

G, D, A, and E. The D string was plucked by a sharp point, the other strings were bowed. The white line shows the longitudinal motions of that corner of the bridge near which the first or E string passes.

#### VIII.—Conclusion.

With respect to the sympathetic vibrations occurring in stringed instruments, it is obvious that, though some little has been done, much more remains awaiting attack. Thus the violoncello, guitar, and harp might be dealt with, but especially, because of its immense vogue, the pianoforte needs thorough investigation. A start was made some time ago by Mr. G. H. Berry, and further researches are now in progress in London under the joint direction of men of science and piano manufacturers.

In the past music-lovers and men of science alike have been deeply indebted to the makers of musical instruments, who have themselves received but little help from science in return. The lecturer expressed the hope that science might shortly pay off part of its debt to the musical craftsmen of the country, and help to make the British piano second to none in the world.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE Moxon medal of the Royal College of Physicians of London has been awarded to Dr. F. W. Mott. The Weber-Parkes prize is not to be awarded this year.

A VOCATIONAL Training Bill carrying an appropriation of 400,000*l.* has been passed by the U.S. Congress. It provides for a system of training for soldiers in more than three hundred trades.

A COMMITTEE has been appointed to inquire and report as to any improvements which may appear desirable to be made in the conditions of service and in the methods of remuneration of teachers in intermediate schools in Ireland, and in the distribution of the grants made from public funds for intermediate education, and as to the best means in the public interest of effecting such improvements. The members of the Committee are:—The Rt. Hon. T. F. Molony (chairman), the Lord Chief Justice of Ireland, the Rt. Hon. W. J. M. Sturkie, Sir J. Larmor, the Rev. P. Canon Marshall, the Rev. T. Corcoran, the Rev. Brother Hennessy, Prof. J. M. Henry, Prof. R. M. Henry, Mr. J. Thompson, Miss H. M. White, Miss M. Ryan, Mr. W. J. Williams, Mr. C. R. Beavan, Miss A. McHugh, Miss E. Steele, Mr. G. Fletcher, Mr. E. Ensor, and Mr. M. Headlam.

THE governing body of Birkbeck College has appointed Dr. George Senter to the office of principal recently vacated by Dr. George Armitage-Smith, who had filled the position for more than twenty years. Dr. Senter, who is well known for his research and writings in chemistry, is head of the chemistry department of the college. Formerly he held the readership in chemistry at St. Mary's Hospital Medical School and, in addition to important examining and tutorial posts in London University, held a seat on the University Senate. His election comes at an interesting time in the long and eventful history of the college, which, familiar to many thousands as a pioneer in public education, has continuously developed the scope and nature of its activities under Dr. Armitage-Smith, and has been recognised by Royal Commission as the future centre of evening university work in London.

THE report just received of the conference of representatives of provincial museums held at Sheffield on October 16-17, which dealt with the educational value of museums and the formation of war-museums, contains interesting accounts of what is being done in Manchester and other towns to bring the museums into closer relation with the schools, but beyond affording evidence of a desire on the part of museum authorities to depart from their traditionally passive attitude, the discussion shows little sign of any attempt to grapple with the principles upon which successful effort in this direction must be based. Neither circulating collections of museum objects nor organised visits to museums as such solve the educational problem. They often mean nothing better than a more elaborate form of the old-fashioned object-lesson, which is discredited because it commonly touches no vital interest. Reaction against verbalism may easily plunge us into another kind of abstract teaching, which is none the less abstract because it is based on things present to the senses. It is only when contact with an object is revealing, when it illuminates a dark place in our minds or opens up an aspect of the world hitherto unrealised, that it is, rightly speaking, educative. We may use it to give information, of course, but information has in itself slight educational value. From this point of view Mr. Haward's account of his work at the Manchester Art Gallery is the most valuable contribution to the subject. He has in mind a revelation, and, even though the children may not feel the ultimate message he would convey to them, it is precisely the ultimate message which should determine the whole procedure. This is true also of similar work in the museum, and a future conference might well address itself to the problem of this final outcome, for it is in the light of that we may hope to discuss profitably particular proposals and particular practice.

### SOCIETIES AND ACADEMIES.

#### DUBLIN.

**Royal Irish Academy, June 24.**—The Most Rev. J. H. Bernard, D.D., Archbishop of Dublin, president, in the chair.—H. Ryan and W. O'Riordan:  $\alpha$ -,  $\beta$ -, and  $\gamma$ -trinitrotoluenes. An attempt was made to ascertain whether differences in the reactivities of the trinitrotoluenes exist which might explain the instability of trinitrotoluene in some rare cases. The behaviour of the three isomers towards alkalis, alkylloxides, amines, hydrocarbons, and aldehydes was examined. All three isomers yield black, amorphous, explosive bodies when heated with alkalis. The  $\beta$ - and  $\gamma$ -isomers have each one nitro-group replaced by a hydroxyl, giving dinitrocresols. The  $\alpha$ -isomer yields hexanitrodibenzyl. The  $\beta$ - and  $\gamma$ -isomers readily exchange a nitro-group for an amino-group, the  $\beta$ -isomer being apparently the more reactive. The  $\alpha$ -isomer forms additive compounds, without substitution, by interaction with amines. The additive compounds obtained from the  $\gamma$ -isomer and amines readily pass into substitution derivatives. Towards hydrocarbons such as phenanthrene the three isomers behave similarly. While  $\alpha$ -trinitrotoluene interacts readily with aldehydes, forming stilbene derivatives, the latter could not be obtained under similar conditions from the  $\beta$ - and  $\gamma$ -isomers.

#### PARIS

**Academy of Sciences, July 16.**—M. Léon Guignard in the chair.—G. Bigourdan: The observatory of the Hôtel of Taranne: works and co-ordinates. This observatory was founded about 1710 by Louville, who was the first to use a filar micrometer in astronomy,

and measured the variation of the obliquity of the ecliptic. The exact position of the observatory is given.—P. **Termier**: The eruptive rocks interstratified in the Coal Measures of Littry (Calvados): the magnitude, variety, and duration of the volcanic manifestations in the Littry region during the Stephanian period. Two borings for coal have been recently made at Saint-Martin-de-Blagny and at Poterie. Although coal was not found, these borings have given valuable information on the constitution of the coal-bearing layers and on the nature of the volcanic eruptions mixed with the sedimentary deposits.—C. **Richet**, P. **Brodin**, and Fr. **Saint-Girons**: New observations on the effects of intravenous saline transfusions after grave hæmorrhage. A description of experiments on dogs, in continuation of work published in earlier communications.—M. **de Sparre**: The advantages resulting from the use of a contraction at the entrance to reservoirs designed to attenuate hammering in pipes.—E. **Ariès**: The pressures of saturated vapour of octatomic bodies. The formulæ developed in earlier papers is applied to the experimental data on methyl formate, ethyl bromide, ethyl chloride, acetic acid, and ethane. Modifications in the values for the critical pressures and temperatures of ethyl chloride are required to bring the experimental and calculated values into agreement.—E. **Vessiot**: The trigonometrical developments of celestial mechanics.—Ed. **Chauvenet** and Mlle. H. **Gueylard**: The combinations of acid zirconyl sulphate with some alkaline sulphates. The existence of compounds of ammonium and sodium sulphate with acid zirconyl sulphate has been proved by thermochemical and cryoscopic measurements.—P. **Duret**: A new method for the rapid destruction of organic materials. The method is based on the oxidation by ammonium persulphate in sulphuric acid solution. The application of the method to the examination of urine for traces of arsenic is given in detail.—G. **Nicolas**: Anthocyanine and the respiratory gas exchange of leaves. A relation has been proved between the formation of the anthocyanic colouring matter and respiratory oxidation.—F. **Ladreyt**: The functional evolution of certain conjunctive elements.—C. **Cépède**: New means for the prognosis of pulmonary tuberculosis. The method is based on Arneith's figure from hæmatological data.—H. **Vincent** and G. **Stodel**: A preventive and curative serum for gas gangrene. The serum is obtained by injecting into the horse multiple bacterial races, including the principal anaerobic species causing gas gangrene. The protective action of the serum on guinea-pigs has been proved, and application to man has also been successful.

#### BOOKS RECEIVED.

National Reconstruction. By J. I. Robinson. Pp. viii+154. (London: Hurst and Blackett, Ltd.) 2s. 6d. net.

A Monograph of the Pheasants. By W. Beebe. In four volumes. Vol. i. Pp. xlix+198+coloured plates xx+photos 15+maps 5. (London: Witherby and Co.) 12l. 10s.

An Elementary Treatise on Curve Tracing. By Dr. P. Frost. Fourth edition revised by Dr. R. J. T. Bell. Pp. xvi+270. (London: Macmillan and Co., Ltd.) 12s. 6d. net.

Canning and Bottling. By H. Pixell Goodrich. Pp. x+70. (London: Longmans and Co.) 2s. net.

Plant Genetics. By J. M. and M. C. Coulter. Pp. ix+214. (Chicago, Ill.: University of Chicago

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Press; London: Cambridge University Press.) 1.50 dollars net.

The Twin Ideals: An Educated Commonwealth. By Dr. J. W. Barrett. Vol. i. Pp. xxxii+512. Vol. ii. Pp. xx+504. (London: H. K. Lewis and Co., Ltd.) 2 vols., 25s. net.

Treatise on Applied Analytical Chemistry. By Prof. V. Villavecchia and others. Translated by T. H. Pope. Vol. ii. Pp. xv+536. (London: J. and A. Churchill.) 25s. net

Coal and its Scientific Uses. By Prof. W. A. Bone. Pp. xv+491. (London: Longmans and Co.) 21s. net.

Elements of the Electromagnetic Theory of Light. By Dr. L. Silberstein. Pp. vii+48. (London: Longmans and Co.) 3s. 6d. net.

The Stars and How to Identify Them. By E. W. Maunder. Pp. 63. (London: C. H. Kelly.)

Common British Beetles and Spiders and How to Identify Them. By S. N. Sedgwick. Pp. 62. (London: C. H. Kelly.)

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