

I mention these, because although their dates are uncertain, they are undoubtedly built upon a common model, they have identical functions, and they have to do with the ecliptic, that is to say, we are in each case in presence of a belt of stars to which the motions of any other heavenly body travelling round the sun or, like the planets, round the earth, like the moon can be readily referred. In these lists¹ I give translations of the Sanscrit, Arab, and Chinese names, so far as they can be made out, and I must here express my deep obligations to Profs. Max Müller, Robertson Smith, and Douglas, for their kindness in supplying them.

J. NORMAN LOCKYER.

THE SECONDARY EDUCATION MOVEMENT.

THE outcome of the Oxford Conference on Secondary Education in England is our usual panacea for social ills, a Royal Commission. As this is to be, let us hope that the reference will be restricted to some definite points, and the members to a small number of properly qualified persons. Otherwise little else than unnecessary delay will be the result. Practical experience of such Commissions tends, however, to disenchant one with the prevailing idea of their usefulness, that is, of their power to settle the question at issue. Look at the last Commission on Primary Education, containing bigwigs of every kind. How long they sat, and how many Blue Books they filled with evidence, may be learnt by those who are interested. But what did it all come to? The large majority reported that they were totally opposed to free education, and the small minority, though not opposed, saw no possibility of its accomplishment. Two years afterwards a Tory Government carried a Free Education Act! Again, a Royal Commission on Vaccination has been sitting every Wednesday for the last five years, and it has not yet finished taking evidence! In face of facts like these, and they might be greatly extended, can one look with much hope to the early settlement of so difficult and complex a question as English secondary education by a Royal Commission as usually constituted? There are two conditions under which Commissions of this kind can act usefully: first, as means of inquiry into facts, and such a one was the Technical Commission of 1881-4, which journeyed over sea and land in quest of information; and second, as a means of carrying out measures laid down by Act of Parliament; and such a one, for example, is the Scottish University Commission now sitting. If we do not now know what we want in the way of secondary education, let there be a Commission by all means. Many may think that we do know. We are all convinced that more good secondary schools are needed both in town and country; and what has to be decided are such matters as how these schools are to be governed, by whom new ones are to be set up, and old ones remodelled to suit the wants of the times, how the necessary funds are to be found, and so forth. Now, are these questions of a kind which a Royal Commission can once for all determine? I think not. In my opinion they can only be settled by the House of Commons. The rival claims of County Councils, now in possession of the funds; of School Boards, now entrusted with primary education; of existing public schools of various orders; and, lastly, of private venture schools of all sorts and sizes, cannot be met or satisfied by any report of a Royal Commission. They must be fought out on the floor of the House, and it is by no means clear that the outcome of such a struggle

will be in accordance with the recommendations which the report may contain. Therefore, desiring, as all those interested in education must do, to see the present chaos reduced to some degree of order without delay, and the crying needs at least to some extent supplied; and, knowing that there is no present prospect of Government action on such a scale as to systematise our varied forms of educational activity, I, for one, should be satisfied to get a Bill through the House of Commons consisting of two clauses, the first making the educational use of the whisky money compulsory and permanent, and the second giving County Councils power to expend such a portion as they think fit, of the funds capable of devotion to technical instruction, on the furtherance of secondary education. That an expenditure in this direction of some of the money especially voted by Parliament for technical instruction is justified by the acknowledged fact that it is impossible to carry on such instruction, except on the lowest level, to persons ignorant of the educational tools which have to be used.

But, in fact, technical instruction, as defined in the Act, is, or may be, modern secondary education, for it includes all the necessary subjects with the exception of classics and, perhaps, of English and history. So that under these Acts schools—either free or fee'd—can now be established wherever the County Councils determine, and these may be, to all intents and purposes, middle-class secondary schools. Moreover, under these Acts, the local authority may aid existing schools so as to enable them to give scientific or technical instruction. Both of these modes of action are now being widely adopted by County Councils all over the country, so that something substantial in the direction of what is needed is being done. There is, of course, considerable difference of opinion as to the best steps to be taken to bring about a complete and satisfactory system; and for the purpose of ventilating the subject, the Oxford University, in its corporate capacity, took the unprecedented step of calling a conference of the teachers of England, from the university to the elementary school, to discuss the whole question of secondary education. The gathering was remarkable in many ways, but chiefly as an admission, on the part of the universities, of the need of radical educational reform, and of the wisdom of their participation in such reforms. The papers read and the discussions held were, of course, of the multifarious and somewhat discursive order. All, however, from Dean Gregory on the one side, to Mr. Lyulph Stanley on the other, agree "that something should be done," but we may seek in vain for any consensus of opinion as to how that "something" is to be done, or even what that "something" is, except, indeed, the consignment of the matter to the tender mercies of a Royal Commission. Nevertheless, much good may come from the conference; many wise things were said, and the coming together of a large number of persons all in one way or another interested in assisting the progress of the question, cannot be without its useful effect.

What one misses chiefly in the discussion is the scientific aspect of the question. Scarcely a speaker touched upon what, I take it, is after all the gist of the whole matter, viz. the necessity, above all and under all, for an education based upon science. We have to deal, as was well said by Dr. Hewitt, of the Cheshire County Council, not with the 10 per cent. of the population to whom we teach the "humanities," but with the 90 per cent. of humanity struggling for existence. If we want to hold our own with foreign nations, we must alter, and that rapidly, and not waste our precious time too much in inquiry. With the object of raising the standard of existence for these teeming millions the nation now pays £750,000 a year, not enough, perhaps, to accomplish all we require, but amply sufficient for pre-

¹ Reproduced from the *Journal of the American Oriental Society*, vol. vi. No. II. p. 468, as given by Profs. Whitney and A. H. Newton.

sent use, especially when we remember that County Councils can, if they please, levy a rate in addition to the Imperial grant. We shall agree with Dr. Gull, of the Grocers Company's School, that the battle of scientific and technical training *versus* the humanities ought to be decided by evolution and natural selection, rather than by authority; though what this latter exactly means I do not quite understand. Authority can only act when evolution and natural selection—in other words, public opinion—has decided what is wanted. But we shall disagree with him when he says that “no time could be worse than the present for settling this question.” We say that no time can be better, or rather that no time can be so good as the present; for if we do not settle the question soon it will be too late, and our people will lag so far behind those of other countries, that we shall not be able to fetch up our lee way, and the victory will not be to us. To my mind much nonsense is talked, especially by those whom I may without offence call the high-faluting educationists, about so-called culture, and of the necessity for the study of grammar and the humanities for children of every degree. Mr. Bowden, President of the Union of Teachers, is not one of these. He calls attention to the fact—deplorable enough—that only about five per cent. of our five million of children on the registers of elementary schools are in the sixth standard. This being so, it is our duty to give these few children whose parents are willing and able to let them pass on to a higher level of education in secondary schools, that which will most effectively fit them for the life which they afterwards have to follow. Ours is essentially an industrial population, and as the Duke of Devonshire said, at another conference on the same subject, “any advance in the direction of utilising existing secondary schools must be made not for the benefit of the middle classes only, but also of the whole of the working-class community of this country”; and to this I may add Mr. McCarthy's axiom, that school machinery which makes for clerky employment at the expense of the skilled handicrafts, is so far harmful. Still, it is mainly our middle-class education which is in chaos and needs reform. The higher secondary education is probably sufficiently provided for by over 100 so-called “public” schools having a total of from 26,000 to 27,000 pupils. Primary education is under State direction, and will improve from year to year. To amend the middle-class education is more important even than to improve the educational ladder. Mr. Llewellyn Smith's most excellent report on the condition of secondary education in London shows how crying is the necessity in the metropolis for such middle-class schools. The few that exist in the kingdom are often insufficiently endowed, and their work is generally hampered by competition with private venture schools; and how bad the education is, which is given in many of these middle-class private schools, can, as Dr. Gull says, hardly be conceived. These inefficient schools must be either mended or ended before we can make much progress, and for this we need a Registration of Teachers Act, and an effective system of inspection. Honest private schools would benefit, and the others would disappear.

Of all the communications made concerning the relations present and prospective of the universities to the secondary education of the country, the letters read by Prof. Jebb, from the late Master of Balliol, are of the greatest interest, as giving the latest opinions of one who throughout his life was an educational, and especially a university, reformer. Dr. Jowett stated his desire that there should be a universal abiturient examination, giving the right of admission to the universities. Then he wished to give all students who pass such an examination the right of becoming candidates, without residence or restriction of age, for any university examination, with or without honours, or for any part of the examination. He further remarks that such persons

should have the privilege of admission to the libraries, of competing for university certificates and prizes without restriction of age. Moreover, he would give to such candidates as have shown any considerable merit, sums of money to enable them to carry on their inquiries; and this, says Prof. Jebb, was intended by Dr. Jowett to apply to all branches of knowledge without distinction, which the universities could best teach. These are indeed truly radical proposals, for they mean throwing open the university honours and emoluments to the world. That such measures should have been suggested in the almost dying words of the greatest master of the greatest of Oxford colleges, is in itself remarkable evidence of the present position of Oxford opinion. If fifty, or perhaps twenty, years ago, a radical undergraduate were to have made such suggestions, he would have stood a chance of being expelled from the university, like Shelley, for blasphemy; now they are the last words of Jowett, quoted in the presence of the Vice-Chancellor, with approval by Jebb.

H. E. ROSCOE.

THE SONNBLICK MOUNTAIN OBSERVATORY.

THE progress of meteorological science having rendered necessary a more careful investigation of the conditions of the higher strata of the atmosphere, the subject of mountain stations was considered at the Meteorological Congress at Rome, in 1879, and the various problems which could best be solved by such observations or in balloons were discussed. Among these may be mentioned:—The decrease of temperature with height, especially during cyclones and anticyclones; terrestrial and solar radiation; the behaviour of barometric maxima and minima at the earth's surface and at great heights, and the increase of wind velocity with height. Several important stations were already in existence, and the establishment of others was strongly recommended. Herr Ignaz Rojacher, the proprietor of the Rauris gold mines, having proposed to the Committee of the German and Austrian Alpine Club, in the year 1884, the erection of a meteorological station at the Miners' House on the Sonnblick, in the province of Salzburg, situated at an elevation of 7550 feet, about half-way between Kolm-Saigurn and the summit of the Sonnblick, Dr. Hann, director of the Austrian Meteorological Service, gladly took advantage of the suggestion, and in December of that year the station was equipped by the Austrian Meteorological Institute. But it was soon found that the site was unfavourable for the purpose, and Herr Rojacher decided that the only suitable position would be the summit of the mountain. After surmounting many difficulties, the work was satisfactorily carried out in the early part of 1886. The Alpine Club undertook the expense of the erection of a wooden house, while the Austrian Meteorological Society provided the self-recording instruments and undertook the building of a substantial tower for the anemometer and the establishment of telephonic communication between the summit and Rauris, a distance of 15½ miles, and, further, to supply instruments to the base station at Kolm-Saigurn. The accompanying illustration shows the position of the Observatory on the peak of the mountain; it is situated at a height of about 10,150 feet, and is the highest station in Europe. The difficulties of dragging the materials for the construction of the Observatory over glacier and snow for a distance of about 900 yards can hardly be overrated. Each trip occupied from three to four hours, and it was at this stage of the work that the greatest assistance was given by Herr Rojacher and his men. His intimate knowledge of the conditions of the glacier and *névé*, obtained from thirty-five years' residence in the neighbourhood, enabled him to select a favourable