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 though 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 additional 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.

* 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; 1*s*. 9*d*.

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