

for the development of the scientific spirit at Yale than the fact that Silliman's *Journal of Science*, for many years the one high grade American periodical of its kind, was published here. In other lines we have not kept up to the traditions set by Professor Silliman, and have suffered from it rather severely; but it is by no means too late for recovery.

The independence of the different faculties at Yale is in some respects a help, and in other respects a hindrance, to our investigators. It is a help in that it helps to keep alive the traditions of academic freedom. It is a hindrance in that it sometimes prevents the most effective cooperation between the laboratories of different departments.

A thing which is an unmixed help in every way, and should not be overlooked in any discussion of Yale's advantages, is the Graduates' Club. By furnishing a center in which instructors and students of all grades and visitors from abroad meet informally on a plane of social equality, it tends to diffuse the spirit of academic freedom and academic progress. It adds immensely to the attractiveness of New Haven as a place for the ambitious investigator, be he student or instructor, and does more than any other one thing to help the formation of that indefinable thing called a university atmosphere. The Graduates' Club was not organized with this end in view. If it had been, it probably could not have accomplished the result so effectively.

SCIENTIFIC RESEARCH.¹

A COLLEGE, as the word is usually understood in America, is a school of general training. Its work is found to be the more effective the better it is fitted to the traits of the individual, but in the nature of things its work with the individual is not limited to a narrow range of subjects. The university is a school of instruction through investigation. Its characteristics are advanced research and specialized development. As matters are, the faculty of the American university has to deal with two sets of students and two classes of

instruction, those of the college and those of the university. But in both cases it is for the university to set the standard. To the university teacher, individual research is the breath of life, and it is the duty of the institution in every reasonable way to foster its development.

In the practical consideration of this problem we may take the following propositions as granted:

1. A few men, and but a few, even in the greatest universities, ever contribute very much to the direct advancement of science.
2. No one can be a great teacher without the spirit of research; without this he lags behind the progress of knowledge, and his mental equipment becomes second-hand.
3. With most men the practical purpose of research is that they may be better teachers.
4. With most men a reasonable following of students is an aid to research, not a hindrance.
5. Those who feel called to research, but who can not or will not teach, should in general look outside the university for careers, at least until they have clearly proved their eminence.
6. The university should recognize the superior teacher or investigator by relieving him, as far as may be, of administrative drudgery, which uses up time and strength more than teaching does. Every active worker should have what he needs in the way of help of stenographers, artists, readers, curators, mechanics and the like. A man of choice powers should not waste his time on what cheap men can do. It is often best to relieve the ablest men in the department from its executive responsibility.
7. It is desirable that a university should publish the results of completed investigations of its professors, and do this in first-class form. Such publication in worthy manner is a stimulus to good work. But material brought together under stress of demand for publication is best left unprinted.

A MEMORIAL TO HERBERT SPENCER.¹

A SHORT time ago a petition was presented to the Dean of Westminster asking permission

¹From the annual report of President David Starr Jordan, Stanford University.

¹From *Nature*.

to place in Westminster Abbey a memorial tablet commemorating the life and influence of Mr. Herbert Spencer, but though the appeal was supported by many men of science and letters it was rejected. The reason why the Dean withheld his consent to this unobtrusive memorial of a great philosopher is not clear; and the *Daily Chronicle* has recently revived interest in the movement with the object of inducing him to reconsider his decision, or, failing this, to secure some other national memorial of Spencer's work. From the opinions of a number of distinguished men published in our contemporary, it is evident that much disappointment is felt at the failure to find a place in the Abbey for a simple memorial tablet to Spencer, but there is a difference of opinion as to whether steps should be taken to establish a national memorial to him in some other form. Among the men of science who consider it would be a reproach to leave Spencer's memory unhonored are Lord Avebury, Professor Clifford Allbutt, Dr. Bastian, Sir Michael Foster, Mr. Francis Galton, Sir Joseph Hooker, Professor M'Kendrick and Professor Poulton. There is, however, a strong feeling, expressed by Sir Norman Lockyer, that while no national memorial to Darwin exists outside Westminster Abbey, it would be undesirable to attempt to raise one to Spencer by public subscription. Lord Kelvin goes so far as to remark: "I have never been of opinion that the philosophical writings of the late Mr. Herbert Spencer had the value or importance which has been attributed to them by many readers of high distinction. In my opinion, a national memorial would be unsuitable." Sir William Huggins also hesitates to support a general movement to provide a national memorial, though he agrees that a memorial tablet in the Abbey would appropriately commemorate Spencer's work. In the absence of this form of recognition, it would seem that the best way for admirers of the philosopher to show their appreciation of his work would be to establish a lectureship or scholarship in sociology, natural science, or principles of education, to issue, as suggested by Dr. A. R. Wal-

lace, a cheap edition of his works, or in some other manner to further the objects to which he devoted his life. A movement with an end of this kind in view might be made of international interest, and would doubtless receive liberal support.

AREAS OF THE UNITED STATES, THE STATES AND THE TERRITORIES.

THE question, 'What constitutes the area of the United States?' is discussed in Bulletin 302 of the United States Geological Survey, of which Mr. Henry Gannett is the author. Jurisdiction extends to a line three nautical miles from the shore, but this strip of sea can not properly be regarded as a part of the country. Supposing our country to be restricted to the sea and lake coast, there remains a question regarding the bays and estuaries. To what extent should the coast line be followed strictly, and where should we begin to jump across the indentations made by the sea? In this matter one can only follow his own judgment, making in each case as natural a decision as possible, as no definite criterion can be established. The absence of an absolute standard is in large measure the cause of the discrepancy between the tables of the Census Office, made in 1881, and those of the General Land Office, prepared in 1899, both of which show the areas of the United States and of the several states and territories.

The measurements and computations upon which these tables were based were made with great care and thoroughness in each case, and the results probably represented the areas as closely as they could be determined from the maps and charts in existence at both times. Most of the differences in these two sets of tables are trifling, amounting to only a few square miles or a small fraction of one per cent., being well within the limits of error of the planimeter and of the maps used. Some of them, however, are considerable, and a few are explained by the fact that more recent maps, which changed the position of boundaries between states, had been used by the Land Office, and its measurement was, therefore, more nearly correct. Other discrepan-