

cultivate a single food plant anywhere over their vast area; but it is nearly paralleled by North America (north of Central America), where not a single indigenous plant was cultivated except perhaps the sunflower (maize was from Central America). Central and South America could show maize, manioc, tomatoes, potatoes, beans, cacao, tobacco, yams, etc. Africa was the home of the durra and probably of coffee, though the latter seems to have been cultivated first in Arabia. Cereals were the staples of western Europe and Asia from the earliest times, as rice was of eastern Asia. The influence which the culture of these articles of food exercised on the daily life and thoughts of early tribes was profound, as is witnessed by their mythology and laws.

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ASTROPHYSICAL NOTES.

IN *Circular No. 19* of the Harvard College Observatory Professor E. C. Pickering announces the results of the examination of the spectra of stars in the large Magellanic cloud on plates taken with the Bruce photographic telescope at the Arequipa station. Six stars in this region, in Right Ascension about 5h. 30m. and South Declination about 69°, are found to have spectra of the fifth type ('Wolf-Rayet' type; Vogel's IIb), consisting largely of bright lines. The position of these stars is unusual, as they lie over thirty degrees from the Milky Way, while all the stars of this class previously discovered, sixty-seven in number, have the remarkable peculiarity of being situated very near the central line of the Milky Way, their galactic latitude on the average being less than 3°.

In the same region seven stars were found whose spectra are of the first type, but with bright hydrogen lines. The number of known stars with this variety of spectrum has been greatly increased in the

past few years in the progress of the Henry Draper memorial.

Circular No. 21 states that the bright hydrogen line $H\beta$, discovered in the spectrum of the southern star No. 9181 of the Argentine General Catalogue in 1895, appears to be variable in that star. It was bright in October, 1897, but invisible on December 27th. Announcement is also made that Mrs. Fleming finds, on examination of Draper memorial plates, that β Lupi is a spectroscopic binary, with a period not yet determined. The approximate relative velocities of the recently discovered spectroscopic binaries μ^1 Scorpii and A. G. C., No. 10,534, are given as 460 and 610 kilometers per second, respectively.

Circulars Nos. 22, 23, 24 and 25 refer chiefly to matters of visual and photographic photometry. From a comparison of the constancy of the comparison stars used in determining the variations of over sixty variables found by Professor Bailey in the cluster Messier 5, it appears that any errors due to irregularity in the sensitiveness of the film on a plate are too small to be detected with certainty. The average deviation of five comparison stars on 35 plates, involving over four thousand estimates of brightness, was but 0.02 magnitude, which includes the errors of observation and those from neglecting hundredths of a magnitude in the individual estimates.

By the addition of a second double-image prism to the polarizing photometer long in use at Harvard, so as to produce coincidence of the emergent pencils from the two stars compared, the previously high accuracy of the observations has been increased. Eight measures, by Mr. O. C. Wendell, of the difference in brightness of two stars on a recent evening gave the singular and unusual degree of accordance of all the measures within 0.01 magnitude.

From a series of measures, by Wendell, of the brightness of the short period variable,

U Pegasi, Pickering concludes that the star exhibits a principal and secondary minimum, at magnitudes 9.90 and 9.75 respectively, in a period of nine hours. Chandler, however (*Astronomical Journal*, XVIII., p. 140), regards this difference between the minima too slight to be conclusive, and derives from his own observations (with the omission of his first estimates by which he discovered the star's variability) a simple, symmetrical light curve, with a period of four and one-half hours.

The number of variables in star clusters discovered by Bailey on the Harvard plates has been increased by his further study of them, so that now the clusters ω Centauri, Messier 3, Messier 5 and N. G. C. 7078 have been found to contain, respectively, 122, 132, 85 and 51 variable stars, or 390 in all.

E. B. F.

NOTES ON INORGANIC CHEMISTRY.

SOME weeks since attention was called in these notes to the formation of ammonium peroxid, or rather a compound of ammonium peroxid and hydrogen peroxid, by P. Melikoff and L. Pissarjewsky at the University of Odessa. To this compound, which is formed by the action of ethereal solution of ammonia upon a similar solution of hydrogen peroxid, the formula $(\text{NH}_4)_2\text{O}_2, 2\text{H}_2\text{O}_2, 10\text{H}_2\text{O}$ was given. An article in the last *Berichte* gives further particulars of the compound and assigns the formula $(\text{NH}_4)_2\text{O}_2, \text{H}_2\text{O}_2, \text{H}_2\text{O}$. The water is considered as water of crystallization, and is apparently not constant, as in one specimen the water present corresponded to $(\text{NH}_4)_2\text{O}_2, \text{H}_2\text{O}_2, \frac{1}{2}\text{H}_2\text{O}$. It is possible, however, to consider the substance as $\text{NH}_4\text{O}_2\text{H}$, the peroxid of ammonium hydroxid. From the relative stability of ozone and hydrogen peroxid it is not improbable that their constitutional formulæ should be written $\text{O}=\text{O}^{\text{iv}}=\text{O}$ and $\begin{smallmatrix} \text{H} \\ \text{H} \end{smallmatrix} > \text{O}^{\text{iv}}=\text{O}$, one atom of

oxygen being considered quadrivalent. If this be the case, the formula of ammonium peroxid might be $\begin{smallmatrix} \text{NH}_4 \\ \text{H} \end{smallmatrix} > \text{O}^{\text{iv}}=\text{O}$.

IN the same *Berichte* account is given of some new compounds in which a part of the oxygen in sulfates and phosphates is replaced by fluorin. Types of these compounds are $\text{HK}_3\text{S}_2\text{O}_7\text{F}$, H_2O and HRbPO_3F , H_2O . These interesting substances are fairly stable and are closely related to the fluoriodates, not long since discovered by Professor Weinland, to whom we are also indebted for these fluosulfates and fluorphosphates.

At the last meeting of the Chemical Society (London) a paper was read by W. A. Shenstone and Beck, on the influence of the silent discharge of electricity on atmospheric air. At first there is a large contraction and this is followed by a re-expansion to nearly the original volume, and a trace of nitrogen peroxid is present.

The explanation offered is that at first the oxygen in the air is condensed to ozone. In air it appears that owing to dilution with an inert gas, nitrogen, from 80 % to 90 % of the oxygen can be converted into ozone. This causes the first contraction. When the oxygen is almost completely changed into ozone some small amount of nitrogen dioxid is formed. This at once attacks the ozone molecule and breaks it down under the influence of the silent discharge, and the gas returns to its original volume. As confirmatory of this theory is the fact that not a trace of ozone can be made in the presence of nitrogen peroxid.

J. L. H.

SCIENTIFIC NOTES AND NEWS.

THE ALLEGHENY OBSERVATORY.

PROFESSOR JAMES E. KEELER has written a letter to the Chairman of the Observatory Committee stating that he is prepared to decline the call to the Directorship of the Lick Obser-