simple. Flavor is given the book by the wide field experience of the author, whose notes on habitats and distribution are especially good. A map gives at a glance the distribution of each species.

Those interested in aquatic plants, after feeling for a long time the need of a good manual, are now handsomely served by two authoritative and useful texts.

IVEY F. LEWIS

REPORTS

THE HARVARD COLLEGE OBSERVATORY[1]

TO THE PRESIDENT OF THE UNIVERSITY:

SIR,—I regret to record a disaster at sea—the loss of the S.S. *Robin Goodfellow* with its crew and its cargo of important materials for war industries. Apparently there had been engine trouble before the ship left port, and possibly a subsequent dropping-out of convoy. A relatively small item in the *Robin Goodfellow's* cargo, but large in the eyes of the Harvard Observatory, was a shipment of astronomical photographs on the way to Cambridge from the Observatory station at Bloemfontein, South Africa. The loss was totally unexpected. The insurance rates on transatlantic shipments had dropped to a very low figure, and our shipping advisers in South Africa and in America had assured us of the relatively high safety of shipments by sea. During the past several years we have made shipments once or twice annually from America to South Africa—shipments of photographic plates and of other materials necessary for the operation of the station; we have had very high insurance costs, but no losses whatsoever. For the past two years we had attempted no return shipments from South Africa. Large quantities of photographic negatives are accumulating in our southern storehouse. Only twice have we had to ration our plate-hungry telescopes for a few weeks or months while awaiting the replenishment of raw materials from England or the United States.

In number of photographic plates our loss by the sinking of the *Robin Goodfellow* is something less than 20 per cent. of a year's work. Notwithstanding the presumably low risk, we did, nevertheless, deliberately avoid shipping home the plates made with the patrol cameras. Photographs made with the Rockefeller reflector or the Bruce refractor can be replaced; but the essence of the patrol plates is their continuous coverage of the sky throughout the year, and time can not be replaced.

In looking over recent Annual Reports from the Observatory, one is struck by the failure to finish off jobs as pledged in the reports. This merely reflects our commendable optimism, when in full pursuit of a scientific project, and also the continually increasing drain by war projects on the personnel of the Observatory staff. The investigators are largely absent, and we do not have computers and other assistants to help carry through the routine researches in the Observatory's programs. For example, the Memorial Volume for Miss Annie J. Cannon, although essentially completed, remains unpublished. The Jewett telescope at Oak Ridge can not yet be put into regular operation. The discussion of the Milton Bureau's variable stars progresses slowly.

Although much delayed, because its authors are deeply involved in war work, the volume in the series of Harvard Books on Astronomy, entitled "Telescopes and Accessories," by Dr. George Z. Dimitroff and Dr. James G. Baker, is completed and within a few weeks of publication. The six earlier volumes in the series have continued to find new readers; four of them have required a second printing. An eighth volume in the series, not heretofore announced, will be entitled "The Relativistic Universe." It will be written by Dr. Phillipp Frank and an associate. The preparation of Dr. Menzel's volume on the Sun and solar problems must be postponed until the end of the war.

A text for courses in navigation was completed during the past year by Dr. Bart J. Bok and Miss Frances W. Wright. The volume, with the title of "Basic Marine Navigation," has been adopted by a large number of colleges and universities for their wartime courses in navigation. One of the important responsibilities of the Department of Astronomy during the past three years has been the giving of heavily attended courses in navigation for both the civilian and navy students in Harvard College.

During the past year, the Wyeth reflector at Oak Ridge has not been used, and there is little likelihood that it will be put into operation again until the return of the observing staff. The same is true of the Jewett reflector, which is of the Schmidt design. It has been tested mechanically and optically, and to the extent that we find it possible, further improvements in the guiding mechanism, the electric drive, and the plate-holder ensemble will be carried on during the coming year. Test photographs by Dr. Bok, with exposures extending up to two hours, demonstrate that the correcting plate, mirror and mounting are all highly satisfactory. The instrument will be able to add importantly to our studies of nebulae, variable stars, Milky Way structure and galaxies when regular

[1] Report of Dr. Harlow Shapley, Director of the Astronomical Observatory of Harvard College, for the year ending September 30, 1944. Cambridge, Mass., 1945.

operations can be resumed. Mr. Ralph Evans, who was formerly operator of some of the telescopes at Oak Ridge, is now involved in other operations; he writes of recent visits to Berlin and other German cities.

The supervision of the observational work at the Oak Ridge station has this year been largely the responsibility of Dr. Bok. The metagalactic surveys with the Metcalf refractor, as well as the systematic patrol of bright stars and bright meteors, and photometric and spectroscopic studies of the Milky Way, have been maintained. The Oak Ridge grounds suffered only slight damage from this year's hurricane. The maintenance of the work at the Climax Station of the Observatory, as at Bloemfontein, has met with personnel difficulties. But both Dr. Paraskevopoulos at the southern station, and Dr. Roberts at the Colorado mountain station, have maintained essentially full operation.

Working with nine photographic telescopes, the Boyden station staff made a new monthly record, 1,218 plates, for July, 1944. Only one night of the month was astronomically useless.

The study of solar phenomenon at Climax continues to yield results of exceptional interest, and we are continually reminded of the advisability of carrying through several developments of equipment and technique in the post-war era, in order that from this nearest of the stars we can enrich our knowledge, both of our own earth and of sunlike stars throughout the Milky Way.

During the past year I have published a revision of the distances of thirty of the globular star clusters and a new estimate of the thickness of the star haze surrounding the galactic system. The Gaposchkins have published, or completed for publication, several papers on interesting variable stars. Each month from the Observatory Dr. Bok issues a mimeographed Astronomical News Letter, which is distributed by the Department of State not only to the embassies and legations abroad for European astronomers, but also to something like a hundred American astronomers who are now away from their observatories and libraries. The material in these Astronomical News Letters comes in part from the astronomical literature of all countries, which we get hold of in one way or another, and in part it is prepared by the astronomers themselves in order to summarize for their colleagues the war-time progress in special astronomical fields. The Harvard Announcement Cards, which carry the "spot news" of astronomy, have been issued in considerable number during the year, notwithstanding the absorption of most American scientists in the war. They have reported Kuiper's discovery of an atmosphere of methane and ammonia on Titan, the large satellite of Saturn; Van Biesbroeck's finding of the star of lowest known candle power; Luyten's finding of a pair of white super-dense dwarf stars; and the discovery of comets by observers in Finland and New Zealand. Harvard's contribution to these discoveries has been only in the providing of some photographic material for others to examine, in the checking of the existence or the motion of some of the comets, and in the routine distribution of the astronomical information.

HARLOW SHAPLEY, *Director*

SPECIAL ARTICLES

THE RHESUS GENE AND THE EFFECT OF CONSANGUINITY

IT is well known that consanguinity increases the proportion of homozygotes. Consequently, individuals homozygous for a recessive gene are found to have a higher proportion of parents who are closely related to each other than the average proportion of close consanguinity for the whole population. Since in general only genes with unfavorable effects stand out sufficiently to become objects of single factor analysis, it has been said, correctly, that marriages between near relatives tend to be unfavorable to the offspring. While such a statement is generally modified by the remark that recessive genes with favorable effects should also be more frequently homozygous in the children from consanguineous unions, no case of such a nature has actually been observed.

There is, however, a human disease of peculiar genetic causation which should be less frequent in offspring from consanguineous marriages. This is caused by the so-called Rh gene. When a mother homozygous for the recessive gene r[1] is pregnant with a child of the heterozygous genotype Rr, it happens in a certain proportion of cases that an antibody originates or already exists in the mother's blood against the R-antigen in the blood of the fetus and that diffusion of the antibody into the circulation of the fetus causes erythroblastosis foetalis, a hemolytic condition often fatal. The genetic prerequisites for the parents of the affected child are that the mother be rr and the father either RR or Rr. Thus, the parents must be of different constitution. Since the

[1] Following R. R. Race, G. L. Taylor, F. W. Ikin and A. M. Prior, *Annals of Eugenics*, 12: 206–215, 1944, the symbols R and r will be used instead of Rh and rh. Furthermore, in the following discussion, all alleles which give a positive reaction with one or more R antisera will be jointly labelled R, in contrast to the allele r which does not cause a positive reaction with any R antiserum.