

quality. Where the tube is filled entirely with sand, the pitch of the note emitted rises as the column diminishes, owing to a proportional decrease of inertia.

In order to see in what way varying the friction between the grains would influence the result, we may fill the tube with magnetic sand and magnetise the column longitudinally. This can be conveniently done by winding a current-carrying wire round the tube. With such an arrangement, the sound produced by the descending column, though feeble at first, is strongly increased on magnetising the grains. Each time the circuit is "made," the sound, almost inaudible before, is plainly heard. In all cases the closeness of the grains, *i.e.* the proportion of normally piled particles, largely determines the pitch of the note. Other factors are the state of the glass surface, the size and roughness of the grains, as well as the rate at which they issue from the nozzle. By suitably adjusting all these conditions, a limited number of notes may be obtained. So far, I have succeeded in producing only five with any degree of certainty, one note being, in fact, obtained by damping the vibrations of the largest tube. The sound is hardly pleasant, but nevertheless I venture to play, if I can, a simple tune upon what may perhaps be called the sand-organ.

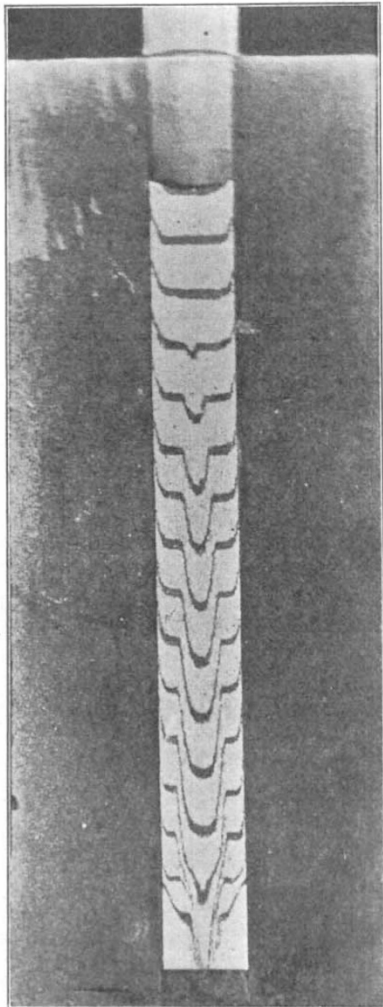


FIG. 11.

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UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

DR. B. C. A. WINDLE, president of Cork University College, has announced that Miss Belle Henan is prepared to place at the disposal of the college at once a sum of 10,000*l.* for the foundation of scholarships to be named the Henan Scholarships.

THE September number of *School Hygiene*, ready on September 1, is a special congress number containing a full descriptive account of the third International Congress on School Hygiene held in Paris on August 2-7. The inaugural speech of the president, Dr. Mathieu, is given in full, as are also the address to the congress by Dr. J. Kerr, chief school medical officer to the London County Council, "The Doctor's Work in the Schools," and by Dr. Chotzen, of Breslau, "Instruction on Sex." Descriptive accounts of the proceedings in the eleven sections, a

notice of the exhibition, a special report of the gymnastic and dancing displays by the English and Continental classes, make up a very complete account of the congress.

THE organisation and coordination of educational effort are, we are glad to know, receiving the attention of the Board of Education. There are in many places several institutions competing with one another in their endeavours to attract large numbers of students in their classes, instead of each institution being assigned a definite place and work in an organic scheme for the educational advancement of the district. In connection with technical education, for instance, we have courses in university colleges, technical institutions, evening and similar schools; and to obtain a clear idea of the number and educational standing of students receiving instruction in pure and applied science in our State-aided institutions is almost impossible. The recent report on university colleges, of which a long abstract appeared in these columns, was a great advance upon any previous report, yet the tables published in it did not show the number of students in the various faculties, so no facts could be obtained from them as to the number of students in the country receiving relatively advanced instruction in scientific or engineering subjects. The volume of statistical information published by the Board of Education shows the number of students in technical schools and classes, but as much of the work thus carried on is of a very elementary character, the numbers give little indication of the actual progress of technical education in its true sense. In the "Regulations for Technical Schools, Schools of Art, and other Forms of Provision of Further Education in England and Wales," just issued by the Board of Education (Cd. 5329), Sir Robert Morant states that the Board hopes to issue, before the end of this year, a body of new regulations which will make more adequate provision for the coordination of continuation schools (day and evening), the grouping of subjects into organised courses, and the coordination of grants to institutions of university rank. At present these institutions receive grants from the Treasury and also from the Board of Education, whereas in an organised educational system one department of State should be sufficient to allocate their grants-in-aid. Separate regulations will be arranged to simplify the present plan; and it is hoped that the requirements which the Board will lay down to be satisfied by the institutions concerned will be such that they can be secured "without interfering with the freedom of universities to work out their curricula in the ways best suited to their individual needs."

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, August 16.—M. Bouchard in the chair.—J. **Guillaume**: Observations of Metcalf's comet, made with the bent equatorial at the Observatory of Lyons. Two sets of observations were taken on August 11. The comet was about of the eleventh magnitude, and appeared to be of a bluish tint. The head was about 30" in size, with a central condensation.—M. **Coggia**: Observations of the comet 1910d (Metcalf, August 9, 1910), made at the Observatory of Marseilles with the Eichens 26-cm. equatorial. Positions of the comet and comparison stars are given for August 11 and 12.—M. **Borrelly**: Observations of Metcalf's comet, 1910d, made at the Observatory of Marseilles with the comet finder. Data given for August 11 and 12. The comet is described as being of the eleventh magnitude, and as having neither nucleus nor tail.—J. **Chatelu**: Observations of Metcalf's comet made at the Observatory of Paris with the 30.5-cm. equatorial. Data given for August 11, 13, and 14. Magnitude about 10.5. The nebulosity surrounding the nucleus appears to measure about 45" of arc.—R. **Bourgeois**: The daily movement of the top of the Eiffel Tower. The motion is due to the unequal heating of the four pillars, and varies between 3 cm. and 17 cm. In spite of the recent floods in Paris, the mean position of the summit has not changed since 1908. The direction of the motion appears to change with the season of the year.—Louis **Wertenstein**: Radio-

active projections. The particles projected from radium B can pass through a thickness of 10 $\mu\mu$ of silver. The free path of the particles in hydrogen is inversely proportional to the pressure, and amounts to 34 mm. at a pressure of 15 mm. and 24 mm. at a pressure of 22 mm. At atmospheric pressure the free path is 0.7 mm.—**William Duane**: The energy of the radium rays. Of the five methods tried to put in evidence the energy of the radium rays, no clear results were obtained with a bolometer, a radiometer, and a thermopile. Positive results were obtained with a differential gas thermometer and a sensitive calorimeter. Details are given of the apparatus employed in the last case. The quantities of heat measured are due to the α rays.—**E. Mathias** and **H. Kamerlingh Onnes**: The rectilinear diameter of oxygen. The system of cryostats employed permitted the determination of the densities of liquid and gaseous oxygen at a series of constant and exactly known temperatures, ranging between -120.4° and -210.4° C. The diameter for oxygen was found to be rectilinear, with a high degree of approximation.—**P. Langevin**: Electric and magnetic double refraction. The hypothesis of molecular orientation completely explains quantitatively both Kerr's phenomenon and the magnetic double refraction of liquids.—**Daniel Berthelot** and **Henry Gauduchon**: The photochemical decomposition of the alcohols, aldehydes, acids, and ketones. The gases produced included carbonic acid, carbon monoxide (in all cases examined), hydrogen, methane, ethane, and butane. No unsaturated hydrocarbons were found.—**Marcel Mirande**: The action of vapours on green plants. The action of the vapour of numerous organic substances upon green leaves was studied. Blackening, with or without the evolution of hydrocyanic acid, was found to be caused by many of the substances tried.—**J. Wolff** and **E. de Stoëcklin**: The peroxydasic characters of oxyhæmoglobin.—**M. Bresson**: The existence of a specific methylglucase in beer yeast.

CAPE TOWN.

Royal Society of South Africa, July 20.—**Mr. S. S. Hough**, F.R.S., president, in the chair.—**Dr. T. Muir**: Factorisable continuants. A short paper with the above title was presented to the society more than six years ago, and appears in the Transactions, vol. xv., pp. 29-33. Attention is now directed to the fact that the fundamental theorem of this paper has by some oversight just been published as a fresh discovery of Prof. Metzler's in the British Association Report (Winnipeg Meeting), p. 390. The identity of the two results is seen on changing the letters n, a, b, c of the earlier paper into $n+1, r, aa, a(b-a)$.—**E. Jacot**: The effect of the electric discharge on water vapour. Experiments leading to results not in agreement with those of M. Henry (*Journal de Physique*, January, 1909, pp. 33-8), viz. that cathode rays are produced in vacuum tubes containing water vapour at pressures higher than is the case in tubes containing air. The electric discharge brings about reduction of the vapour. In tubes containing metallic electrodes, the reduction, if started by the passage of a discharge, will even proceed quite independently of the discharge. In electrodeless tubes, the final steady state of pressure of electrolytic gas depends on the pressure under which the water vapour is initially admitted, and is affected by the presence of coloration on the glass due to chemical action by cathode rays.—**Dr. A. W. Rogers**: Note on "Verneuk Pan." Verneuk Pan is a flat surface cut in shale and partly covered with sandy mud, which forms a thin layer only. It is a striking example, being more than 100 square miles in area, of numerous pans on the Dwyka formation in the north of the colony. It has an outlet over a bar of hard dolerite. The formation of this and other pans which lie in the course of streams was probably due, in the first place, to the extremely low grade reached by streams behind bars of hard rock, then to the unfavourable conditions for plant-growth owing to the increasing brakness of the soil, which is due to the lack of sufficient surface drainage, and the scope thus given to the wind to remove dust and sand from the bare ground.—**Dr. J. R. Sutton**: A further note on the diurnal variation of level at Kimberley. The suggestion is made that the diurnal oscillation of level may be of photo-electric origin. Experiments made to test the idea are so far not very definite. Meteorological results at

Kimberley are not in disagreement with some kind of photo-electric theory. The extreme range of the pendulum from west to east is greatest on clear days, and least on very cloudy days. Also the range of earth temperature is greater or less according as the sky is clear or cloudy. When the barometer is lowest, during the passage of a barometric depression, the diurnal range of the pendulum diminishes to a minimum, and rises to a maximum as the depression passes away. The clouds which form in the depression are responsible for a large part of the variation of level indicated by the range of the pendulum.—**Dr. L. Póringuey**: Recent finds made in rock shelters once occupied by Strand Loopers (a branch of the Hottentot race). The relics imply a simple culture, remains of which were little or not known hitherto. But that culture was not limited to these troglodytes, nor were these aborigines cantoned only in caves. A comparison of the scenes painted on stone implements, such as a quern, and on flat slabs found under a considerable depth of kitchen refuse, showed certain peculiarities to be met with only in paintings occurring in localities far removed from these cave shelters. The figure of a giraffe in an open-air painted scene, not far removed from the shelters, as well as two teeth of crocodile, clearly pointed to wanderings in the interior of the colony on the part of the dwellers.

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