THURSDAY, APRIL 4, 1878

THE SCOTTISH UNIVERSITIES COMMISSION

THE Report of the Royal Commissioners appointed to inquire into the Universities of Scotland, together with Evidence and Appendix, has just been issued. We will begin our reference to this important document with an extract (p. 49) :—

"It would, we consider, be a misfortune if the separate individuality which has long characterised the Scottish Universities were impaired, and if the spontaneous and healthy development of different schools of thought were rendered impossible by laying an obligation on men of original genius to make their teaching subservient in all its details to the requirements of an extraneous examining authority. The admirable influence which the Scottish Universities have hitherto exerted upon the people of the country has been due not only to the prolonged and systematic course of mental discipline to which their students have been subjected, but to the stimulus and encouragement given to inquiring minds by distinguished men who have made the professorial chairs centres of intellectual life ; and we cannot think it desirable that any such changes should be made as would tend to lower the Universities into mere preparatory schools for some central examining board."

These words are peculiarly noteworthy at the present time, when attempts at centralisation are becoming more rampant than ever :—and when the general tendency of so-called "Educational Reform" is to substitute for teaching in the highest sense, an almost Chinese system of examinations, with their inevitable attendant *Cram*. For the true definition of Cram is "preparation for examination, and for examination alone":—and its varieties are infinite, ranging as they do from processes closely resembling the manufacture of *foie gras* in the live bird, to those which are adopted in dressing diseased meat for the market. The Scottish Universities have, it seems, been hitherto singularly free from this monstrous evil ; and, it is to be hoped, will remain so. The Commissioners who are now dealing with our great English Universities would do well to pay particular attention to this point, for Cram, in its worst forms, is by no means a stranger to them. The true cure for this evil is very well stated in the Report (p. 49) :—

"The examination of the students of a University for their degrees by the Professors who have taught them is sometimes spoken of as an obvious mistake, if not abuse ; but those who are practically acquainted with University work will probably agree with us that the converse proposition is nearer the truth. In fact, it is hard to conceive that an examination in any of the higher and more extensive departments of literature or science can be conducted with fairness to the student, unless the examiners are guided by that intimate acquaintance with the extent and the method of the teaching to which the learner has had access, which is possessed only by the teachers themselves."

Nothing could be more true, or more happily put. Let all University instruction (in England as well as in Scotland) be real *teaching*, such as is (or at least ought to be) given by Professors or Lecturers and their specially chosen Assistants, and let the teachers be in the main the examiners. Mere speed of writing, and other similar qualifications, are unworthy the notice of scientific men or scholars—and certainly ought to have no influence in a University Examination, at least until Universities are furnished with Professors of Caligraphy, Maintien, &c., attendance upon whose lectures shall be made compulsory. It is right and proper that such things should be looked to in Civil Service Examinations and the like—just as it is right that the candidates in some of these should be submitted to medical inspection. But who ever heard of medical inspection in a University examination ?

But we now come to the one true difficulty in this part of the question :—*How to choose Professors*. On this point there are several very useful hints, both in the *Report* itself and in the *Evidence* appended.[1] The Commissioners do not seem very decided in their recommendations, so many widely differing and yet individually plausible schemes have been submitted to them. But practically the patronage seems from the evidence to be very fairly bestowed (*i.e.*, in very good hands) in the majority of the Scottish Universities. The main exception is that of Edinburgh, where several of the most important chairs were left by the Universities (Scotland) Act, 1858, virtually in the gift of the Town Council, which had been up to that date the supreme authority in the metropolitan University. Such a state of things is barely credible to us in England. For, though custom has familiarised us with great schools under the management of City Companies, we could hardly imagine the Mayor and Aldermen of Cambridge electing to the Lowndean or Lucasian Professorship. Yet the chairs once held by Maclaurin, Black, Leslie, Dugald Stewart, &c., are at the disposal of a Board of seven, four of whom are nominated by the Edinburgh Town Council ! Instead of the heroic treatment which such malformation demands, and which would probably have made opposition impossible ; the Commissioners propose merely to create two additional members of this Board, so as to place the Town Council representatives in a minority ; a step whose timidity may only ensure a violent, and too probably a successful, resistance.

It appears clearly from these volumes that the one great want of the Scottish Universities is *money*. Over and over again, throughout the evidence, this is painfully brought out. Yet, with their few thousands these Universities are at present educating many more students than Oxford and Cambridge together, each of them with its annual hundreds of thousands. And the education given to each and all is generally of the highest order, because it is given by the Professors themselves. How many Cambridge men go for instruction to Cayley or Stokes—to Munro or Kennedy ? Of names like these Cambridge is justly proud. But unfortunately such teaching as these men could give *doesn't pay*, so the "coach" is resorted to ! In Scotland the Professors are the teachers, hourly accessible to all, and among the latest additions to their ranks we find the names of Jebb and Chrystal. They will do more good to students now in one year than they could have done in a lifetime spent in Cambridge ! Comment on such a statement is needless.

After what we have just said, the reader will scarcely be

[1] The Analysis or Abstract of the Evidence, which is contained along with the Report itself in the first of these four Volumes, seems to be exceedingly well executed throughout. This is one of the specially good features of the work, and Prof. Berry, the Secretary to the Commission, deserves high credit for it.

prepared to hear that one great reproach to the Scottish University system is commonly thought to lie in the shortness of the session, as it is called. This is a great point with would-be University reformers—"Go to, ye are idle." But it will be found, on examination, that the compulsory working-time *per annum* is longer at the Scottish than at the English Universities :—whence men go down regularly whenever term divides. In Scotland the majority of the lectures continue uninterrupted (except by the week from Christmas to New Year) from the end of October to the middle of April ; and by that time both students and professors *require* some relaxation, especially those who have to teach or attend the summer classes, which occupy the whole of the months of May, June, and July. The Commissioners have no hesitation on these points, and meet the grumblers very sharply. They say :—

"Without saying that the present arrangement of the academical year is the best that could be devised, it is that which long experience has shown to be the most suitable to the circumstances of Scotland. Nor is it without its advantages for the purposes of study. To the well-advanced and intelligent the vacation affords an opportunity for reflection and self-culture, so as to prevent his University education from degenerating into a mere acceptance of facts and conclusions from the mouth of his teacher. For a student, indeed, who is backward or indolent, the leisure afforded by the long vacation may be useless and hurtful. But to meet the case of such students the fitting remedy is that which we have already stated, the institution of summer tutorial classes where these do not now exist, and their extension, if necessary, where they do."

Our readers are already acquainted with the Report of the Devonshire Commission. A good deal of the evidence which that body collected has been taken as repeated before the present Commissioners, and they adopt, and strongly urge the carrying out of, several of the recommendations of their predecessors:—especially those which concern grants of public money for the extension of buildings and appliances for Science teaching in the Scottish Universities. It is well that this has been done, for attention has thus been recalled to one of the most important documents connected with education which has ever been laid before Parliament, and which (probably because of the moneys it recommended to be granted) has been practically shelved for some years.

So far we have been dealing with the Report as a whole. We must now more particularly examine it as regards *Science*. And this, we fancy, will be allowed to be its weakest point. The Commission was exceedingly strong on the literary, legal, and general-culture side :—but very weak—numerically at least—on the scientific. It is no disparagement to such men as Dr. Lyon Playfair and Prof. Huxley (who were the *two* representatives of Science among *twelve* Commissioners) to say that they cannot adequately represent *all* science. For there are three great divisions of Science, the Observational, the Experimental, and the Mathematical, and the third and greatest of these was altogether unrepresented on the Commission. This was a very grave defect, and the value of the Report is considerably reduced in consequence.

So strong, in fact overwhelming, was the general culture side—including Members (or ex-Members) of both Houses of Parliament, Scottish (and Indian) Judges and Advocates, &c.—that the Report cannot fail to surprise all readers by its general tenor. For there can be no question that in it Science has managed to carry the day against all comers :—the greater the pity that it was not fully represented, if but by the addition of a single mathematician. To make room for him, a lawyer might easily have been spared.

We cannot spare space for more than one instance of the proposed revolution :—but we choose an important and typical one, the modifications to be made in the mode of attaining the degree of M.A. This degree has hitherto, in Scotland, involved a certain amount of knowledge of *each* of the following seven subjects :—Latin, Greek, Mathematics, Logic, English Literature, and Moral and Natural Philosophy :—and has not been at all nearly so easy to attain as the ordinary (or Poll) degree in the English Universities—which, though at first styled only B.A., becomes M.A. by mere lapse of time and payment of additional fees, and is therefore practically the same thing. In Scotland it is now proposed that there shall be five distinct avenues (several with alternative branches) to this degree in addition to the present one :— (p. 25)

"Moved by these considerations, we have come to the conclusion that to secure a basis of general culture every student proposing to proceed to the degree of M.A. should be required to pass a 'First Examination' in Latin, Greek, Mathematics, English, and, when the state of education in the schools renders it practicable, in Elementary, Physical and Natural, Science. This examination should be passed at the beginning of the University session,—either the winter or the summer session,—every student proposing to graduate being required to pass it, whether he may have been previously a student in the University or not. With some modification, the examination might be so adapted as to apply not only to students proceeding to a degree in Arts, but to those also intending to graduate in Law, Science, or Medicine. In the case of persons proceeding in Law, we think that an examination in translating from French or German should be allowed as an option for Greek. Again, in the case of students proposing to graduate in Science or Medicine, we think that, as some knowledge of modern languages is most important to them, they should be examined either in translating from French and German, or in translating from one of the languages and in Greek. In this way, it would be necessary for them to show ability to translate from at least one modern language.

"As we shall explain afterwards, we regard this as the best equivalent for an entrance examination. Through its application to all proposing to graduate, whether previously students at the University or having come direct from school, a salutary reflex action on the schools will be secured by the encouragement given to them to send their pupils to the University in an advanced state of preparation. In a different shape, and if accompanied by the condition of exclusion from the University should the candidate fail to pass, an entrance examination would, in our opinion, be attended with injury rather than benefit.

"After passing the 'First Examination,' the candidate for a degree in Arts should be allowed to proceed in the present course, if he please, and as, no doubt, many will still do. If, however, he prefer to take a different course, we propose that he should be allowed to take any one of the five following departments or lines of study, viz. :—

"I. Literature and Philology.
II. Philosophy.
III. Law and History.
IV. Mathematical Science.
V. Natural Science.

"The branches to be included under these different departments we propose should be as follows :—

"I. Literature and Philology should comprise the subjects of Latin ; Greek ; and English Literature ; together with one of the following subjects, viz. : Comparative Philology ; Sanskrit ; Hebrew ; a Modern Language ; Gaelic, with Celtic Philology. Questions on history and geography incidental to each subject should form part of the examination.

"II. Philosophy should include Logic and Metaphysics ; Ethics and Psychology ; and the Physiology of the Nervous System. The first two subjects are understood to embrace the History of Philosophy.

"III. Law and History should include Civil Law ; either Constitutional Law or International Law ; and Political Economy ; together with the history of any one of the following groups, viz. : Greece and Rome ; Modern Europe ; Egypt, Syria, Palestine, and Arabia ; India ; Ancient and Modern America.

"IV. Mathematical Science should embrace Mathematics, pure and applied ; Natural Philosophy ; and Physical Astronomy.

"V. Natural Science should comprehend four groups, viz. :—(1) Applied Mathematics, Natural Philosophy, and Chemistry ; (2) Natural Philosophy, Chemistry and Physiology ; (3) Physiology, Botany, and Zoology ; (4) Natural Philosophy, Chemistry, and Geology. A candidate should be allowed to take any two of these four groups ; and the practical working of the arrangement would be that Natural Philosophy and Chemistry would be compulsory, while any option would be given between the mathematical and the morphological sciences.

"It may be explained that the subjects of examination in the sciences comprehended in Department V. are such as are required in the first Bachelor of Science examination as detailed in the Calendars of the Universities of Edinburgh and London (1877). The purpose we have had in subdividing the subjects of Department V. into groups has been, in the first place, to ensure a sound acquaintance with Physics and Chemistry, which lie at the foundation of all natural science ; and, in the second place, so much being secured, to give fair play to individual intellectual tastes and peculiarities. It is rare to find a man equally capable of dealing with long chains of abstract reasoning, or with experimental research, and of observing and remembering the analogies and differences of form. The scientific aptitude, when strongly marked, is either for mathematics, for experimental investigation, or for morphology, rarely for all three.

"In regard to the scientific subjects, mere book knowledge should not suffice ; practical work in the laboratory should be essential."

We are much mistaken if this Report does not produce great irritation, amounting in many quarters to white heat at least, and determined opposition. The dry husks of speculative "philosophy" which, feebly existent even in the present day (like Bunyan's *Pope* and *Pagan*), formed so large an ingredient in the mental pabulum of Scottish students in the past, are doomed to "cease from troubling" :—but they will die hard. In their place will come the still oppressed truths of modern science, and the legitimate speculations which Experience and mathematical power alone can enable the human mind to originate and develop.

SUN-SPOTS AND RAINFALL

THE paper which we print from Mr. Meldrum this week, appearing as it does within a few days of the debate in the House of Commons on the Indian Famine expenditure, is one which should be interesting to many besides professed meteorologists. It will, for one thing, enable even the most unscientific among us to see the manner in which men of science are striving to arrive at the truths of nature the while the average Member of Parliament only refers to their labours in order to sneer at them even when their results may elucidate a question of high national importance.

Granting that the Member for Cambridge comes up to the average of our legislators, let us see how he distinguished himself on Tuesday. In his indictment of the policy of Sir John Strachey, he was unwise enough to touch on the question of the connection between sun-spots and the Indian rainfall. "It appeared that, according to the astronomer to the government at Madras, the absence of several important spots (*sic*) on the sun's disc was connected with the retarded rainfall." It is clear from this, we think, that Mr. Smollett, in his ignorance of all things solar, instead of taking a little trouble to inform himself, has built up a mental image of the physics of our central luminary, by likening it to the house of which we will grant again he is one of the most prominent units. The cause of the sun-spot minimum appears to him to be that at this time "several important spots"—let us say the Smolletts of the sun—are in the tea-room or at dinner, anyhow they are absent from the division, and the opposition carries the day—that is, if Mr. Pogson is right, but he proceeds to show that Mr. Pogson is wrong.

Dr. Lyon Playfair, as was to be expected, put this matter right before the house. He stated that "it was established that famines in India came at periods when sun-spots were not visible. Out of twenty-two great observatories of the world it had been shown in eighteen that the minimum rainfall was at times when there were no spots on the sun. That was as true in Edinburgh as in Madras, in St. Petersburg as in Australia. It was therefore essential for the Government of India to take that into consideration in calculating as to when famines were likely to occur. The Secretary of State for India had acted wisely in sending out photographers to the Himalayas to take photographs of the sun, and having seen some of those, he was sorry to say that on none which he had seen were spots to be detected." As Dr. Playfair is not in the habit of making statements without getting up his case, we may be thankful to Mr. Smollett for the sneer which called Dr. Playfair up.

Mr. Meldrum's communication contains a very condensed reference to his memoir on Sun-spots and Rainfall recently presented by him to the Meteorological Society of the Mauritius, a memoir which goes far to complete one portion of that magnificent edifice, the erection of which was foreseen by Sir Wm. Herschel at the beginning of the present century.

In this important paper Mr. Meldrum, than whom there exists no higher authority, states that the result of his seven years' work has been to convince him that the connection between sun-spots and rainfall is as intimate as that between sun-spots and terrestrial magnetism ; and that having regard to the number of cycles at our disposal we should be as justified in rejecting the diurnal oscillation of the barometer as the curve along the hills and hollows of which the maximum and minimum rainfalls of the world lie.

This result of course will be received with incredulity