of twenty-two and a half degrees and lettered. This quadrant as a whole was excavated to an average depth of six feet its periphery to an average depth of eight to nine feet, and a shaft was sunk to a depth of twelve feet on the north edge.

The writer was accompanied and aided by Dr. George E. Condra, Edwin Davis, Paul Butler, and as time would permit by Mr. Gilder. Systematic work was continued for three consecutive days. Fragments of human bones, scattered and unrelated, were found throughout the quadrant at all levels even to the depth of eleven and one half feet.

It was plainly demonstrated that the part without the circle of the mound was quite as rich in bone fragments as that within. The relation of the two sets of bones may be viewed as purely accidental. In but a single instance were several bones found together. Three ribs, fragments of limb bones, and an astragalas were in proximity. Probably two hundred fragments were exhumed on this occasion. It should be noted that no whole bones were found excepting a few phalanges. Instead they are bone-chips and splinters, with an occasional section from a limb bone, and many of the fragments are pitted or etched. Out of this set the following fragments seem of especial interest: half of a jaw with a solitary molar, the condyle, angle, and region of the symphysis being weathered off, fragmentary rami of two other unrelated jaws, the bony palate with the two back molars in place. By far the most interesting and instructive specimen found at this time was a skull completely disarticulate, broken, and scattered over a space five by five feet.

This was taken out in blocks, and no attempt will be made to remove the bits from their original position, the intention being to keep everything in such condition as to facilitate the detection of inaccuracies and errors.

Age of the Supposed Loess Man.—The present paper concerns itself simply with the announcement of human remains found in undisturbed loess. The chief point is the evidence that human remains have been found in the loess, and whether this is the very oldest or newest loess seems a secondary consideration. The loess here is not leached of lime salts, but is actively effervescent at all levels, arguing for recency of deposition. All recognize the chronological diversity in the loess formation, and whether Long's hill is in the main loess body, as we believe it to be, or in a much more recent one does not materially affect the relation of the bones to some stage of glaciation, the precise glacial or interglacial age being as yet undetermined.

The loess in question rests on Kansan drift, and though as young as the later Wisconsin sheet or younger, it is nevertheless old.

Erwin Hinckley Barbour
The University of Nebraska,
December 14, 1906

ASTRONOMICAL NOTES

The United States Naval Observatory

The Naval Observatory is showing an activity in astronomical work and publication, which ought to go far toward creating a more favorable opinion of that institution than has sometimes prevailed in the past. Several volumes have recently appeared, containing observations of the sun, moon, planets and miscellaneous stars from 1900 to 1903, of the sun, moon, planets and comets from 1866 to 1891, and of standard stars and zodiacal stars from 1900 to 1902; also, reduction tables for transit circle observations and meteorological observations.

Several hundred pages and a large number of plates are also devoted to an elaborate study of the total solar eclipses of May 28, 1900, and May 17, 1901. The leading members of the astronomical department of the observatory are: Professors Skinner, Eichelberger and Littell and Assistant Astronomers Hill, Rice and Hammond, under the superintendency of Rear-Admiral Asa Walker, U.S.N. A large number of astronomers from other institutions assisted in the work of the eclipse expeditions.

The Solar Observatory of the Carnegie Institution

The solar observatory on Mount Wilson continues to surprise the astronomical public with its developments. A five- or six-foot mirror has perhaps appeared to most astronomers to mark the limit to practical construc-

tion, and to usefulness in most lines of astronomical work. Professor Hale, however, comes forward with the announcement that he is prepared, through the generosity of Mr. John D. Hooker, of Los Angeles, to undertake the construction of a reflecting telescope having an aperture of eight feet and four inches. Such an undertaking is of necessity somewhat in the nature of an experiment, but no one is better able to overcome the technical difficulties involved than Professor Ritchey, Mr. Hale's able assistant.

Meanwhile researches of importance are being pushed with the present equipment. Recent observations of sun-spots, taken in connection with spectroscopic studies carried on in the new laboratory, show that the differences between the spectra of the photosphere and of sun-spots are due to differences in temperature. It has also been shown that certain stars, as Arcturus, have typical sun-spot spectra, and are thus at a lower temperature than our sun.

POSITIONS OF STARS IN THE GREAT CLUSTER IN HERCULES. LUDENDORFF

THE positions of 833 stars in the great cluster in Hercules were determined photographically by Dr. Scheiner, of Potsdam, in 1892. After thirteen years, Dr. Ludendorff, of the same observatory, has independently determined the positions of 1,136 stars in the same cluster. Of course, the largest part of the stars measured by Scheiner were remeasured by Ludendorff. Both observers determined the brightness as well as the positions of the stars. The accordance between the results obtained by these two observers is in general extremely good. Ludendorff measured the stars on two plates, and from a comparison of the two determinations an idea can be formed of the precision which was attained. Grouped according to distance from the center in R.A., the differences range from $-0.15''$ to $-0.22''$. As might be expected, the mean differences increase systematically toward the center of the cluster, where the measurements are most difficult. Among 1,588 differences only 22, or 1 in 72, amount to more than $1''$. The probable error of a catalogue position in R.A. is given as $0.179''$, and in declination $0.180''$. These values are somewhat smaller than the corresponding values in the work of Scheiner. Small systematic differences appear, however, between the two determinations by Ludendorff, and especially in the determinations of declination between Ludendorff and Scheiner.

The importance of precise measurements of the positions of the components of such clusters as that in Hercules can hardly be overestimated. Thirteen years may be too brief an interval for the determination of the proper motion of the cluster and the stars which undoubtedly are projected upon it, and much more so of the motions of the individual members of the group. When a suitable time shall have elapsed, however, these determinations should be of high value in the solution of the fascinating problems which are associated with the globular clusters.

Ludendorff finds only small changes in the brightness of the two variable stars discovered in this cluster by the writer, and no evidence of the variability of any other stars.

POSITIONS OF STARS IN THE CLUSTERS h AND χ PERSEI. YOUNG

AN investigation similar to the preceding appears also as No. 24 of the 'Contributions from the Observatory of Columbia University.' This is an elaborate and valuable determination of the positions of 145 stars in the double cluster in the sword-handle of Perseus, by Anne Sewell Young. These clusters are little condensed, but are beautiful objects when seen with a low power. The plates employed were made by Rutherfurd during the years 1870–1874; they had double exposures of about six minutes. The measured stars were of the tenth magnitude and brighter. The methods of reduction have been in general those of Jacoby. The results appear to be of the highest precision and in good accord with the best work which has been done before.

RESEARCHES IN STELLAR PHOTOMETRY. PARKHURST

A VALUABLE contribution to our knowledge of the variable stars has been made by Mr.

John A. Parkhurst, in a volume issued through the Carnegie Institution. This contains the results of observations by the author, during twelve years, of twelve variable stars of long period, and includes photometric determinations of the magnitudes of the comparison stars, measures of the light of the variables, and detailed and mean light-curves. Many of the recent measures were made with the forty-inch refractor, and are invaluable, since they furnish our only information in regard to the minima of some variables of large range.

Excellent photographic charts of the regions of the variables are given. It is unfortunate, however, that astronomers are not in agreement in regard to the scales of star charts. For terrestrial maps definite scales are generally employed. For astronomical charts a scale of one minute to the millimeter seems to be a natural one, with simple multiples and divisors of this scale, when necessary. This subject might be referred to a national or international committee.

S. I. Bailey
Harvard College Observatory

Current Notes on Meteorology

Climate and Climatic Changes in Kashmir

Ellsworth Huntington, whose work on Turkestan as a member of the Pumpelly Expedition of a few years ago is already well known, and who has more recently been engaged in further exploration of Central Asia, notably of Chinese Turkestan, contributes to the *Bulletin of the American Geographical Society* for November, 1906, an account of his studies in the Vale of Kashmir in 1905. The climate is described as warm and damp from June to August, though but little rain falls; mild and delightful in April, May, September and October; and cold and snowy in winter, when 'bracing' is not infrequently less true to the actual conditions than 'rigorous.' Of late years there has been an increasing influx of English summer visitors from India, who seek relief from the heat of India in the cooler and more favorable climate of the Vale of Kashmir. A study of the physiographic features of the region, especially of the river terraces, as well as of the human history, leads to the conclusion that there has been a transition from colder or damper climatic conditions two thousand years or more ago to warmer or drier conditions to-day. This transition appears to Huntington to be part of a wide-spread climatic change extending at least from Persia and the Caspian Sea on the west to the borders of China proper three thousand miles away on the east.

Monthly Weather Review

No. 9, Vol. XXXIV., of the *Monthly Weather Review,* contains the following articles of general interest: 'The Relation of the Weather to the Flow of Streams.' In this paper F. H. Brandenburg, District Forecaster at Denver, shows how many factors, meteorological and physical, control the run-off of streams. A 'Phenomenal Rainfall at Guinea, Va.,' on August 24 last, is reported by E. A. Evans, Section Director at Richmond, Va., to have yielded nine and a quarter inches in about thirty minutes. Professor Arthur Searle, of the Harvard Observatory, contributes a paper on 'The Zodiacal Light,' in commenting on which Professor Cleveland Abbe says editorially: "As this article by Professor Searle definitely settles the old question as to whether the zodiacal light and *Gegenschein* are atmospheric or celestial phenomena, we shall hereafter commend the publication of such material to the astronomical journals, and reserve the columns of the *Monthly Weather Review* for meteorology proper." 'The Direction of Local Winds as affected by Contiguous Areas of Land and Water,' by T. H. Davis. 'The West Indian Hurricanes of September, 1906,' by Professor E. B. Garriott. The development of hurricanes in this month was exceptionally active, a fact which the writer attributes, in part at least, to an unusually strong flow of air from the more northern latitudes toward the tropics. One of these storms, it will be remembered, caused serious damage at Pensacola and at Mobile.

A Disappearing Lake

Additional evidence regarding the desiccation of Lake Chad, in central Africa, is