

(probably) into the monoxide, hydrogen being liberated, and when this is once achieved the following sodium ions form metallic sodium at the cathode. The use of two electrolytes with a common cation enables the sodium to be liberated in such a way as to escape oxidation by the fused nitrate. It is obvious that the only substance used up is the nitrate. Fig. 1 gives a general view of the sodium furnaces.

The nitrogen peroxide and oxygen evolved at the anode are conducted by earthenware pipes to a number of Woulff's bottles, connected together and containing water. The arrangement is shown in Fig. 2. The action of NO_2 on water is as follows:— $3\text{NO}_2 + \text{H}_2\text{O} = 2\text{HNO}_3 + \text{NO}$. The NO takes up more oxygen to form NO_2 and more nitric acid is produced. If very strong acid is required, a system of absorbing towers is used.

Sodium is now used on the large scale for making sodium peroxide and sodium cyanide. The peroxide is made by burning

Mr. Darling states that he has devised a new method of preparing cyanides in which he avoids using so much sodium in the metallic state.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—Considerable changes will be introduced into the examination for Mathematical Honours, Moderations, by a scheme which comes into effect in 1904. The main features of this scheme are (1) the legalising of the use of the infinitesimal calculus in answering questions on mechanics; (2) the abolition of restrictions on the freedom of choice of method, analytical or synthetic, in the treatment of geometry; (3) the introduction of the elements of analytical solid geometry.

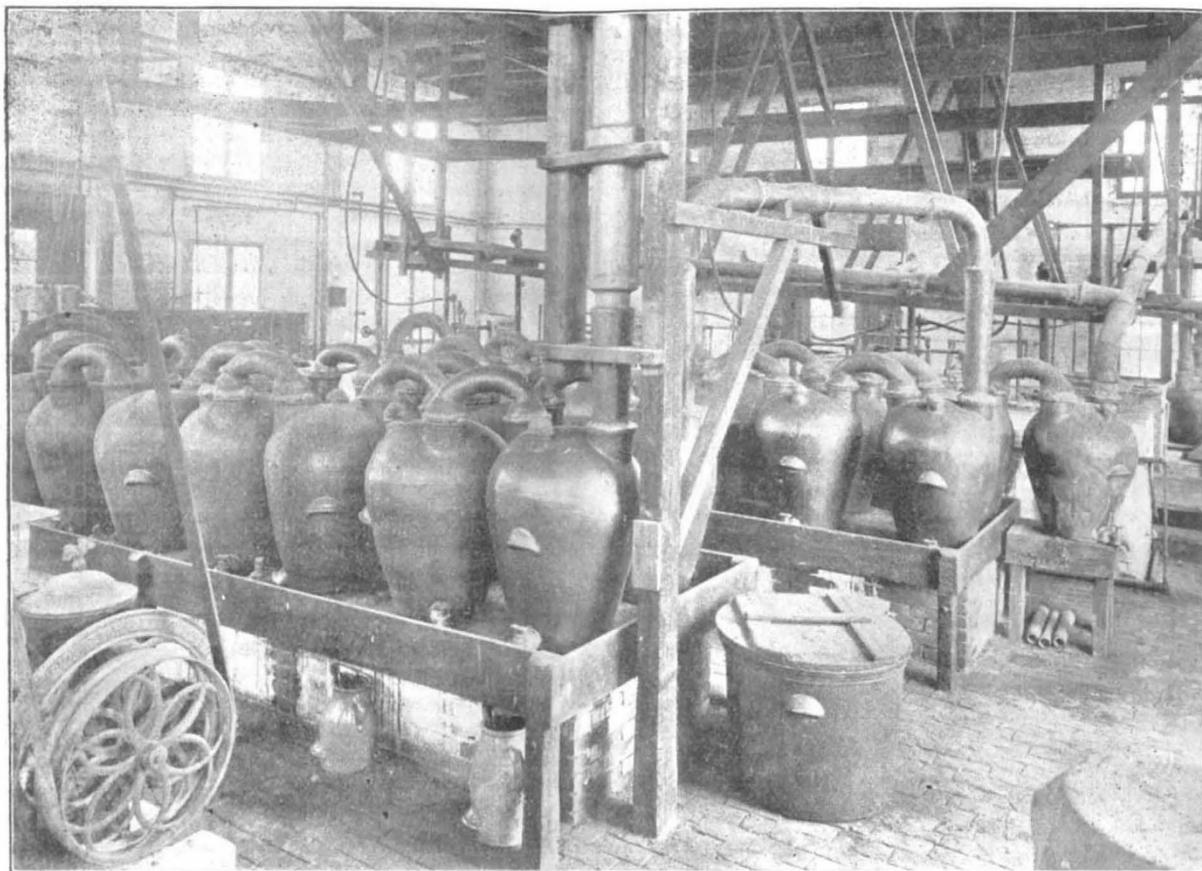


FIG. 2.—Apparatus for converting Nitric Oxide into Nitric Acid.

sodium in an excess of dry air free from CO_2 in an externally heated retort. It is a valuable oxidising and bleaching agent, replacing the most costly hydrogen peroxide.

Sodium is used in making cyanides by Erlenmeyer's process, in which the metal is heated with potassium ferrocyanide, $\text{K}_4\text{FeC}_6\text{N}_6 + 2\text{Na} = 4\text{KCN} + 2\text{NaCN} + \text{Fe}$. Potassium carbonate is usually added so as to make the percentage of CN in the mixture equivalent to that of pure KCN.

Another method of using sodium in the manufacture of cyanides is to make sodamide by heating the metal in ammonia gas, $\text{Na} + \text{NH}_3 = \text{NaNH}_2 + \text{H}$. The sodamide may then be heated with carbon, $\text{NaNH}_2 + \text{C} = \text{NaCN} + \text{H}_2$. or, according to another process, it may be made to first form a cyanamide, $2\text{NaNH}_2 + \text{C} = \text{Na}_2\text{N}_2\text{C} + 2\text{H}_2$. The cyanamide is then treated with more carbon at a higher temperature, $\text{Na}_2\text{N}_2\text{C} + \text{C} = 2\text{NaCN}$.

CAMBRIDGE.—The following are the speeches delivered by the Public Orator, Dr. Sandys, on June 10, in presenting for the degree of Doctor in Science *honoris causa* (1) Sir Harry Hamilton Johnston, G.C.M.G., K.C.B., Special Commissioner for the Uganda Protectorate, and (2) Dr. A. W. Rücker, F.R.S., Principal of the University of London:—

"Semper aliquid novi Africam adferre" etiam inter antiquos dicebatur. In Africa nuper ab hoc viro, ne plura commemorem, camelopardalis speciem novam repertam esse constat. Idem Africae in regione septentrionali, occidentali, orientali, Africa etiam in media, patriae personam summa cum dignitate gessit; Africae montes, flumina, lacus exploravit; exploratos et pingendi et scribendi arte eximia ante oculos nostros posuit. Quid dicam de libris illis, quorum in uno Livingstonii vitam egregie narravit; in alio colonias omnes ab Europae gentibus in Africam deductas luculenter descripsit; in alio denique Afrorum

servitutis imaginem vividam expressit? Talium virorum laboribus indies plura de Africae regione immensa cognovimus, et telluris illius tenebras luce indies maiore illustratas cernimus. Duco ad vos virum a societate zoologica numismate aureo honoris causa donatum, equitem insignem, HARRY HAMILTON JOHNSTON.

Universitatis Londiniensis nuper denuo constitutae praesidem primum ea qua par est observantia salutamus, virum studiis mathematicis olim excultum, Collegii sui inter Oxonienses honoris causa socium; primum in comitatu Eboracensi, deinde inter Londinienses scientiae physicae professorem; Societatis Britannicae scientiarum finibus proferendis nuper praepositum; Regiae denique Societatis inter lumina iamdudum numeratum. Qui insulae Britannicae explorationem magneticam non semel tantum ad finem felicem perduxit, nunc Universitati maximae est praepositus, in qua, animi vi quadam magnetica praeditus, collegarum suorum omnium corda ad se attrahit, et Universitatis totius ad communem fructum Londiniensium liberalitatem allicit. Duco ad vos Universitatis Londiniensis praesidem insignem, ARTHURUM WILLELMUM RÜCKER.

HOLIDAY courses in botany, physics, physiology and zoology will be held at the University of Jena from August 4 to August 16. Particulars and detailed programmes of these and other courses can be obtained from the secretary, Mrs. Dr. Schnetger, 2 Gartenstrasse, Jena.

THE discussion of the Education Bill was resumed in Committee of the House of Commons on Tuesday. An amendment providing that the council of a borough with a population of more than 10,000, or an urban district with a population of more than 20,000, must obtain the consent of the council of the county in order to become the local authority for elementary education was put to the vote and negated. A proposal to omit the whole of the clause which constitutes the county councils local education authorities was also rejected.

AT a meeting of the council of the Institution of Mining and Metallurgy on Tuesday, it was decided to offer scholarships in mining and metallurgy to the following colleges:—The Royal School of Mines, two scholarships of 50% each; King's College (London), 50%; the Camborne School of Mines (Cornwall), 50%; and the Durham College of Science (Newcastle-on-Tyne), 50%. These scholarships will be offered annually for three years. In addition to other work for the advancement of technical education in mining and metallurgy, the Institution has submitted to the Board of Education a comprehensive scheme for affording practical experience in workshops throughout the kingdom to mining and metallurgical students, and it is expected shortly to be put in force.

AT a special meeting of the council of King's College, London, held on Friday last, it was resolved by twenty-two votes to two, "That, in view of the situation created by the University of London Act, 1898, the council, while determined to maintain the connection of the college with the Church of England as set forth in section 5 of King's College, London, Act, 1882, resolves that, so soon as may be, every religious test as a qualification for office, position, or membership in or under the council or college, other than professorships or lectureships in the Faculty of Theology, shall cease to exist, and, further, that all necessary and proper steps be taken to give effect to this resolution." The section referred to in this resolution specifies the following as the purpose of the college:—To give "instruction in the various branches of literature and science and the doctrines and duties of Christianity as the same are inculcated by the Church of England."

A SUCCESSFUL exhibition, designed to show the provision made for science teaching in the secondary and elementary schools of Hampshire and the Isle of Wight, was held at the Hartley College, Southampton, on Saturday last. A well-arranged series of exhibits enabled the visitor to see at a glance the encouragement given by His Majesty's inspectors and others to the construction of simple home-made apparatus to illustrate the principles of physics and chemistry. It was clear from the work of students which was on view that considerable prominence is being given to nature study in these districts; and the collections and drawings of biological subjects of the kind shown should serve to extend and improve the teaching of botany and zoology in schools. The conference of teachers held at the Hartley

College in connection with the exhibition, to discuss methods of teaching science, was largely attended and gave evidence of a widespread desire to introduce observational and experimental methods in all scientific instruction.

SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, May 28.—Prof. Meldola, F.R.S., vice-president, in the chair.—Taxine, the alkaloid of yew, by Dr. Thorpe, C.B., F.R.S., and Mr. G. Stubbs. The authors have confirmed the observations of Hilger and Brande, Marmé and others on the occurrence of an amorphous alkaloid in yew.—The sampling of soils, by Dr. J. W. Leather. Comparative experiments were made in India to determine the possible accuracy of the auger method of sampling soils, the available phosphoric acid and potash being taken as a standard of comparison. The results showed that in most cases the agreement was good between the samples, but that there was occasionally a divergence of about five per cent.—Some excessively saline Indian well waters, by Dr. J. W. Leather. An examination of some well waters collected in the Muttra district, United Provinces, India, showed that they contained from '2 to 2 per cent. of saline substances consisting of sulphate, nitrate, chloride and carbonate of sodium.—Nitrobromo-derivatives of fluorescein, by Dr. Hewitt and Mr. Woodforde. Several of these substances have been isolated and characterised.—Phosphorus sesquisulphide and its behaviour with Mitscherlich's test, by Mr. F. G. Clayton. Analyses of commercial specimens of this substance have been made, and show that they contain from 83 to 97 per cent. of sesquisulphide.—Atomic and molecular heats of fusion, by Mr. P. W. Robertson. The author finds that for a number of the elements and their binary inorganic derivatives a relation between (atomic or molecular) heat of fusion, absolute melting point and atomic volume exists which is capable of a more or less general representation by an equation of the form $Aw/T^3\sqrt{V} = \kappa$.—The preparation of mixed ketones by heating mixed calcium salts of organic acids, by Mr. E. B. Ludlam. An extension of the method proposed by Young in 1891.—Isomeric additive products of methyl, ethyl and propyl benzyl ketones with benzylidene aniline, part iv., by Dr. Francis and Mr. Ludlam.—The influence of solvents on the rotation of optically active compounds, part iii., influence of benzene, toluene, *o*-xylene, *m*-xylene, *p*-xylene and mesitylene on the rotation of ethyl tartrate, by Dr. T. S. Patterson. The above solvents exert in the order named an increasing influence in diminishing the rotation of ethyl tartrate; in the case of the first four solvents this effect reaches a minimum and a maximum at appropriate concentrations.—iv. Influence of naphthalene on the rotation of ethyl tartrate, by Dr. T. S. Patterson. The effect of this hydrocarbon is to increase the observed rotation.

Geological Society, May 28.—Prof. Charles Lapworth, F.R.S., president, in the chair.—The Red Sandstone-Rocks of Peel (Isle of Man), by Prof. W. Boyd Dawkins, F.R.S. The Red Sandstone series, ranging along the coast from Peel to Will's Strand, is faulted into the Ordovician mass of the Isle of Man. It has been referred to the Old Red Sandstone, the Calciferous Sandstone, the basement Carboniferous, and to the Permian. The series consists of red sandstones containing irregular conglomerates and breccias, more or less chemically altered, known in the lake district as "Brockram." Sections at Ballagnane, Creg Malin, and at the Gob and Traie Fogog, are described in detail; the rocks are classified, and their range to the north-east and inland is described. It is pointed out that the rocks are different in many respects from the basement Carboniferous rocks of Langness and elsewhere, and a list of the materials contained in the "Brockrams" is given. The fossiliferous pebbles in the rocks in question are described, and their fossil contents determined. The whole group of fossils is Lower Carboniferous and Ordovician, and centres mainly in the Carboniferous Limestone. A comparison is instituted with the Permian rocks of Barrowmouth, the Vale of Eden and elsewhere.—The Carboniferous, Permian and Triassic rocks under the glacial drift in the north of the Isle of Man, by Prof. W. Boyd Dawkins, F.R.S.—Note on a preliminary examination of the ash that fell on Barbados, after the eruption at St. Vincent (West Indies), by Dr. J. S. Flett, with an analysis of the dust by Dr. William Pollard (see p. 130).