

## Summaries of Addresses of Presidents of Sections\*

SEASONAL WEATHER CONDITIONS AND  
FORECASTING

**I**N his presidential address to Section A (Mathematical and Physical Sciences), Sir Gilbert Walker discusses the problem of "Seasonal Weather and its Prediction".

The demand for warning of the calamity due to a failure of the rains has in a number of countries been so great that it has produced a supply, often of the most doubtful quality. Modern methods do, from time to time, enable us to foresee a drought with considerable certainty; but appreciation and confidence will not be won unless those methods are discarded which will not bear scrutiny; further, the best methods as yet available yield only approximations, and it is only when their indications of an excess or a deficiency of rain are really emphatic that publication can be justified. Of unreliable methods, that in widest use is based on periodicities to which standard criteria have not been applied; the widespread instinctive faith in weather cycles is probably a survival from the days of astrology and magic.

The most satisfactory index as yet available for the seasonal rainfall of a region depends on success in discovering previous weather conditions, there or elsewhere, which exercise control over it. A search for such relationships over the world is facilitated by finding closely interrelated groups of seasonal conditions of pressure, temperature and rainfall. Such systems prevail in the North Atlantic and North Pacific Oceans; and there is a large system controlling the fluctuations over the Pacific and Indian Oceans, with the rainfall of southern Asia, part of South Africa, Australia and part of South America. A surprising persistence of conditions in this system in the southern winter yields at once rough indications of the character of the summer rainfall in several important southern areas, and these can be improved by a study of the local relationships.

Sir Gilbert then describes the systems of prediction now in use and the degree of success that they have reached. In India, during the past thirty years, the published estimates of future monsoon rainfall have on the average been right twice in three times; and it may be held that

any programme leading to success less than four times in five is too ambitious. However, in Southern Rhodesia similar statistical methods have worked well; out of eight forecasts based on a clear indication seven have been correct. Short accounts are also given of the processes employed in Java, Australia, California, Sweden, Russia and Germany.

Towards the physical explanation of the world-wide oscillations, little progress has been made. The control appears to lie neither in sunspots nor in any short-lived solar emanation; nor in the amount of pack ice in the antarctic; nor in the temperature of the Pacific Ocean. But there is ample scope for inquiry with the view of improving existing methods; and investigations are needed regarding such large unstudied areas as exist in Asia, South America and Central Africa.

## NATURAL COLOURING MATTERS

**P**ROF. R. ROBINSON in his presidential address to Section B (Chemistry) points out that the plant and animal pigments have excited the interest of chemists not only because of the intrinsic importance of these substances, for example, in the physiology of respiration, but also because the property of visible colour, more than any other, facilitates the experimental study of a compound. It happens that the study of colour in Nature has had the most important consequences often in totally unexpected directions.

The example of Baeyer's researches on indigo is well known, and similarly the investigations of Graebe and Liebermann on the molecular structure of the constituents of madder were the forerunners of the modern development of fast vat dyes derived from anthraquinone.

Other fundamental researches on colouring matters have been too numerous to catalogue, but special mention is made of A. G. Perkin's and von Kostanecki's studies of the yellow water-soluble plant colouring matters, of Willstätter's pioneering work on chlorophyll, the blood pigment and the anthocyanins, and of Hans Fischer's wonderful syntheses in the porphyrin group culminating in the artificial preparation of hæmin.

Prof. Robinson also directs attention to the analogies existing between the various classes of

\* The collected presidential addresses delivered at Leicester are being published under the title "The Advancement of Science" (Leicester: B.A. Reception Room; London: Burlington House), price 3s. 6d.