

College students being compelled to meet elsewhere instead of in the College on account of there being something of a religious character connected with their meetings, while there are facts of a different character in the history of King's College which may be easily remembered. That a federal University consisting of institutions so dissimilar would work harmoniously I very much doubt. Probably the graduates of the existing University would care but little, except on general public grounds, about University and King's Colleges having power to grant degrees, if as a University they would assume a name not likely to be mistaken for that of the University of London. As yet the Victoria University is not a conspicuous success, and the London University examinations are still held at Owens College.

With the views set forth by Mr. Thiselton Dyer I should be disposed in great measure to agree, though there are some points on which I should have liked to make some remarks; but I fear, if I did so, I should trespass too far on your space.

London, May 29.

THOMAS TYLER.

THOSE who have taken part in the interesting discussion on the University of London, in your columns, have all viewed the subject from the academic standpoint. Would it not be well to consider it also from another point of view, viz. that of the educational needs of London? Prof. Ramsay contends "that a University is primarily a place for the extension of the bounds of knowledge." It is surely more accurate to say that a University, under the conditions that now exist, has two main functions—the one the extension of the bounds of knowledge by research, and the other the wide diffusion of that knowledge. The purpose of such diffusion should be to afford, as far as possible, to every individual the opportunity of obtaining such a training as would qualify him or her to take part in the development of some branch of knowledge, or at any rate to follow with appreciation and interest the advance made by others.

It needs no argument to show that it would be for the advantage of research, and for the well-being of the community, that real University training should be as widespread as possible. Ability and bent for some special study may frequently not be developed until somewhat late in life, after a business career has been begun. There is scarcely a branch of science that does not owe much to investigators whose researches were carried on during hours spared from some bread-winning occupation. The late Prof. John Morris was in early life a chemist in the Borough; Dr. James Croll was for years the janitor of the Andersonian University, Glasgow; even in the very number of NATURE containing Mr. Dyer's letter, the case of M. Rouault, one of the pioneers in the geology of Brittany, is mentioned, who did his early work while carrying on the business of hairdresser. A University training would have been of inestimable value to such students as these (and there are hundreds of such, with capacity for good work, scattered over London and the country), but no provision is made for them in our existing system.

Surely the important question therefore is, What kind of University would discharge most effectively for London the duty of providing for the needs of every class of students? The University should clearly recognize all organized teaching of University rank, whether given within the walls of a specified College or not. One of the most urgent needs of London is a co-ordinating head for all its multifarious higher educational agencies. The only University that will really adequately meet the needs and stir the enthusiasm of Londoners will be a University in vital relation with and directing and controlling all the higher teaching of the metropolis. This would, no doubt, be a new type of University, but the changed conditions of these times necessitate large modifications in the constitution of our institutions. This is sufficiently illustrated by the fact that the University of London itself was a new type of University, as also was the more recent Victoria University.

The new teaching University for London should have as its accredited professors and lecturers the staffs of University and King's Colleges, the Royal College of Science, the various medical schools, and any other institutions of equal rank, and in addition a large staff of lecturers at work in different parts of the metropolis at convenient centres. It would be possible, by an extension of the principle admitted into the draft scheme for the re-constitution of the University of London, viz. that of requiring from every University teacher a syllabus of his course of teaching, and further, by making such syllabus the basis of the examination, to incorporate all the work done by the accredited

teachers of the University into its curriculum for degrees. This would make it possible to open up a University career to evening students. While day students would complete their course of study in three or four years, evening students would take nine or ten, and the curriculum could without serious difficulty be modified to meet the conditions.

May 30.

R. D. ROBERTS.

I WOULD ask whether it is quite fair to assume that, because Convocation has rejected the Charter proposed for the University of London, it therefore follows that that body is out of sympathy with the attempts that are being made to establish a "real University," whatever that may mean. Is it not possible that a large proportion of those adverse votes were recorded because there were elements in the scheme which were felt to be impracticable or open to serious objection? At all events, I feel sure that there are many who would refrain from regarding the vote as being an expression on the main issue.

The views so well put forward by Prof. Ray Lankester as to the undesirability of establishing what he terms federal Universities fully enlist our sympathies; but are we not sailing very near the wind in the suggestion that University and King's Colleges and "other institutions" should be incorporated on University lines?

I say, by all means avoid centralization and beware of the "never-ending Committees and schedules of such clumsily-organized Universities." But what of value is then left that University College does not already possess? Would the appropriate definition and allotment of degrees of all shades and grades have contributed one iota to the work and influence of Graham, Sanderson, Sharpey, Foster, Williamson, and Prof. Lankester himself, or have added to the benefit they have conferred upon University College? One does not surely regard the granting of degrees as an important element in the German University: its distinguished professors are not Berlin men or Strassburg men—they are pupils of Liebig, of Wöhler, of Bunsen, and the like; and its students are not regarded as graduates of Heidelberg or Giessen, but in like manner as pupils of so-and-so. And University College is, I take it, much more nearly in function a German University now than ever it is likely to be as a federal University. I verily believe that such is the taste of the so-called properly ordered English mind for schemes, plans, and organizations, that a governing body, even though largely composed of the most uncrystallizable elements, would shortly be found carefully hedging itself round (and the students) with that beautiful machinery which Prof. Lankester so heartily detests. Prof. Ramsay's association of "examination on the brain" with the London University undergraduate I fear does the said undergraduate an injustice, if it is meant to differentiate him from his fellows of the "real Universities."

The men who regard the College Calendar with its traditional questions as their *vade mecum*, and whose only other study is the idiosyncrasies of the examiner, are ubiquitous, and their name is legion. If I could think they were confined to the "Burlington Gardens University," I, for one, would vote against the alteration of one jot or tittle of the present organization, if only lest they might be disturbed from their resting-place there.

G. H. BAILEY.

May 30.

Quaternions and the Ausdehnungslehre.

PROF. GIBBS' second long letter was evidently written before he could have read my reply to the first. This is unfortunate, as it tends to confuse those third parties who may be interested in the question now raised. Of course that question is naturally confined to the invention of methods, for it would be preposterous to compare Grassmann with Hamilton as an analyst.

I have again read my article "Quaternions" in the *Encyc. Brit.*, and have consulted once more the authorities there referred to. I have not found anything which I should wish to alter. There is much, of course, which I should have liked to extend, had the Editor permitted. An article on Quaternions, rigorously limited to four pages, could obviously be no place for a discussion of Grassmann's scientific work, except in its bearings upon Hamilton's calculus. Moreover, had a similar article on the *Ausdehnungslehre* been asked of me, I should certainly have declined to undertake it. Since 1860, when I ceased to be a Professor of Mathematics, I have paid no special attention to