the Schneiderian membrane, and loss of smell. As the process descends, first irritation and then atrophy of the mucous membrane of the pharynx and larynx occur. At this stage the cough induced by the irritating particles becomes "dry" and useless; the entrance of dust into the lungs being thus facilitated, nodules of dust-filled, inflammatory infiltration are formed, which break down and provide a nidus for the tubercle bacillus.

A further argument against the dry-grinding process was brought forward by Dr. Barnes (of Sheffield). He maintained that the great susceptibility of grinders to tuberculosis was due to the fact that the dust amongst which they worked aided in the dissemination of the tubercle bacillus by inducing the rapid drying of the sputum. He pointed out that, whereas now a tuberculous worker spits upon a dusty floor, in the old days he spat into a trough containing water. The speaker, in effect, insisted that "grinder's disease" was pure tuberculosis and not pneumoconiosis, and called upon the contents of the pathological museum to substantiate his contention.

We were surprised to notice that no mention was made of the growing belief that tubercular infection of the lung takes place *viâ* the alimentary canal. Even in the case of the Sheffield grinder this theory would not be antagonistic to the general principles which we know to lie at the root of all systematic infections. It is well known that an infection, no matter how introduced into the system, will always seek out a *locus minoris resistentiae*; in this case it would be a lung weakened by pneumoconiosis. It is now universally recognised that the prognosis in tubercular disease is very largely dependent upon early diagnosis. In a disease such as pneumoconiosis, which so closely resembles tubercle in its clinical signs and symptoms, we were rather surprised that some form of easily applied tuberculin diagnosis—such as Calmette's ophthalmo-reaction—was not mentioned as having been tried, at least to any extent.

The Pathological Museum presented a mass of excessively interesting material, the specimens being, however, for the most part of interest rather to the specialist than to the general public. Among the exhibits having a somewhat wider interest may be mentioned the sections of Egyptian mummy organs shown by Dr. Armand Ruffer. The sections were taken from the mummy of a priest of Amen, and in spite of the fact that the material was at least 2400 years old, the microscopical structure was surprising in its detail and perfection.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

LONDON.—In the faculty of engineering at University College, London, a new lectureship in electrical design has been instituted, and Mr. H. M. Hobart has been appointed thereto. By the assistance of a committee of former engineering students and of other friends of the college, the new laboratories and extensions of the departments of the faculty of engineering, which were opened by the Chancellor, Lord Rosebery, last March, will be further equipped during the present long vacation. The new equipment will include a new boiler in the department of mechanical engineering, a steam turbine, and hydraulic apparatus, and equipment for research in metallography and radio-telegraphy. The facilities for advanced and post-graduate students, as well as for undergraduate students, will thus be considerably increased.

SHEFFIELD.—Dr. Ralph P. Williams has been appointed to the professorship of public health rendered vacant by the resignation of Dr. Harold Scurfield.

By the will of the late Dr. H. J. Hunter, the residue of his property, which will, apparently, amount to between 15,000*l.* and 20,000*l.*, is bequeathed to the University.

AN anonymous gift of half a million kronen (about 20,833*l.*) has been made to the Vienna Academy of Sciences for the establishment of a "Radium Institute" in connection with the new physics laboratories of the University of Vienna.

AN interesting proof of the efficiency of mathematical teaching in Poland in the seventeenth century is afforded by M. H. Merczyng's paper on a mathematical text-book for Polish students under Sigismund III., published in the Bulletin of the Cracow Academy, part x. (1907), recently received. The book in question is a treatise on arithmetic and geometry by Joachim Stegman, who about the year 1630 was principal and professor of mathematics in the gymnasium of Rakow. This school was founded by Polish unitarians, but was attended by pupils of all creeds numbering up to 1000, and existed from 1602 to 1638. The writer of the present notice applies the English expression "up-to-date" to the contents of the book in relation to the times in which it was published. The paper is illustrated by reproductions of the title-page, a drawing of the pantograph, anticipating by three years the previous records of its discovery by Scheiner, and a diagram for the solution of trigonometric problems, as we should say in "modern" examination papers, "by drawing and measurement."

THE report of the departmental committee appointed by the Board of Agriculture and Fisheries to inquire into and report upon agricultural education in England and Wales has been published as a Blue-book (Cd. 4206). The committee of twelve included Lord Reay (chairman) and Profs. T. H. Middleton and William Somerville. All institutions in receipt of grants from the Board of Agriculture were invited to submit evidence, witnesses from numerous institutions not in receipt of such grants were examined, and witnesses also attended from county councils, agricultural and other associations, in addition to those from Government departments at home and in the colonies. The total number of persons attending to give evidence was 113. It is impossible in a note to deal fully with the conclusions and recommendations of the committee, but one result arrived at is that there is no doubt that, by a general adoption of scientific methods, an important development could be effected in every branch of agriculture and in the various rural industries subsidiary to it. It is urged that a complete system of technical agricultural education is the natural corollary to the vast sums spent on elementary education in the rural parts of the country. The committee is of opinion that it will be possible to build up in England and Wales, at no excessive cost and within a reasonable time, a system of scientific and practical agricultural education equal, if not superior, to that now existing in any other country.

THE Lancashire Education Committee maintains a flourishing agricultural department. We have received an illustrated account of the scheme of agricultural education which has been devised for the county and is carried out at the County Council Farm, Hutton, the County Council Agricultural School, Harris Institute, Preston, and in various parts of the county. The county farm consists of 157½ acres, and in connection with it are permanent dairy and poultry schools, with a chemical and bacterial laboratory. Manurial, feeding, and other experiments are conducted at the farm. The object of the agricultural school at Preston is to prepare young men and women for the work of a farmer's life by instructing them in the principles which underlie farming operations, and demonstrating modern and scientific methods of agriculture. A county staff of lecturers in agriculture, horticulture, butter-making, cheese-making, and poultry keeping is, so far as practicable, placed at the disposal of local education committees, agricultural societies, and farmers' or horticultural associations. Numerous farmers' bulletins have been issued, advice is given to farmers with respect to farming operations and agricultural experiments, and analyses of manures, feeding stuffs, soils, waters, and dairy produce are made at low fees for the farmers of the county. In these and other directions the Lancashire Agricultural Department is doing much to encourage and develop scientific agriculture.

THE regulations (Cd. 4187) for technical schools, schools of art, and other forms of provision of education other than elementary in England and Wales for the year 1908–9 have been issued by the Board of Education. There are not many changes, and those introduced are in the direction of greater efficiency and more elasticity. The

limit imposed in previous years to the number of hours of instruction which may be counted for the purposes of grant has been relaxed, a fact which will encourage local education authorities to plan prolonged and well-organised courses of evening instruction and help to remove a reproach that much of the work in evening classes has been scrappy, unrelated to local industries, and not part of a coordinated scheme. Greater encouragement than formerly is being given to vacation courses for teachers, and the sensible advice contained in the prefatory memorandum as to the necessity of securing due recreation for teachers during the progress of the holiday work deserves the careful study of the organisers of such courses. It is now laid down by the Board that there shall in future be a principal, or head teacher, in those institutions where in the past unrelated classes in charge of separate teachers, responsible only to the managers, have been held. The new regulation will, if the right type of head teacher is appointed, lead to a greatly improved state of things. Students will be able to receive much needed advice in planning suitable courses of study to assist them in their industrial pursuits, and the work of succeeding sessions will form part of a complete scheme. The changes as a whole are conceived in a broad spirit, and should assist to develop still further the excellent work which is being done in technical and other schools.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 7.—"A Tantalum Wave-detector, and its Application in Wireless Telegraphy and Telephony." By L. H. **Walter.** Communicated by Prof. J. A. Ewing, C.B., F.R.S.

It has hitherto not been possible to employ a metal in conjunction with mercury as a wave-detector which is spontaneously restored to the sensitive condition, without some artifice which assisted decoherence; much less has it been possible to use a noble metal for this purpose. The only metal that has been found usable is iron, and this latter is, owing to its tendency to rust, manifestly not adapted to stand prolonged use, besides being otherwise not satisfactory.

The author has found that the metal tantalum gives an effect with mercury which greatly exceeds that obtainable with iron, the sound being very loud and of a pure tone. The tantalum, in the form of a fine wire point, dips into a pool of mercury so that the point is only just immersed. An external applied potential difference of about 0·2 to 0·4 volt gives the best results, the tantalum point being connected to the negative terminal.

As now generally constructed, the device comprises a glass containing-vessel into which are sealed two platinum wires. One of these wires dips right into the mercury, and serves to make contact therewith, while the other has its end hammered out into a form of clip which is made to hold the tantalum point.

The level of the mercury is adjusted while the usual telephone receivers are connected to the detector, and this adjustment, when once properly carried out, during the filling process, renders all further adjustment unnecessary. The whole arrangement is hermetically sealed in the glass bulb, which may previously have been exhausted.

The detector has been tried at various wireless telegraph stations, and has shown that for not too weak signals the sound is several times louder than the same signals with the electrolytic detector, it being understood that the most suitable telephones for each type of detector are employed. At a distance of 450 miles from a ship station fitted with a 2-kilowatt plant the signals obtained on the electrolytic and the tantalum detectors were of about equal loudness, although in this case the telephones were not at all suited to the tantalum detector.

The device just described is rather sensitive to shaking, and so a second form of detector is described which, owing to its construction, is quite indifferent to vibration and even to shock. Experiments were afterwards made with numerous other metals, but no other case of an imperfect contact of this nature was observed; the behaviour of tantalum is apparently unique.

From the physical standpoint the chief interest lies in the fact that by a suitable choice of materials it has been possible to revert to the primitive simplicity of a metal point in contact with another metal, and yet all the attributes of a modern detector be retained.

EDINBURGH.

Royal Society, July 7.—Prof. Crum Brown, F.R.S., in the chair.—The craniology of the aborigines of Tasmania: Sir William **Turner,** K.C.B. This race had become extinct in 1877, and of the eighty skulls which were known to be deposited in various museums of this country and the Continent, no less than ten were in Edinburgh. The main features of these dolichocephalic skulls were described in detail, the curious roof-shaped top and the thick orbital ridges specially being noted. A cast of the face which belonged to the University Anatomical Museum was shown. The woolly or frizzled hair which differentiated the Tasmanians from all neighbouring races had been described by several travellers. The question of the affinities of the race was very obscure. All attempts to find relationship with the indigenous races of the Malay Peninsula and islands, with the Polynesian races, or with the inhabitants of Australia or New Zealand, could not bear close inspection. When first discovered by European travellers, there could not have been more than 70,000 Tasmanians in an island almost as large as Ireland. Throughout their isolation there must have been in-breeding for centuries, leading to an accentuation of any peculiarities which might have arisen, and so giving to the race its own peculiarities.—Inversion temperatures and the form of the equation of state: Prof. W. **Peddie.** It was shown that a number of equations of state, all fairly satisfactory otherwise as representative of facts, lead to the conclusion that the inversion temperature of air decreases as the initial pressure rises, which is contrary to Olszewski's experiments. Also the discrepancy cannot be explained as due to difference of initial and final kinetic energies. Some other source of error has probably affected the results. Observations of the critical temperature and its variation with pressure might discriminate among various equations of state.—Magnetic quality in the most open cubic arrangement of molecular magnets: Prof. W. **Peddie.** It was found that such an arrangement, unlike the closest packed arrangement, cannot explain the magnetisation of magnetite, but presents analogies to the magnetic properties exhibited by pyrrhotine.—Energy accelerations and partition of energy: C. W. **Follett.** From this discussion it appears that equipartition is not possible amongst the freedoms in some of the cases.—Combustion analysis: Prof. J. **Walker** and T. **Blackadder.** The paper described certain modifications of Liebig's method, which enabled the experimenter to use a smaller combustion tube and to carry through the operations in much shorter time and with less expenditure of gas.

PARIS.

Academy of Sciences, July 27.—M. Bouquet de la Grye in the chair.—The necessity of making use of the three dimensions in space for the successive directions of the two moving right lines joining the sun and a planet to the earth, for determining in a simple manner the relative variations of magnitudes of these lines: J. **Boussinesq.**—The total sugar of the blood: R. **Lépine** and M. **Boulud.** It has been stated by MM. Hugounenq and Morel that larger amounts of sugar are found after hydrolysis with hydrofluoric acid than with sulphuric or hydrochloric acids, and they regard this as being due to the less destructive action of the hydrofluoric acid. The authors of the present paper confirm this fully, and have applied this reagent to the determination of the virtual sugar in the blood. Details of the technique are given, and it is shown that the amounts of sugar obtained by hydrolysis of the blood clot with hydrofluoric acid are of the same order as those obtained from the serum, the sum of the two representing the total sugar of the blood.—