

of 381 publishers' remainders. The copies are as published, *i.e.* not second-hand, and the reductions in many cases are considerable. Several books of scientific interest are included. The list should be seen by all who are in search of book bargains.

THE Oxford University Press announces "Race Problems in the New Africa," by the Rev. W. C. Willoughby, in which will be discussed the relation of Bantu and British in the parts of Bantu Africa which are under British control. The same house will also publish "A Practical Hausa Grammar, with exercises, vocabularies, and specimen examination papers," by Capt. F. W. Taylor.

MESSRS. A. AND C. BLACK, LTD., have in preparation new editions of vol. 2 of Dr. D. H. Scott's "Studies in Fossil Botany" (Spermophyta) and

vol. 1 (Radiography) of Dr. R. Knox's "Radiography and Radio-therapeutics." In the first-named work the account of the so-called "Seed Ferns" (Pteridosperms) has been completed, rearranged, and for the most part rewritten. A number of families are described more fully than in the previous edition. The systematic position of the Pteridosperms is discussed, and a new view is taken of this question differing widely from that formerly maintained. In the second work the opportunity has been taken to bring the text up-to-date in regard to the progress of radiography, and to include a chapter on the author's recent work on gallstones. The volume also includes some appendices, one consisting of a report of the committee which was appointed to consider the protection of the operator from the effects of over-exposure to X-rays or radium.

Our Astronomical Column.

THE PRESENT CONDITION OF THE GIANT PLANETS.—Some surprise was created at the meeting of the Royal Astronomical Society on April 13 by a paper from Dr. Harold Jeffreys in which he raised doubts about the generally accepted view that these planets are still at a very high temperature. He made an estimate of the amount of heat that would have been radiated by Jupiter in the course of a period of three hundred million years, on the assumption of a high temperature throughout this period, finding that it exceeded the probable initial supply; he drew a further argument from the low densities both of primaries and satellites, in the case of these four planets, concluding that they are built of less dense materials than the inner planets. While there was some agreement with these views at the meeting, there were several expressions of dissent. The very energetic processes that are obviously going on upon Jupiter can scarcely be ascribed to the very feeble solar radiation, which is only one-twenty-seventh of that received by the earth. Moreover, if Jupiter were formed of material of the same density as that forming its satellites, the much greater force of gravitation upon it would produce a higher density through compression, unless counteracted by heat or some similar agency. A further argument was drawn from the spectra of these planets photographed at Flagstaff; these all showed broad absorption bands, implying dense atmospheres.

It will be remembered that recent studies of Jupiter by the bolometer indicated no sensible heating effect; but this was ascribed at the time to a dense absorbing atmosphere rather than to an actually cool interior. In any case, it is always in the interests of truth for any weighty evidence that can be put forward against accepted results to be considered seriously in an impartial frame of mind.

NATURE OF THE SPIRAL NEBULÆ.—Recent discoveries on the rapid rotational motion of the spiral nebulæ, which has been revealed both by spectroscopic determinations of velocity in the line of sight, and by Dr. Van Maanen's discussion of photographs taken at an interval of some years, has shown that these objects are not directly comparable with the Galactic system. Their distance can be roughly estimated by comparing the angular and linear rotational velocities; it is of the order of a few thousands of light-years, which is far too small to permit us to regard the regions of uniform luminosity

as being due to the combined light of millions of stars. Prof. Lindemann read a paper before the Royal Astronomical Society on April 13 in which he put forward the view that they are simply vast collections of cosmical dust, the diameters of the particles being of the order of 10^{-4} cm., that being the size for which light-pressure is most efficient.

In other words, as Prof. Turner expressed it in the discussion which followed, the spirals are regarded as the dustbins of the stellar system, into which all interstellar dust is swept by the light-pressure exerted by the stars. An explanation would thus be afforded of the remarkable freedom from dust of the interstellar spaces, which was brought out by Prof. Harlow Shapley's work on the globular clusters, and by other researches. Prof. Lindemann suggested that the light of the spirals was simply reflected light from the whole stellar system; their spectrum, which seems to be a blend of all the stellar types, is in accord with this view. The case would be analogous to that of the Pleiades nebulæ, which give the same spectra as those of the stars which they surround. Prof. Lindemann showed that on certain assumptions as to the thickness of the spirals, reflected starlight would account for the observed luminosity. The mass of the spirals would still be of the order of thousands of suns, and they might still be regarded as providing the material of future clusters.

VARIABLE WITH A REMARKABLE SPECTRUM.—Dr. Harlow Shapley, in Harvard College Observatory Bulletin No. 783, describes the spectrum and the light variation of the tenth magnitude star H.D. 81137 (R.A. $9^{\text{h}} 18.7^{\text{m}}$, Dec. $-52^{\circ} 8'$) as "both of unprecedented types." The spectrum belongs to the type Ma of the Harvard Classification, and contains five well-marked bright lines or bands coinciding with some of the strongest bright lines in the spectrum of η Carinæ, the origins of which are unknown.

The spectrum of η Carinæ is not classified by the Harvard observers but described simply as "peculiar," but it is probably a hot star. H.D. 81137, as it is classed Ma, is comparatively a cool star, so this is an example of a cool star exhibiting bright lines of a hot star nature. Approximate positions of these lines are λ 4244, 4287, 4352 to 4358, 4414 to 4416, and 4452 to 4457.

The light curve showed a steady rise from 9.8 in 1890 to 9.2 in 1901, and has since steadily dropped, reaching 10.1 in May 1922, so the period of variability is long.