

REPORT OF THE ACTING PRESIDENT

cult, if not impossible, to meet the high expense of technological education. This expense includes, it must be remembered, not only the high tuition fee, but many other items not involved in collegiate courses of study, such as charges for laboratory apparatus, drawing instruments, and expensive scientific books.

Reduced Fee for First-Year Men.

This difficulty may be met in either of two ways—a general reduction of our tuition fee or provision for larger funds for scholarship aid to individual students. Under the existing conditions a combination of the two methods seems most advisable. To reduce our tuition fee for all our students would involve such a large reduction of our income that it probably cannot be immediately considered; but it might be practicable to adopt the plan of reducing the tuition fee from \$250 to \$200 for first-year students. Assuming a first-year class of 330 students, this would involve a decrease of \$16,500 in our annual income; but this might be partly offset by the increase which it would probably cause in the number of first-year students. The advantages of this reduction in tuition for first-year students are proportionally far greater than a corresponding reduction for those of the higher years—desirable as the latter is. It would enable a larger number of properly prepared students to enter the Institute; and the most deserving of these, after they had demonstrated their ability by their first year's work, could be assisted to continue by grants from our scholarship funds and those of the State, which can not be awarded with proper discrimination to boys in advance of their coming to the Institute. Moreover, as the student gets older and has had more training, it is easier for him to get remunerative employment in the summer vacations. It will, too, diminish the tendency for students to go to other institutions for a single year or two, merely for reasons of economy. Finally, it is the most equitable, and from a financial standpoint, the safest one for the Institute to pursue in effecting a reduction of its tuition charges, since the first year instruction is less costly than the more specialized instruction of the higher years. This plan would, however, remedy only in part the difficulties of our high tuition; for our scholarship funds are not adequate to meet the needs of our deserving students in the higher years. This is fairly evident merely from the statement that the scholarship grants to undergraduate students formed last year only nine per cent. of the total tuition fees paid by them. Ampler funds must therefore be secured either through an appeal to the generosity of private donors or through further grants from this Commonwealth, which can not afford to allow the opportunity of a higher technological education to remain closed to such of its young men as are fully qualified to receive it.

I come now to matters more closely related to the work of instruction and involving, fortunately, less difficult financial problems—matters which are, however, of the greatest importance to our development.

Free Summer Schools.

First of all I would bring to your attention the extension of the required work of the Institute courses for a period of four or five weeks into the summer. Such an extension can best be made, not by lengthening our present term, but by providing summer schools which our regular students are required to attend, and to which they will be admitted free of charge, in the summers at the end of the first two school-years. The importance of this extension of our regular work can be fully appreciated only by those who are intimately acquainted with the difficulties and defects of our present system of instruction; but the main aspects of this matter can be readily understood. The educational problem of the Institute, as has already been stated, is to give to students with only a high-school preparation a liberal education, a thorough training in fundamental scientific subjects, and sufficient technical knowledge to enable them to enter at once upon the practice of their profession. Under the present conditions, as I have already said, we must attempt to do this as far as possible in a period of four years; at any rate an unconditional requirement of a fifth year seems to me unwarranted until the opportunities of the four-year period have been fully utilized. Our summer vacations form one-third of the whole year; and during this time most of our younger students are unoccupied or are

at work in places from which they derive no educational advantage. The assignment of even four or five weeks of the summer vacations after the first and second years, to those portions of our work which consist largely in the acquirement of technical skill and experience, such as laboratory practice, shop work, drawing and work in the field and in industrial establishments, would so relieve the present overcrowded curriculum that an amount of good entirely out of proportion to the time gained could be accomplished. The time gained would, I am sure, be devoted by the Faculty not to further specialization in the engineering branches, but to some increase in general studies and to more thorough training in the fundamental principles of the sciences underlying the professional work. The attempt would be made to concentrate the attention of the student upon fewer subjects at one time, to demand more thought and less learning of lessons, and to emphasize important principles through the solution of numerous problems by the student. This would tend to remedy the tendency, sometimes spoken of, of the Institute student to work too much and think too little. The pressure of the studies of the school year would be somewhat diminished; while the work of the summer school, being largely in laboratory, shop, or field, and concentrated upon one or two subjects, would not continue the mental strain to any great extent. The plan would involve increased expense to the Institute; for it would be necessary to pay the salaries of the instructors engaged in the summer schools for an additional month. Aside from this, the only important objection to it seems to be the added tax that it imposes upon the resources of certain students in forcing them to meet the expenses of living in Boston for a longer period and in shortening the time which they can devote to remunerative work. This makes it, in my opinion, out of the question to charge an additional tuition fee for such required summer courses; but is not a sufficient argument for postponing a step which is so essential to the effectiveness of our work.

Student Welfare.

The problem of the outside activities of our students are, I believe, in the main solving themselves satisfactorily under the guidance of the administrative officers of the Institute. To our last President, Dr. Pritchett, is due in large measure the development of the conditions that make for a broader and fuller student life. His establishment of the Tech Union, which is the center of the social activities of students, his promotion of a rational system of athletics, his interest in the appointment of a Dean of the Faculty, his institution of general convocations of students at which they are addressed by distinguished speakers, and other results of his own personal participation in student affairs, form a most worthy and enduring memorial of his services to the Institute. Credit for the progress in this direction must also be given to our Dean and Bursar. The work of the former, as the general consulting officer for students, and of the latter in his sympathetic administration of his financial office and his effective management of the Tech Union, and the participation of both in the social gatherings of students have done much to develop a loyal, manly, democratic spirit such as exists in few colleges.

The Tech Union, great as are the benefits which it has brought to our student life, is, however, miserably inadequate as the social gathering place of our fourteen hundred students; and the same is true of the present temporary gymnasium as a means of providing for their physical welfare. One of the strong reasons for a prompt decision as to our future location is that the Walker Memorial Building can then be at once erected, whereby suitable social and dining halls and a properly equipped gymnasium will be provided.

Plan for Small Dormitories.

There is, however, also a need of some provision for the housing of those of our students who can not live at home or with friends, or in fraternity houses. Perhaps one-fifth of the whole body of students live in undesirable surroundings in cheap boarding houses, where opportunities for student fellowship and for the development of a healthy social life do not exist. I strongly dissent from the view sometimes expressed that our obligations to the young men who spend with us four of the most critical, formative years of

their lives are solely on the intellectual side; and the situation I have just mentioned is one, I think, for which we must soon find a remedy. It is one, too, which is especially appropriate for the Corporation and Alumni to deal with directly. In attacking this problem, it is desirable to proceed slowly and in an experimental way. A plan that might be followed is one which the Dean has suggested—the plan of erecting two or three student houses, each accommodating twenty-five to thirty students, upon the Institute's vacant land in Brookline, adjoining the Athletic Field. The establishment of large dormitories accommodating a hundred or two hundred students does not offer a satisfactory solution of the problem; for there is a lack of the close fellowship and of the *esprit de corps* which is developed in smaller compact groups. The Greek letter fraternities have demonstrated the type of student associations which is attractive to young men. These have been extensively developed here during the past ten years, and, whatever may be true of them in the atmosphere of the college campus, they are, on the whole, successful with the earnest kind of student who attends the Institute. The fraternity houses, however, owing to the large expense connected with the maintenance of such isolated private houses in the city, fail to provide for many of the students who most need such social opportunities as they afford. In buildings erected upon Institute land in the suburbs, it should be possible, with proper financial management, to provide board and room at a cost of six dollars a week, which would be within the means of a much larger proportion of our students. There is every reason to believe that, with the interest in this undertaking already shown by the Dean and certain members of the Corporation, the Alumni, and the Faculty, this experiment would be successful.

Should Keep in Touch with the Community.

An extension of opportunities for investigation both in pure and applied science by members of our staff and by advanced students is a matter which, though secondary to the considerations directly affecting the instruction and general welfare of undergraduate students, is nevertheless of the greatest importance in its effect on the relation of the Institute to the scientific and technical development of this country. It ought to be the especial aim of the Institute to get into the closest touch with the scientific problems of the manufacturer and the community, and to assist in the solution of them—as is being done by the universities and agricultural colleges of the Western states. Professors and instructors on our staff are already doing a vast amount of work in this direction, partly through the thesis work of students, and partly through their employment as experts. But this work is often performed under conditions which make a thorough-going investigation impossible; and, because of its personal character, it fails to be identified with the Institute and recognized among its contributions to scientific progress. In my opinion, we should in all departments give each of our assistants and instructors a reasonable proportion of free time for research purposes, we should afford him adequate laboratory facilities, and should then insist as a condition of his promotion and advancement in salary that he have made and published scientific or technical investigations. Almost all our instructors already have some available time that could be devoted to research work, so that the carrying out of this suggestion does not involve a proportionate increase in our staff. That time is, however, at present so limited, so disconnected, and so apt to be encroached upon by other work that the man feels little encouragement to enter upon an investigation. If that amount of time could be increased, and made definite by the assignment of days or half-days for research work, there would result not only an incalculable gain to himself as a teacher, investigator, and scholar, but also added reputation to the Institute because of its larger contributions to science.

Benefit of Research Laboratories.

Another method of promoting investigation work at the Institute is through the establishment of research laboratories in connection with the departments. For each such laboratory an income of about \$5000 needs to be guaranteed for at least a few years. Two laboratories have already been started which are devoted to research in physical chemistry and in sewage disposal,

and their contributions to pure science in the one case and to questions of municipal sanitation in the other have attracted much attention throughout the country. The Departments of Chemistry and Geology have recommended two new laboratories of this kind,—a Research Laboratory of Applied Chemistry and a Research Laboratory of Physical Geology,—the former to be devoted to the study of chemical problems of general importance to the manufacturer, and the latter to the investigation of geological processes and disturbances of economic significance. The Departments of Applied Mechanics and Mechanical Engineering are also in need of research assistants to carry on more systematically such investigations as have long been in progress and to prepare the results for publication. The formal organization of research laboratories accomplishes much more than the same expenditure of money for uncorrelated investigations by the individual members of the departments. It calls attention to the activity of the Institute in this field, raises its scientific standing, attracts advanced students, who are often just as effective research workers as inexperienced assistants, offers facilities and inducements for advanced study and investigation to our younger instructors, and forms a nucleus of development in this important direction. I recommend that the Visiting Committees of the Departments give this matter their attention.

Conclusion. Special Committees.

I might go on to discuss some of the more specific developments which it is desirable for the Institute to introduce, such as better provisions for training teachers in those branches of science and engineering with which we are most closely identified, definite arrangements for offering our professors leave of absence in the sabbatical years, or for a half-year in every four, and the like; but I have already made too great a demand on your attention. In closing, permit me, however, to make one further suggestion. From my conversations with members of the Corporation I know that many of them earnestly desire to be of greater assistance to the Institute through closer contact with its work. I believe now that a great service might be rendered if special committees were appointed to promote of the various lines of development to which I have alluded in this report. You have already appointed a Committee on the Site. It might be well to appoint also a Committee for the Promotion of the Welfare of the Students, which could deal with the question of student houses, with other plans for enlarging their social, cultural, and physical life, and with further provision for scholarship aid to alleviate the hardships imposed by our high tuition. Still another Committee might be appointed for the Promotion of the Work of Instruction. This Committee would consider such matters as the extension of the personal conferences between instructors and students, the introduction of required summer work in the undergraduate courses, provision for research work by the junior members of the instructing staff, and enlargement of the scope of instruction in any desirable direction, it being understood that any such plan of educational development shall have first received the endorsement of the Faculty. These committees should, I believe, be in the closest relations with the Executive Committee with reference to all questions involving financial arrangements or radical changes of policy, and with the officers and committees of the Faculty in all matters relating to the work of instruction or to the interests of students. They should frequently hold joint meetings with the representatives of the Faculty, thereby establishing the closer contact with that body which is so desirable. They should attempt to provide for the realization of such improvements as seem to them advisable, and to that end should be given the necessary authority. The development of plans might well receive preliminary consideration in these committees alone, final actions of importance being taken in joint session with the Executive Committee, in order to secure the proper correlation between the work of the different representatives of the Corporation. I recommend, however, that the appointment of such committees be deferred till the permanent president has been appointed, in order that he may participate from the start in the important work which they would undertake.

ARTHUR A. NOYES.

December 11, 1907.