

from so doing. It thus happened that the matter dropped until the announcement in 1860 of Lescarbault's observation on March 26 in the preceding year, when Mr. Scott, in a communication addressed to the *Times*, drew attention to his experience in the summer of 1847. It was then discovered that he had not been the only observer of the strange object. Mr. Wray, the well-known optician, then resident at Whitby, had remarked a small circular black spot upon the sun late one afternoon at the end of June or early in July, though he also had, in 1860, lost the exact date. Both these gentlemen have furnished the writer with every other particular of their observations. That they refer to the same object can hardly be doubted. Mr. Wray had it under observation for forty minutes, when the sun sank into a bank of cloud and was not again visible that day. In this interval the spot appeared to have moved about five minutes of arc, and when last perceived was so near the western limb of the sun that Mr. Wray believes if the cloud had not interfered, in about ten minutes he would have witnessed the egress. This circular spot, the diameter of which he judged to be about six seconds of arc, was not visible early on the following morning, though other spots of ordinary form which were present on the disk remained nearly unchanged. Mr. Scott was observing with a refractor of about  $4\frac{1}{2}$  inches aperture, Mr. Wray with a fine 6-foot Newtonian reflector of equal aperture, which he was employing at the time in a study of the varying aspect of the solar spots. Notwithstanding the unfortunate loss of the date of these observations, such particulars as are available are still of value as certifying the existence of such objects in transit; there is no observation of the kind resting upon more excellent authority.

A letter from Prof. Heis, of Münster, the author of the "Atlas Cælestis Nova," received while closing these remarks, gives full details respecting Weber's observation. The spot was intensely black, perfectly round, and smaller than the planet Mercury in transit. Prof. Heis expresses the utmost confidence in this observation by his friend, who has long been accustomed to examine the solar disk.

J. R. HIND

#### UNIVERSITY COLLEGE, BRISTOL

WE have been able to keep our readers informed of the various steps which have been taken to bring to fruition the movement which was commenced about three years ago to establish in Bristol an institution for University education. This movement, we are glad to say, has been so far successful that a beginning is to be made on Tuesday week, October 10; on that day commences the first term of the first session of what will be henceforth known as University College, Bristol. From the first it was sought to make the proposed institution something more than a mere "technical" college. All along it has been kept in view that the only really liberal training is one in which all the faculties of man are drawn out harmoniously and equally, in which a broad basis for future special work is laid, by education in all the great departments of human knowledge. The Bristol institution is not to be a mere special college, it is to be a University. Prof. Jowett, at the meeting held in June, 1874, struck the right note when he said: "The distinction he would draw between liberal education and merely

technical education was this—the one comprehended the other; it was the other, with something added to it, carried on in a higher spirit; it was the one pursued not merely for the sake of getting on in the profession, or making a man an engineer, or a miner, or a doctor, but for the sake of the improvement of the mind. No man will be a first-rate physician or engineer who is not something more than either." The first programme of the classes of this new college is certainly a modest one so far as extent is concerned, but it comprehends all the elements of a liberal education—literature, science, and art. In science there will be instruction in chemistry, physics, zoology, botany, geology, mathematics and applied mechanics, and political economy; in literature, classes for modern history and literature; and in art (for evening classes at least) geometrical and mechanical drawing. In all these branches professors or lecturers have already been appointed, but the programme contains other subjects—classical languages and literature, modern languages, and textile industries—to which no appointments have yet been made, but which will no doubt be filled up as soon as circumstances permit. Affiliated to the Bristol College, moreover, is the old-established Bristol Medical School, for which new buildings will be erected, and on which, we believe, the new institution will have a stimulating and liberalising effect. The principal work of the college will of course be carried on during the day by means of lectures and laboratory work, but we are also glad to see that the directors have resolved to follow from the first the excellent example of Owens College, Manchester, by establishing evening classes for those who are unable to take advantage of the day classes.

Altogether the originators of this movement and the Council of the College are to be congratulated on the fair start they have made, and if they continue as they have begun, we cannot doubt that in no long time University College, Bristol, will become as great and as firmly-established a centre of culture as the Owens College, Manchester. But in the meantime the great want of the new institution is money. Owens College, Manchester, has received many liberal donations since John Owens left his 100,000*l.* for the endowment of professorships, and by these gifts it has been enabled to develop wonderfully. But even Owens College feels itself hampered from want of sufficient funds, and now with justice advances its claims to government endowment. The originators of the movement which has just reached a successful culmination in Bristol calculated that they could not make a beginning without a capital sum of 25,000*l.*, and an annual subscription of 3,000*l.* for five years. They have received many liberal donations and subscriptions, and have obtained so nearly all that they thought was required, that they have felt authorised in making a beginning. From the first Balliol and New Colleges promised 300*l.* a year each for five years. A good many donors, individuals, firms, and companies have given 1,000*l.* each, and many subscriptions of smaller sums have poured in. The Clothworkers Company have offered a handsome subscription, on condition that means are taken to promote technical education in the West of England clothmaking districts, and as we have said, "Textile Industries" is put down as one of the lectureships to be filled up. We hope, however,

that the Worshipful Company will not put too narrow a construction on the conditions of their subscription, but that they will have the shrewdness to see that the best possible preparation for a special knowledge of textile industries is a thorough grounding in the sciences on which these are founded.

Still, notwithstanding all that has been done and promised, the Bristol College must stand still, and therefore fail of its purpose, unless subscriptions and endowments continue to pour in handsomely until it be enabled to offer an education not inferior to that offered by Owens College, Manchester, or the Universities of Edinburgh and Glasgow. We feel confident, however, that once the institution is fairly started and at work, and has had opportunity of showing the vast benefits it is able to confer on the large industrial population with which it is surrounded, and thus indirectly on the general culture and material welfare of England, that some at least of the many rich and liberal-minded men in the country, who only wait for a worthy object on which to exercise their generosity, will see that here is one that deserves and requires their help, by giving which liberally they will not only benefit their country but do lasting honour to themselves. No similar institution that has been started on a liberal and disinterested basis and has been properly brought before the public has yet proved a failure; we need only refer again to Owens College, to the Newcastle College, and to the more recent Yorkshire College of Science, which, however, has much to do before it gets beyond the stage of a merely technical school. Soon also will we have an institution in Birmingham, the Josiah Mason College, so liberally endowed by its still living founder. These institutions have all sprung up to supply what was felt as a great want; and no district in the country has more need of a centre of liberal culture than the south-west of England, the seat of so many and so varied industries. We venture to think that all that has been yet obtained is nothing to what the extensive district, containing so many rich landed proprietors, manufacturers, and merchants, can afford. Now that they see the institution actually at work in their midst, and perceive how impossible it is for it to do efficient work on its present basis, we cannot doubt that they will extend their liberality, and, aided by others throughout the country who are able and always ready to help in a noble and deserving cause, establish University College, Bristol, on as solid a pecuniary foundation as any similar institution in the country.

We need not insist here again, as we have often done already, on the fact that we are in danger of losing our lead among the nations so far as industry is concerned, from the inefficient training of those who have the conduct of our commerce and manufactures in their hands. It is a fact which is being ever and anon reiterated on the platform and by the general press. Along with a sound and comprehensive system of elementary education, it is only by establishing all over the country, in the great centres of industry, institutions where a comprehensive education can be obtained as the only satisfactory basis on which a special training can be built, that we shall be able to hold our own on the Continent and with America. We have five such centres in England either established or about to be, some of them, however, greatly deficient

in comprehensiveness. Bristol, we have no doubt, will one day become one of the most efficient in the country. Everything has gone smoothly hitherto. Even the Clifton Association for the Higher Education of Women intend to have no courses of lectures this winter, to see how far women in and around Bristol will avail themselves of the College; for the lectures will be given to both sexes at once, though the class instruction will be separate. We only hope that other important centres will follow the examples already set, and that ere many years no man in England will have to go without a liberal education because it is not within his reach. If Scotland with her four millions of people finds it difficult to meet her wants in this direction with four universities, how much has yet to be done in England with her twenty-four millions ere she is on the footing of even her poor relation of the north.

#### FIELD GEOLOGY

*Field Geology.* By W. Henry Penning, F.G.S., Geologist, H.M. Geological Survey of England and Wales. With a Section on Palæontology, by A. J. Jukes-Browne, B.A. F.G.S., H.M. Geological Survey. (London: Baillière, Tyndall, and Cox, 1876.)

IN the modestly-written preface to this little volume, the author naturally refers to the difficulty which he experienced in determining what subjects ought properly to be treated under the title of "Field Geology." It would have been defensible to have included in such a work as the present useful, if somewhat desultory, suggestions upon almost every branch of geological inquiry, and thus to have expanded the convenient manual into a ponderous treatise; we believe, however, that the author has exercised a very wise discretion in restricting the work within its present limits, and making it of as practical a character as possible; for everything calculated to increase the size, weight, and price of the book must, perforce, have tended to prevent it from occupying that place for which it is primarily designed—the portmanteau of the working geologist.

The Geological Survey of the British Islands, the foundation of which was laid by the labours of De la Beche and Logan nearly half a century ago, and which is now approaching completion, differs in some important respects from most of the official geological surveys of European and American states. While the latter usually aim at little if anything more than defining the boundaries of the areas occupied by each of the geological formations, the former sets before itself a much more lofty ideal—no less in fact than such a delineation of all the lines of outcrop of the strata, with indications of their flexures and dislocations, as will enable any competent person using the maps and sections to realise the actual geological configuration of the rock-masses to a considerable depth below the surface.

Of course the execution of such a design as this must necessarily be very unequal. Not to mention differences of individual ability and scientific culture in the members of the staff of the survey—differences, the consequences of which not even the most perfect organisation or rigid supervision can altogether neutralise—we must remember that the data on which the geological surveyor has to rely in drawing his lines in different areas, are so varied as greatly to affect the value of the results attained. In one sheet of the Geological Survey map, which happens to