than in the arrangement of courses of study. The final answer to criticisms of the elective system is to recognize its occasional abuses by professors as well as by students, and to ask, what else will you put in its place?

Doubtless a prescribed course is sometimes effective, as in engineering or in medicine, but only where it is prescribed by the nature of the subject. Mathematical subjects are linked together, one dependent on another, and the student desiring mathematics makes no complaint of this prescribed order. But for courses of mixed science, literature, art and philosophy, so many units of one, so many of another, disjointed fragments brought together in the name of culture, the student can have no respect. Required courses of this fashion have passed away never to return. The checks on the elective system must come from the student himself. He must be trained to guard himself from premature specialization on the one hand and from limp diffuseness on the other. If he is a real student, the safe mean leans strongly toward the side of specialization, for after all this is but another name for thoroughness. "The mind is made strong by the thorough possession of something."

The writer once heard President Eliot disclaim any unusual degree of prophetic vision, allowing for himself only an honest industry, attacking one problem as it arose after another, with such solution of each as might be within the range of practical action.

One of Dr. Eliot's predecessors in Harvard was once complimented on the logical coherence of his sermons. He disclaimed all special excellence in this regard. "I write one sentence," he said, "then I thank God and write another." President Eliot has himself accepted this definition of his method. One thing done, he turns to and does the next, and this is the essence of his educational foresight. He does the next and the next, never stopping with the first result or the first achievement; and thus he has made of the administration of Harvard a continuous struggle, while all our other colleges have followed near or far along the same lines of progress.

And to the young man on whom his mantle shall fall, the administration of Harvard will still be a struggle. Nothing is completed, nothing is settled, nothing is final. New lines of development will follow swiftly on the old. The university must be separated from the college, and must be devoted wholly to the work of men as distinguished from the work of boys. All trace of the trade school must be eliminated from the training of professional men. The university professor on the firing line of scientific advance must be maintained and appreciated and none the less the college teacher whose first aim shall be to develop the boy into the sound, sober and enlightened man. The unification of higher education has been in a degree accomplished.

The substantial requirements for entrance, the broad outlook of the elective system, the intensive thoroughness of the graduate professional school, the glorification of the spirit of research, all these are exemplified in the Harvard of to-day. The Harvard of to-morrow will lead in the differentiation of the work of men, the separation of boys and boys' teachers from men and men's teachers. It will not be Harvard College as it was, nor interchangeably Harvard College and Harvard University as it is to-day. It will be a university resting on a college foundation, a university worthy of the eighty millions of free men who form its constituency, a university fit to frame the highest aspirations of the noblest youth of the republic.

David Starr Jordan

SCIENTIFIC JOURNALS AND ARTICLES

It is ever a wonder to us in America that German biologists can so easily start and maintain a new periodical. No sooner does a science become well defined and gain a number of workers than the proper periodical is forthcoming. These remarks are called forth by the appearance of the *Internationale Revue der gesamten Hydrobiologie und Hydrographie* (Leipzig: Klinkhardt), of which the first (double) number appeared in May. The backing of the magazine is indicated by the names on the cover. R. Woltereck (of Leipzig and Lunz) is the editor. B. Helland-Hansen (Berlin), G. Karsten (Bonn), A. Penck (Berlin), C. Wesenberg-Lund (Hilleröd), R. and F. Zschokke (Basel) are the other members of the editorial staff. The Prince of Monaco, Agassiz, Chun, Forel, V. Hensen, R. Hertwig, Murray, Nansen, O. Pettersson and Weismann have lent their names to the undertaking. The first number contains 307 octavo pages, of which the first half contain original contributions; those of Weismann, Murray, R. Hertwig and Issel being essays written especially for the introduction of the new journal. A paper by Nathansohn begins a projected series on the biology of the plankton; one by A. Fischel deals with very successful intravitam staining of *Cladocera;* one by Klausener treats of the annual cycle of the fauna of alpine lakes; and one by Götziner in the first part of a monograph on Mitter Lake at Lunz, in the Austrian Alps. The remainder of the number contains abstracts of reports, summaries of results, critical reviews, notices from stations and a list of recent literature. There are eight plates and numerous text-figures. Certainly the periodical starts out with the highest ideals and it will be a great stimulus to hydrobiology. It deserves, as it will receive, the most active support of the numerous American workers in this field. C. B. D.

The Independent begins with its issue for January 7, 1909, a series of articles on the fourteen universities of this country, written by Dr. Edwin E. Slosson, of the editorial staff and previously professor of chemistry in the University of Wyoming. Harvard is the first institution discussed and the others to follow in the order named at intervals of one month are: Yale, Princeton, Pennsylvania, Chicago, Johns Hopkins, Stanford, California, Michigan, Wisconsin, Minnesota, Illinois, Cornell and Columbia.

BOTANICAL NOTES

TREES AND FORESTRY

The University of California has done well in publishing Mr. N. D. Ingham's bulletin (No. 196) on "Eucalyptus in California." In 88 pages the author by means of plain descriptions and 70 excellent half-tones gives his readers some very clear and usually very new ideas as to these wonderfully interesting trees as they grow in California.

Major George P. Ahern's "Annual Report of the Director of Forestry of the Philippine Islands," for the year ending June 30, 1907, is of interest to forestry students in this country as showing the considerably different problems which pertain to work in the islands. Two maps help to give a clearer idea as to the available forest tracts in Negros Occidental and Mindoro.

Two years ago Rolland Gardner, of the timber-testing laboratory at Manila, published a bulletin (No. 4) on the "Mechanical