

Modern Metal Cleaning.

THE increasing use of electroplating processes for the protection from corrosion, the reduction of wear, the building up of worn parts, or the actual manufacture of components, coupled with the fact that the production of an adherent metal coating depends on the complete removal of all foreign matter from the basis metal, makes an account of the means whereby this clean surface may be obtained by mass production methods one of considerable importance. A paper on the subject was presented by Messrs. L. Wright and F. Taylor to the Electroplaters and Depositors' Society recently.

Cleaning tanks of steel, iron, or wood, with or without electrical connexions, still remain the most common means of achieving this end, and large volumes of cleaning solution, at a steady temperature, are required if the dirt is not to be redeposited on the work. Such tanks may be heated by gas or by electrical immersion heaters; but a steam coil, placed at that side of the tank opposite the overflow dam, is the best. This causes the solution to boil towards the dam, carrying with it surface scum or oil. The coil should be shielded with perforated sheet metal, and the solution, gushing through the holes, effects adequate agitation. For the general run of cleaning, the solution should be maintained at the boiling point, which has the incidental advantage that as the metal expands the dirt is loosened.

Agitation by compressed air has the disadvantage that it rapidly cools the solution and promotes foaming. In the absence of steam heating, the most convenient method for rapid and efficient cleaning is by an arrangement of paddles.

Electric cleaning, which is rapidly coming into general use, adds a mechanical to the chemical effect. The passage of the direct current through the solution liberates hydrogen in small bubbles at the cathode, forces the particles of dirt away from the metal, and carries them into the bulk of the solution, where they are readily emulsified and suspended. The potential across the tank should be of the order of 6 volts, and the cathode current density 30-40 amp. per sq. ft. Any danger of metals such as tin, lead, or zinc accumulating on the cathode may be eliminated after the cleaning by temporarily making the article the anode; this removes any such adherent film. The accumulation of colloidal hydroxides can be avoided by the occasional use of supplementary steel electrodes, on which the colloidal hydroxides adhere. The electrodes are from time to time removed from the bath and the accumulations scoured off.

Effective rinsing after cleaning, in clean, soft water, is as important as the cleaning itself, as it washes away the dirt which the cleansing solution has loosened and softened. Hard water reacts with the soap films forming a calcium soap, which adheres to the work. The use of two tanks is recommended, the first hot and the second cold; and after rinsing, the article should be chemically clean, as shown by the surface being uniformly wetted.

Meteorology in India.*

THE year 1929-30 was one of exceptional expansion and reorganisation in the Meteorological Department of the Government of India, arising from the formation of new air-routes. To meet the meteorological requirements of such air-routes, and of addi-

* Report on the Administration of the Meteorological Department of the Government of India in 1929-30. Pp. 25 + 4 plates. (Calcutta: Government of India Central Publication Branch, 1930.) 1 rupee; 1s. 9d.

tional contemplated air-routes not yet in operation, as laid down in various international recommendations, it was found necessary to arrange for the preparation, twice daily, of weather charts at regional forecast centres, and to raise the status of most of the third class weather stations to second class status. A new forecast centre in charge of a fully qualified meteorologist had to be opened at Delhi in November 1929 in order to supply weather forecasts to the State Air Mail and other aviators flying on the Jodhpur-Delhi and Delhi-Allahabad air-routes, while the existing forecast centre at Karachi made itself responsible for forecasts for the Karachi-Jodhpur route. Further expansion was necessitated by the imminence of additional air-routes from Delhi to Calcutta and Calcutta to Rangoon, and detailed proposals for meeting this need were submitted to the India Government.

One of the most urgent needs of aviators is knowledge of the winds to be expected at various altitudes, in order that flying may be done with the maximum of wind assistance. This has necessitated an increase of stations equipped for making observations of upper wind by means of pilot balloons, an increase which has reacted upon the organisation of the Upper Air Observatory at Agra, where the plant for producing the hydrogen required for the balloons is situated; an increase both of the plant and of the staff of that observatory has therefore become essential.

All this activity on the side of organisation and equipment has not prevented useful research work from being done. Many subjects have received especial attention, among which may be noted that of the electrical charge of thunder-clouds, which has resulted in observational support being found for Simpson's breaking drop theory. Microseisms caused by earth-tremors due to ocean waves have been studied in relation to the storms on the seas around India, and interesting relationships have been obtained; while the Upper Air Observatory at Agra has made a special study of the 'nor'-westers' that occur in Bengal in spring and early summer, a special expedition being organised in 1929 for this purpose. These brief notes indicate only a few of the activities of a meteorological service that is rapidly pushing its way into the forefront of investigational enterprise.

University and Educational Intelligence.

CAMBRIDGE.—The Natural Sciences Tripos Committee has issued a report to the University and has made the following recommendations, to take effect after the examination to be held in 1933: (1) the examination in mathematics in Part I. of the Natural Sciences Tripos shall be conducted by two special papers instead of by means of the papers set in Part I. of the Mathematical Tripos. The total maximum of marks allotted to mathematics shall be half that assigned to each of the other subjects; (2) all candidates for Part I. of the Tripos shall be required to offer not less than three subjects exclusive of mathematics; (3) the subject mineralogy in Part I. of the Tripos shall be redefined to include both crystallography and petrology. It is also recommended that the written examination in mineralogy consist of two papers: (1) the elements of crystallography, crystal optics, and descriptive mineralogy; (2) (a) crystallography and crystal physics, (b) crystal structure and crystal chemistry, (c) mineralogy and ore deposits, (d) petrology. Two of these sections only are to be taken, with the restriction that (d) shall be taken only by students who offer also the subject of geology. This report will be discussed next term.

In NATURE of Mar. 14, p. 424, it was stated that Dr. J. Wishart had been appointed University lecturer

in statistics. This is incorrect. Dr. Wishart has been appointed to the readership in statistics, to succeed Mr. G. Udny Yule. Mr. Udny Yule, formerly lecturer in statistics, was appointed reader on Jan. 1 last, but he will vacate this post at the end of the present academical year. A lecturer in statistics is to be appointed by the Faculty of Economics.

EDINBURGH.—The Senatus Academicus of the University has resolved to confer the honorary degree of Doctor of Laws, at the graduation ceremonial on July 2, on the following among others: Dr. E. J. Allen, Director of the Marine Biological Laboratory, Plymouth; Sir George Berry, M.P. for the Scottish Universities, formerly lecturer in ophthalmology in the University of Edinburgh; Sir Walter Morley Fletcher, Secretary of the Medical Research Council.

OXFORD.—Congregation has accepted with thanks a gift of £200 from Mrs. Clara Brooks in memory of her son, Clement C. Brooks, formerly on the staff of the Imperial Forestry Institute, who was killed in a bicycle accident. The interest of this sum is to be devoted to the purchase of entomological books and apparatus for the use of the Forestry Department.

APPLICATIONS are invited by the Salters' Institute of Industrial Chemistry for a limited number of fellowships for chemists of post-graduate standing. The fellowships are each of the value of from £250 to £300 and their object is to afford additional and special training, at home or abroad, preparatory to a career in industrial chemistry. The Institute is also offering a limited number of grants-in-aid to young men and women employed in chemical works in or near London, of 17 years of age and upwards, who desire to extend their education for a career in chemical industry. Applications, in each case, should be made by May 1 at latest to the Director of the Institute, Salters' Hall, St. Swithin's Lane, E.C.4.

THE March issue of the *School Science Review* devotes sixty pages to reports of the proceedings of the Science Masters' Association at the Birmingham meeting held early in January (see also NATURE, Jan. 17, p. 111). The presidential address by Sir Charles Grant Robertson, vice-chancellor of the University of Birmingham, pleads the claims of biology to general recognition as an essential constituent in the school science curriculum. The general principles of science cannot be imparted by instruction limited to physics, chemistry, and mathematics, and the omission of biology is stigmatised as a crime against science. Sir Charles invited the Association to ask the Royal Society to appoint a small but representative committee to attack the problem of where, when, and in what system of allocation the teaching of science ought to begin and be carried on alike in the schools and the universities. In a discussion on science education of the boy up to eighteen, Prof. F. W. Burstall, vice-principal of the University, pointed out that in competition with the other sciences, biology inevitably suffers from the handicap that it is generally believed to be not so likely to help a boy to earn a living when he leaves school. A discussion on the subject of 'general science' disclosed a remarkable consensus of opinion in favour of the teaching of some biology to all pupils as an element of 'general' science, and an interesting description was given of a course arranged at Harrow as an introduction to science, occupying five periods weekly during one term. Prof. A. W. Nash, professor of petroleum technology in the University, addressed the Association on the work of the physicist and chemist in the petroleum industry; and the Bishop of Birmingham gave a lecture on "A Finite Universe?" The *Review* gives reports of both addresses.

Birthdays and Research Centres.

Mar. 22, 1868.—Prof. A. FOWLER, F.R.S., Yarrow research professor of the Royal Society and professor of astrophysics in the University of London, Imperial College of Science, South Kensington.

In view of the considerable number of research students, an attempt is made to cover a wide field of spectroscopic research. Continued attention is being given to the spectra of elements at successive stages of ionisation, and to the production and analysis of band spectra. Some progress has also been made towards the establishment of standard wave-lengths in the ultra-violet and Schumann regions of the spectrum. New work contemplated is the investigation of problems involving intensities and contours of spectral lines, and work on hyperfine structure, for which equipment has recently been provided.

At present I am specially occupied with an investigation of the spectra of flames, in the belief that our present knowledge as to the molecular origins of numerous bands will throw considerable light on some of the processes of combustion.

Mar. 22, 1868.—Prof. ROBERT A. MILLIKAN, chairman of the Executive Council of the California Institute of Technology and director of the Norman Bridge Laboratory.

I am still pursuing quite intensively my studies in the field of the cosmic radiations; for they have relations to meteorology not yet fully explored and their values at very high altitudes still have something to teach us about the precise nature of the cosmic atom-building processes. Also, as an adjunct to these studies, I am interested in the problem of the origin of the very heavy elements and, as a possible clue to its solution, am collecting further data, by a new method, on the terrestrial distribution of the radioactive elements. Artificially stimulated radiations of high penetrating power are also a part of the programme.

Mar. 25, 1863.—Dr. SIMON FLEXNER, For. Mem. R.S., director of The Rockefeller Institute for Medical Research.

The constantly growing number of those diseases of man, the lower animals, and plants, shown to be brought about by filterable agents or viruses, emphasises their known significance. Among human beings, a disease of this character is poliomyelitis or infantile paralysis. The modes of infection and of extension of the virus of this disease are questions of outstanding importance. Ever since 1909, when the first serial transmission of the disease to monkeys was accomplished (Flexner and Lewis), these questions have commanded attention. The indications, then secured and since confirmed, are to the effect that the virus is nerve conducted, as it enters and even as it leaves the body of infected human beings and animals via the respiratory mucous membranes.

Not only is this finding of importance in so serious a disease as poliomyelitis, but corresponding questions are of high interest in connexion with virus diseases generally, as is also the question of the precise nature (chemical or otherwise) of the viruses themselves.

Mar. 27, 1855.—Sir J. ALFRED EWING, K.C.B., F.R.S., formerly principal and vice-chancellor, University of Edinburgh; previously director of naval education and professor of mechanism and applied mechanics, University of Cambridge.

I am too old now for individual research. But a long experience of laboratories and of administration