On my classification we shall be able to study the peculiarities and differences of the two systems; and a valuable test is in this way provided.

These considerations are certainly fundamental enough, and there are others.

The similarity of the third curve to the first and second justifies the return to some considerations which I referred to in the fourth Bulletin regarding the kinks in the curves. The descending arm of the curve is much more continuous than the ascending one; the greatest change from the more vertical to the flatter shape of the ascending arm occurs at the Aldebarian and Crucian stages—that is to say, the greatest number of stars at nearly the same temperature occurs in those two regions. It is suggested that this is due to the fact that the stars involved reach their highest temperature in these regions, so that we may assume that not all stars first visible as Antarian reach the highest temperature, but one set may reach it near the Aldebarian stage, and another at the Crucian stage, or rather *between* the Crucian and Alnitamian stages, only a very small number of stars reaching the Argonian stage. It is very remarkable what a small percentage of stars reach the Argonian stage. It is fair to assume that the power of reaching these various stages of temperature must depend on the initial equipment of the swarm, and from this point of view a close inquiry into the mass and density conditions may be expected to help matters.

In all that has gone before I have dealt with a rise followed by a fall of temperature. I am bound to say that for years after I put this view forward as the only one acceptable on the meteoritic hypothesis it was generally scouted. This would not have mattered so much had the Harvard classification, with its thousands upon thousands of stars, not taken the other view of a continued fall of temperature, as demanded by the views formulated by Kant and Laplace.

There have been many signs lately that the opposition to my views is weakening; but the more they are accepted, the more is it necessary that a large number of stars should be added to those I have classified. We want tens of thousands of stars in homogeneous groups in order that inquiries may be prosecuted with advantage.

I showed in Fig. 1 of the fourth Bulletin that the letters A, B, F, K of the Harvard classification occurred in the spectra of stars located on both sides of my temperature curve, and although differences were indicated by sub-numbers, it is a common practice to use the descriptive letters alone, and it is difficult, therefore, to ensure homogeneity.

One of the great desiderata of the moment, therefore, is to inquire whether something cannot be done to render the stupendous and long-continued work of classification carried out at Harvard available under conditions which would ensure the complete homogeneity of the stars classed together. In order to study this question I have prepared tables which show the Harvard classification of the stars included in the Hill Observatory catalogues of 354 and 287 stars (PLATE 1). I chose these catalogues because the classification was carried on by the same three observers and with the same instrument, and the classification by each observer was carefully checked by the others. The dispersion employed between K and H_δ, 927 Ångström units, is equal to 28 mm.

My hope was that the same sub-numbers of the Harvard classification would not be found on both sides of the temperature curve.

In the comparisons I have previously made of the Harvard classification and my own I have indicated the Harvard classification of the stars chosen as the type star in each of my groups, but it will be seen from the present comparison that the Harvard classification, in consequence of the much greater detail which it attempts to secure, does not justify us, as I hoped it would, in giving a distinction between the letters and their accompanying numerals used on both sides of the curve.

But this difficulty is not common to all parts of the curve. Near the top, at the Crucian and Achernian stages, the greatest number of stars in which, on both sides, are classified B3, it is not of the highest importance to draw the distinction. In the case of the Sirian and Cygnian stars, where it is imperative that a complete separation should be chosen, the majority of stars in both are classified in A, with the exception of two classified as F, which probably may be due to misprints. But when we come to the difference between the Polarian and Procyonian and the Aldebarian and Arcturian, it will be seen that the attempt is hopeless. Twenty-two Aldebarian stars are classified as K, and forty-two Arcturian stars also classified as K.

NORMAN LOCKYER.

Hill Observatory,
August 21, 1919.

THE SUPPLY OF DRUGS DURING THE WAR.

WHEN war broke out, the National Health Insurance Commission was charged by the Government with the duty of safeguarding the position of this country with regard to the supply of drugs, and the Commissioners have just issued a memorandum [1] describing the work done in this connection. The work fell mainly into two categories, viz. (1) conservation of existing supplies by such means as restriction of exports and the most economical use of the materials available, and (2) encouragement of home production of fine chemicals used in medicine. The second is, of course, much the more interesting, and some of the results of this work were illustrated in the exhibits shown by various fine chemical manufactureres at the recent British Scientific Products Exhibition. Certain manufacturers took up on their own initiative the pro-

[1] Memorandum on the Special Measures Taken by the National Health Insurance Commission (England) in Relation to the Supply of Drugs and her Medical Stores during the War. Cd. 183. (1919.)

duction of such drugs as salvarsan, aspirin, and salicylic acid, and in these cases the Commission assisted by securing the release of controlled raw materials.

The report alludes to the help rendered by the Royal Society, under whose auspices the manufacture of a number of drugs was undertaken in about forty university and other laboratories. It is satisfactory to learn that the knowledge so acquired of the best methods of manufacture has not been wasted, but has been placed at the disposal of manufacturers. As a result the Commissioners are able to report that some sixteen medicinal chemicals, in which Germany had a virtual monopoly before the war, are now being made in this country, in some cases on a scale large enough to provide a margin for export.

On the whole, though difficulties arose from time to time, the needs of the Army and the nation appear to have been met adequately so far as all essential drugs are concerned.

In view of this it seems clear that of the hundreds of synthetic drugs which used to be imported from Germany before the war many were unnecessary additions to our therapeutical resources. It is, in fact, an interesting exercise to look through such a publication as Arend's "Arznei-Mittel," or one of the "Guides" and "Mentors" to therapeutics, which used to be distributed by the German drug manufacturers, and see how many of the products, each with its carefully plausible name duly registered, have passed out of use and almost out of memory.

The Commissioners point out that the manufacture of fine chemicals developed in this country during the war will need to be watched carefully, suitable encouragement being given, where necessary, and means provided for keeping manufacturers in touch with scientific workers. These functions they consider might well form part of the duties of the Ministry of Health.

While it is important that the manufacture of synthetic drugs should be assisted in every possible way, it is no less important that the old-established British fine chemical industry in the manufacture of alkaloids should not be neglected. In this connection it should not be forgotten that the supply of some of the raw materials, such as cinchona bark and opium, required by this branch of the industry is now in urgent need of attention from an Imperial point of view.

ERNST HAECKEL.

AFTER a prolonged illness Prof. Haeckel died at his house in Jena on August 8 at the age of eighty-five. His signature of the infamous manifesto issued by ninety-three German professors in 1914, his recent bitterness towards Britain, and his acquiescence in Germany's crimes need not blind us to what is lasting in the work he did, to features of greatness in his character, and to the irresistible charm of his personality. He was a champion of evolutionism from the publication of the "Origin of Species" onwards, in days when the doctrine was unpopular and upholding it meant obloquy; he broke new zoological ground in many directions, and he was the teacher of many illustrious naturalists.

Ernst Heinrich Haeckel was born at Potsdam on February 16, 1834, and went to school at Merseburg; he studied medicine at Würzburg, Berlin, and Vienna; he was much influenced by the writings of Schleiden, one of the founders of the cell theory; by Johannes Müller and Virchow among his teachers; and by his friend and fellow-worker, Gegenbaur. After a short period of medical practice he became lecturer in the University of Jena and full professor of zoology in 1865. In spite of repeated and tempting offers, he remained in this position until his retirement from active duties a few years ago. He found opportunity, however, for many journeys, from an early pilgrimage to Down in 1866 to later explorations in Ceylon and further east. He wrote three interesting volumes of travel, and indulged his love of sketching in a large series of landscapes. In his early youth he had dreams of becoming a painter, and his artistic skill is familiar to those who know his monographs on Radiolarians, Sponges, Siphonophora, and Jellyfishes. Indeed, his facility became almost a snare, for he was sometimes guilty, they say, of improving upon Nature and allowing art to mingle with his science. The symmetry which is exhibited in his well-known genealogical trees, which are often referred to contemptuously, as if it was not a legitimate zoological ambition to discover and describe relationships, was an expression of the same artistic sense, which the rugged facts of Nature do not often gratify.

Haeckel was a popular teacher, and students from many parts came to listen to his lectures and to work in his laboratory. He lectured rapidly and picturesquely, with infectious enthusiasm, and the beautiful diagrams and blackboard drawings added to the vividness of the impression. While he was always very busy with work of his own, especially perhaps during the *Challenger* period, he took a keen interest in those students who showed anything of his own temper, helping those who helped themselves. At his best he was a very handsome man, with overflowing kindliness, with no end of energy, with a passionate love of the beautiful whether in the microscopic Protists or in mountain scenery. His bible was Goethe.

In addition to his technical systematic work and his championing of Darwinism and freedom of thought and speech, what services did Haeckel render? By his vivid style he made biology popular and diffused concepts of development and evolution throughout the world, for the sale of books like "The Natural History of Creation" was colossal. His "Generelle Morphologie" (1866), as a generalising survey, occupies a place beside Spencer's "Principles of Biology," and, like it, is held in considerable esteem by the few who have read it. He led the way in applying evolution ideas to zoology in general, as in his