and the others, which are not volatile without decomposition, furnish water, furfurol, carbon, etc.

In the molecule of cellulose the various groups are probably united together in consequence of the opening of the ring at an oxygen atom which does not form the furan ring, and in this way the cellulose molecule, forming a vast cyclic network, may bear some analogy to those of the albuminoids, in which the linking agents are nitrogen atoms.

Joseph Black and Belfast.

UNDER the title of "Joseph Black: His Belfast Friends and Family Connections" Mr. Henry Riddell has recently published in the Proceedings of the Belfast Natural History and Philosophical Society (vol. iii., 1919–20, p. 49) an interesting account of Joseph Black's connection with Belfast. As is well known, the famous chemist was born at Bordeaux, where his father, John Black, was a factor and wine merchant, but his ancestors for many generations back were Ulstermen, and he himself received his school education either in the old Latin School in Belfast, endowed by Earl Donegall in 1666, or at the hands of a Mr. Sprott, a schoolmaster of repute in that city. Up to the age of twelve Black was educated by his mother, Margaret Gordon, who is described as a woman of great force of character and many accomplishments. She was the daughter of Robert Gordon, a merchant of Aberdeen, and was married to John Black in 1716, by whom she had issue eight sons and five daughters, Joseph Black, who was born in 1728, being the fourth son.

The Blacks were of Scottish extraction, and were said to be descended from a member of the Clan Lamont who was known as Gillie-dhu on account of his remarkably black hair. Some of his sons, on the invitation of James I., passed over to Ulster, which had been laid waste and depopulated by the wars among the Irish chiefs and their clans. Their descendants, or some of them, settled in Belfast and anglicised their name to Black. One of them, John Black, the great-grandfather of the chemist, fought as a trooper against Cromwell. His son, also John Black, born in 1682, was a burgess of Belfast, and had a family of five sons, all engaged in "merchandysinge" in various parts of the Continent. The various members married into some of the leading Ulster families—the Eccles, Wilsons, Banks, Legges, Clarkes, and others. Jane Eccles, the grandmother of the chemist, was the daughter of John Eccles of Cranmore, who entertained William III. on his way from Carrick to Drogheda. The chemist's eldest brother, John, married Jane Banks, a member of one of the best-known families in Belfast. One of their granddaughters, Maria, became the wife of Lord Downs, and from them sprang two girls, Ann and Charlotte, who married respectively Lord Clonmel and Lord Seaton. Isobel Black, the sister of the chemist, married James Burnett, of Aberdeen; their daughter became the wife of Adam Ferguson, the moral philosopher and colleague, intimate friend, and cousin of Joseph Black. A descendant of one of his other sisters, Katherine, became the wife of Prince Waldeck and Pyrmont.

Two of Joseph's brothers, Samuel and George, returned to Belfast and took a prominent part in the municipal life of the town, holding the office of "Sovereign" (mayor) between them no fewer than seven times between 1772 and 1789.

Joseph Black, after a good grounding in classics and mathematics, left Belfast for Glasgow in his eighteenth year, entering the University, therefore, considerably older than the usual run of matriculants at that period. He came almost immediately under the influence of two remarkable men, Dick, professor of natural philosophy, and Cullen, professor of medicine and lecturer on chemistry. The fact that Black was considerably senior to the majority of his fellow-students may have induced Cullen to offer him the position of lecture-assistant, and it was probably this fortunate circumstance that determined his career.

The great chemist, who died in 1799, was never married, and left no immediate descendants. It is evident from this short statement that he belonged to a family of noteworthy mental peculiarities, many members of which were characterised by remarkable powers and capacity. Joseph Black, so far as is known, is the only one who showed any striking predilection towards scientific pursuits, and there are special circumstances in his case which may serve to explain the direction of his inclinations. If, as the late Sir Francis Galton contended, high reputation is a pretty accurate test of high ability, Joseph Black certainly ennobled his ancestry. But an examination of their individual history seems to show that he is no less a debtor to those who went before him, and that his eminence is in no small degree due to qualities implanted in him by his Ulster upbringing and associations. T. E. THORPE.

The Sakura-jima Eruption of 1914.

PROF. OMORI has recently made two additions to his valuable series of memoirs on the eruption of the Sakura-jima (South Japan) on January 12, 1914. The fourth memoir deals with the continued changes of elevation in the neighbourhood of the volcano, and the fifth with the numerous earthquakes which preceded and followed the eruption (Bull. Imp. Earthq. Inves. Com., vol. viii., 1920, pp. 323–51 and 353–466). Until 1914 the Sakura-jima was an island in the Bay of Kagoshima, the inner bay to the north of it being a basin 12½ miles long from east to west and 7½ miles wide. A comparison of two series of levels made a few years before the eruption and in April and May, 1915, revealed a depression of not less than 20 in. in the northern part of the bay, and of from 1 ft. to 5½ ft. round the coast of the former island, the centre of which was elevated in two places by as much as 30 ft. and 41 ft. In the winter of 1918–19 a new series of levels was made along the west and north coasts of the bay, from which it is seen that the depression of the inner bay gave place to an elevation, the mean rise from February, 1915, to December, 1918, being about 4 in. In 1917 a series of soundings was also made in the bay, and these show that there are three depressions (of maximum depth 85, 113, and 79 fathoms), the first being separated from the others by a submarine ridge running north from the volcano, and apparently due to the eruptions of A.D. 764, 1468–76, and 1779. Comparing the new soundings with those made in 1906, there are seen to be three areas of fresh depression (from 3 to 4 fathoms) coinciding with the three depressions, and two areas of new elevation, the more important one (of 3 fathoms) being near the submarine ridge. Prof. Omori estimates that the total resultant depression of the district amounts to about one-quarter of a cubic mile, and the volume of lava and ashes ejected to slightly more than one-half of a cubic mile, and he suggests that this difference may account for the defect of gravity sometimes observed in the neighbourhood of a volcano.

The records of the Sakura-jima earthquakes at Kagoshima (6½ miles from the volcano), Nagasaki

(92 miles), and Osaka (348 miles) leads to the following conclusions:—(1) The frequent occurrence of earthquakes, both unfelt and strong, terminated at or immediately before the opening of the eruption; (2) the principal centre of the after-shocks coincides roughly with the centre of elevation of the sea-bed to the north of the Sakura-jima, which is 8·9 miles from Kagoshima; (3) the mean duration of the preliminary tremor at this place was 1·94 seconds, corresponding to a focal distance of 8·9 miles, from which it follows that the focal depth was very small; and (4) in the after-shocks the first distinct displacement was usually directed towards or from the source of disturbance, while the mean directions of the maximum vibrations were parallel and perpendicular to the line joining the craterlets on the two flanks of the volcano. C. D.

University and Educational Intelligence.

AN introductory public lecture to a series of seven courses of lectures on the history of science will be given by Sir W. H. Bragg at University College (University of London) on Thursday, October 7, at 5 p.m. The courses arranged are as follows:—The General History and Development of Science, Dr. A. Wolf; The More Important Developments in Physical Science during the Nineteenth Century, Sir W. H. Bragg, Prof. E. J. Garwood, Mr. D. Orson Wood, and others; Egyptian Science, Prof. Flinders Petrie; The History of the Biological and Medical Sciences from Early Times to the Eighteenth Century, Dr. Charles Singer; The History of the Biological Sciences since the Eighteenth Century, Prof. J. P. Hill; Elementary Astronomy, treated Historically, Prof. L. N. G. Filon; and The History of Mathematics up to the Eighteenth Century, Mr. T. L. Wren.

IN the annual report for 1919–20 of the Coventry Public Libraries several points are worthy of notice. Figures are given showing the number of issues which have been made during the past and the previous year. Of the total of 380,170 issues of books in 1919–20, 167,758 were of technical and literary books, while 144,296 were works of fiction. The figures are significant of the use to which the library is put by the inhabitants. As compared with the previous year, the number of issues of technical works has increased by 26,976, while the increase for fiction was only 2087. These figures indicate the revival of study which was to be expected with the return of students to peaceful occupations. In the issues of the home-reading libraries similar figures were observed, the increase in the demand for works on the arts and sciences being 6449. On the other hand, research work, by which is meant the study of the accumulated data of a subject before proceeding with investigations, has declined since the armistice. Only one-twelfth of the 82,245 volumes in stock are classed as fiction. The libraries are intended chiefly for the use of students, and their continued popularity shows that they are appreciated as such.

THE President of the Board of Education has addressed a letter to the Vice-Chancellor of the University of London (Dr. Russell Wells), under date September 24, with reference to the Government offer of a site for the University behind the British Museum, explaining that, with the consent of the vendor (the Duke of Bedford), it is possible for the offer to remain open until the Senate's meeting on October 20, but no longer. Mr. Fisher expresses general approval of the proposed conditions to be attached to acceptance of the offer which were discussed by the Senate in July, save that respecting freedom from debt as regards the new buildings before the old buildings are vacated. He suggests a revision of the wording of this condition, but admits that the Government fully shares the view as to the undesirability of the University and King's College entering upon the occupation of their new buildings under an embarrassing load of debt. Mr. Fisher further explains that the Government offer is not available for any alternative site, since on a review of all the circumstances the Government has come to the definite conclusion "that the site behind the British Museum is the most suitable and the only one which they would feel justified in acquiring for offer to the University." In conclusion, Mr. Fisher expresses his earnest hope that the Senate will decide to accept the offer which the Government has made.

THE educational system of Japan (Bulletin No. 57, 1919, of the United States Bureau of Education) is the result of a fusion of the traditional training in national humanistic studies with that in modern science. Progress is possible on the latter side only. Technical education of an elementary type is given in the vocational schools, to which students who have passed through the elementary schools are admitted. In 1915–16 the number of technical schools attached to such vocational institutes was 9001, an increase of 533 over the preceding year; while that of the private technical schools was 366, an increase of 20. Approximately 95,000 pupils were enrolled in all schools of this kind, exclusive of continuation schools. The technical continuation schools admit students who have passed the standard of the elementary schools, though the individual school authorities have power to admit or refuse any candidate. In the year 1915–16 407,600 male pupils and 89,601 females were enrolled in these schools, an increase of nearly 50,000 over the numbers joining during the previous year. Within the next six years it is proposed to spend some four and a half million pounds on higher education. The technical and high schools already in existence will accommodate 14,000 students only, while during the year 1917–18 about 56,000 applied for admission. This money will therefore be devoted to the building of ten new high schools and eighteen new technical and commercial institutes. Great prominence is given to the rapid but efficient training of teachers of all grades.

Societies and Academies.

PARIS.

Academy of Sciences, August 30.—M. Henri Deslandres in the chair.—G. **Humbert**: An arithmetical link between the real ternary quadratic forms and the indefinite forms of Hermite.—H. **Deslandres**: The recognition in stars of the successive layers of their atmosphere and the periodic variations of these stars. From the study of the calcium lines in the solar spectrum the existence of three layers in the solar atmosphere has been deduced. The same method can be applied to the fixed stars, and an account is given of the results obtained up to the present by various observers.—E. **Ariès**: The specific heat of saturated vapours at low temperatures. Reply to a communication by G. Bruhat.—J. **Andrade**: The regulating organs of chronometers.—E. **Jouguet**: Waves of shock in solid bodies.—M. **Galbrun**: The deformation of a helical spring.—M. **d'Azambuja**: The spectrum of the new star in Cygnus. On August 25 and 28 the spectrum of the new star presented the appearance usual with novæ in the course of the first stage of their evolution.—M. **Burson**: The spectrum of Nova Cygni.