

closing currents and current-carrying capacities are listed, and twelve different standard circuit and wiring diagrams are shown. The hot-wire vacuum switch is capable, in various sizes, of handling up to 10 kW. at 440 volts, and is suitable for controlling alternating or direct currents up to 30 amp. and voltages from 10 to 600.

J. J. Thomson on "Cathode Rays"

THE text of J. J. Thomson's historic Royal Institution lecture of April 30, 1897, on "Cathode Rays", has been reproduced in full in the November-December issue of the *American Journal of Physics* as the contribution of the American Association of Physics Teachers to the Electron Jubilee celebrations (see also *Nature*, 160, 776; 1947). It will be recalled that it was in this lecture that J. J. Thomson, after discussing Lenard's, Perrin's and some of his own experiments on the charges carried by cathode rays, concluded that "the size of the carriers [of electrical charge] must be small compared with the dimensions of ordinary atoms and molecules". Further, that from his experiments on the deflexion of cathode rays, he was able to deduce a value for m/e which, quoting from the final words of the lecture, was "of the same order as the value 10^{-7} deduced by Zeeman from his experiments on the effect of a magnetic field on the period of the sodium atom"

Italian Polar Research Institute

A NEW polar institute, Istituto Geografico Polare, has been formed in Italy under the directorship of Dr. S. Zavatti. The *Polar Record* for January-July announces that the aims of the institute are: (1) to widen knowledge of all polar areas; (2) to encourage interest in polar affairs in Italy and to publish Italian contributions to polar knowledge; (3) to form a polar library; (4) to publish a monthly periodical, *Il Polo*; and (5) to publish maps of scientific value on polar regions and a series of "Polar Classics". The first number of *Il Polo* came out in February 1946. The address of the new institute is Istituto Geografico Polare, Porto Potenza Picena, Macerata.

Pathogenicity of *Aspergillus nidulans*

THERE are numerous reports in medical literature of infection of man and other animals by species of the fungal genus *Aspergillus*. Pathogenicity of *A. fumigatus* is comparatively well known, and *A. nidulans* has occurred in circumstances which seemed to implicate it as a cause of disease. Dr. Charles H. Drake has studied the latter species in a recent paper (*Mycopathologia*, 4, Fasc. 2, pp. 103; 1948). He finds that the fungus is pathogenic to rabbits, causing initially a purulent inflammation with abscess formation. Subsequent injections may give rise directly to tubercles, in which the fungus changes morphologically to give actinomycetoid granules. Cell-sap of *A. nidulans* is not toxic to rabbits, but stimulates the formation of precipitins. This species does not appear to be pathogenic to guinea pigs, which fact might explain some earlier uncertainty about its disease-producing character.

Land-mine Detectors

FOLLOWING a request, received early in 1940, by the Scientific Advisory Committee of G.H.Q. Middle East for work to be undertaken on the design and construction of land-mine detectors, Dr. Lawrence Balls, then chairman of the Committee, together

with Mr. J. H. Cole, and with the assistance of military personnel, produced, and tried out in actual operations, several successful models. In an article entitled "Land-mine Detectors designed at Giza", which Dr. Balls contributes to the June number of *Reme*, the journal of the Corps of Royal Electrical and Mechanical Engineers, details are given of the construction, performance and characteristic features of these land-mine detectors. They were of various sizes, the large models suitable for road clearance, and the smallest for surgical applications, such as shrapnel detection in wounds. The Mark IV design was first used, but was superseded by an original design due to Dr. Balls, consisting of twin search-coils, thus giving double sensitivity. Coils of about 12-in. diameter were found convenient for ordinary field detectors, and of about $\frac{3}{8}$ -in. for surgical use. Operating on the heterodyne principle, a frequency of one megacycle per second proved most useful, with a frequency ratio of two-thirds to produce the audio-frequency beat-note. Segmented screening, twin oscillators, and a low-loss chassis were the three main characteristics of the 'twin' design. The earthed screen surrounding a search-coil was cut, usually, into twelve segments, each segment being separately connected by a thin wire to a central earth on the chassis. The two identical search-coils, mounted together in the same plane, were inductances of separate oscillatory circuits, driven from a single twin-triode valve. Passage of the coils over a metal object caused the beat-note, somewhat lower than middle C, to be altered downward by one coil and upward by the other, thus causing the headphone note to change suddenly from a progressively lowering growl to a falling high shriek as the object passed from one coil to the other. The weight of a one-man detector is naturally a matter of practical importance, and a prototype, of which two copies were flown to Britain in 1943 but too late to be considered for production, and which was made of wax-boiled wood though designed for production in plastics, weighed only 14½ lb., of which the batteries accounted for more than half.

Mathematical Tables for Science and Industry

THE lack of the relevant mathematical tables for investigations in the physical, chemical and engineering sciences, in mathematics and in industry may well delay progress, and steps are being taken to meet the difficulty. Much work in this field has been done, and tables of a fundamental nature have been produced by the British Association through its Mathematical Tables Committee. These activities have now been transferred to the Royal Society on the invitation of the British Association, and a special Royal Society Mathematical Tables Committee has been established to continue and extend the earlier work. The Committee would be glad to receive suggestions from industrial research groups, from individual investigators and from Service departments relating to existing needs in their special fields. Requests for assistance may be met either by advice as to the most economical way of producing the desired tables, or by an undertaking to produce the tables under the auspices of the Royal Society, or, in exceptional cases, by a grant towards the cost of tabulation or to make possible the publication of important tables which may exist only in manuscript. In the first instance inquiries should be addressed to the Assistant Secretary, Royal Society, Burlington House, London, W.1.