

As an example of the practical aspects of fatigue and its investigation, Dr. P. B. Walker concerns himself with the structural aspects of aircraft fatigue, describing, incidentally, investigations carried out on large, and sometimes very large, specimens. That simultaneous action of corrosion and fatigue may lead to failure under stresses which normally would be borne without danger is well known, and Dr. R. B. Waterhouse discusses the theory and practice of corrosion fatigue, and the effect, sometimes large, of fretting. He concludes that "corrosion and fretting have a far greater influence on the fatigue strength than merely the production of pits in the surface which act as stress raisers", and again our ignorance rather than our knowledge of the phenomena involved appears to predominate.

Finally, Mr. P. H. Frith discusses the effect of temperature on fatigue properties over the range from liquid air temperatures to 870° C. An enormous mass of material has been tabulated, and the engineer-designer concerned with fatigue strength cannot but be grateful for the work involved.

Without pretending to be a comprehensive treatment of the subject, these lectures provide the engineer with a mass of detailed information, much of which is not readily accessible elsewhere in a condensed but easily assimilable form.

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ASTRONOMY AT THE CAPE OF GOOD HOPE

REPORT FOR 1955

THE Report of Her Majesty's Astronomer at the Cape of Good Hope to the Secretary of the Admiralty for 1955* appears under seven headings, and in the first of these, "Buildings and Grounds", reference is made to their fairly good general conditions at the time of the Report. As a result of the extensive programme of works and repairs carried out during the past few years, relatively little maintenance had to be done in 1955. The work of ten instruments—including subsidiary equipment—is described under "Instruments"; the usual programme mentioned in previous Reports has been carried out, although the tower telescope was not used during 1955 owing to its ancient and rather unsteady mounting. This will receive a complete overhaul and the 6-in. lens will be repolished before the instrument is used again for serious work. The mirrors and tube for the 18-in. reflector were received from Messrs. Cox, Hargreaves and Thomson during 1955 and have been mounted on the equatorial stand built by Repsold in 1886 to carry the 7-in. heliometer. The reflector and the 7-in. Merz refractor have been mounted side by side so that the refractor can be used either as a guiding telescope or independently for observing double stars. While the reflector is intended almost exclusively for photoelectric photometry, provision is being made for photography at the Cassegrain focus. Various other alterations have been made, including an almost entirely rebuilt stand, a new electric drive incorporating a Grubb type control and an independent

two-speed electric slow-motion, transference of the main driving wheel from the top to the bottom of the polar axis, arrangements for setting directly in right ascension instead of in hour angle, and alterations to the shutter on the old heliometer dome.

"Observations and Reductions" deals with the usual work with the reversible transit circle, including observations for the "Second Cape Catalogue for 1950.0", begun in 1951. Some consideration has been given to the composition of the next catalogues to be observed with this instrument, and two interlinked programmes seem to be equally urgent. The first of these is the observation of the various groups of standard stars in as fundamental a way as possible; the second is the extension of the resulting fundamental system to a sufficient number of stars to ensure the adequate reduction of photographic observations. Details of the scope of the schemes are given. Among the other usual sub-headings reference may be made to Eros; measurement and reduction of forty-six plates of this minor planet which were taken during the 1954 opposition have been completed. About twelve reference stars per plate were used to reduce the effect of errors in their adopted proper motions, and a very interesting by-product of the investigation was the light it threw on the sizes of these errors. The proper motions from the Cape Astrographic Zone Catalogues, which were obtained by the differential measurement of two sets of photographic plates, are markedly superior, as regards relative accidental errors, to those in the more recent Cape and Yale Zone Catalogues which were obtained by comparing a photographic plate with an earlier meridian place.

Under "Meteorological Observations", reference is made to the Halliwell-Dines anemobiograph, in use since 1924, which had been giving considerable trouble through small leaks in the float. It was finally dismantled and replaced by the South African Meteorological Department with a Dines pressure-tube anemobiograph which was brought into use on August 12. Among other headings are "The Radcliffe Section", "The Time Service", "Publication of Results", "Personnel Establishment" and also "Miscellaneous", in which Dr. R. H. Stoy, H.M. Astronomer at the Cape, pays tribute to the work and enthusiasm of his staff.

ICE-FORMING NUCLEI

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IN an earlier communication¹ we reported on the ice-nucleating ability of a variety of chemical aerosols when introduced into a supercooled cloud formed in a diffusion and a large mixing-cloud chamber. Except in the case of silver iodide and lead iodide, these results were in disagreement with those of other workers in that we found many of the substances reported as highly effective ice-nuclei in the literature (notably silver nitrate, silver sulphate, the iodides of ammonia, potassium, sodium, cobalt, magnesium, manganese and thallium) to be quite inactive. Repeated tests with very pure chemicals in carefully cleaned air suggested that spurious results

* Report of Her Majesty's Astronomer at the Cape of Good Hope to the Secretary of the Admiralty, for the year 1955. Pp. 10. (Royal Observatory, Cape of Good Hope, 1956.)