Mr. Chesnut exhibited utensils used by the Indian women in the preparation of acorn meal.

WILLIAM H. KRUG, *Secretary.*

## *ASTRONOMICAL NOTES.*

### CLOCK RATES AND BAROMETRIC PRESSURE.

ENSIGN EVERETT HAYDEN, U. S. Navy, publishes in the Publications of the Astronomical Society of the Pacific, No. 68, an interesting investigation of the effect of variations in barometric pressure upon the rates of clocks and chronometers. This study was made at the Mare Island Observatory, where chronometers are rated for the U. S. Navy, and where the time observations are regularly made, which are supplied by the Western Union Telegraph Company to that part of the country west of Ogden, Utah. The paper gives in detail the results for the Mean Time Clock of the observatory and for three Negus chronometers. The method is empirical, depending upon the rates actually observed under varying pressure and temperature, and the numerical results are obtained graphically. From tests of the Mean Time Clock extending through two hundred days, it is believed that had the rate-curves been used without any time observations the errors of the noon signal would at no time have exceeded six-tenths of a second, and seldom have exceeded one-tenth of a second, and at the end of the period would have been correct within a few hundredths of a second. The barometric and temperature curves of the sidereal and mean time clocks are now used in the current work of the observatory, and the author is of the opinion that a first rate pendulum clock is a much better instrument than usually supposed, and actually comparable in uniformity with the axial rotation of the earth, if account is taken of these variations. The experiments on chronometers lead the author to believe that the use of a barometric curve in actual practice at sea is worthy of trial, and the navigator of one of our naval vessels now in the Pacific will report upon his experience with the three chronometers whose rates are discussed in the paper.

### STELLAR PARALLAX BY PHOTOGRAPHY.

A CONTRIBUTION to this subject is made by Östen Bergstrand of the observatory at Upsala. The author discusses the theory of the reduction of measures on the photographic plates and the instrumental errors of the Repsold apparatus employed. The parallax of $\Sigma 1516\ A$ is found to be $0.''080 \pm 0.''011$ and of $A - Oe.$ 11677, which has a proper motion of nearly $3''$, to be $0.''192 \pm 0.''013$. These determinations were made on account of the discrepancies in the results of other observers. The paper is in Swedish but an abstract in French is supplied.

### JUPITER'S FIFTH SATELLITE.

PROFESSOR BARNARD has added to our knowledge of the period of this satellite the results of his observations in the last two oppositions of Jupiter made with the 40-inch equatorial of of the Yerkes Observatory. Combining these with the earlier observations at the Lick Observatory, the period is 11 h. 57 min. 22.647 sec. and is not in error exceeding 0.01 sec. The discordancies in the separate determinations are very small and the measures show the great accuracy attainable in micrometric observations with these large refractors upon difficult objects.

WINSLOW UPTON.

PROVIDENCE, R. I., Oct. 14, 1899.

## *CURRENT NOTES ON METEOROLOGY.*

### KITE AND BALLOON METEOROLOGY IN FRANCE.

TWO communications have been made to the French Academy of Sciences during the past summer by Teisserenc de Bort on the kite and balloon work carried on at the Observatory of Trappes. Altitudes of 3,940, 3,590 and 3,300 meters were reached on June 14th, June 15th, and July 3d, respectively. The results obtained by means of the kite meteorographs during more than 100 ascents show that in anti-cyclones the rate of decrease of temperature aloft becomes slower at a distance of a few hundred meters above the ground, and inversions of temperature are often observed. In cyclonic areas the decrease of temperature is more rapid. In fine weather, with high pressure, the wind velocity generally decreases with increasing distance from the ground up to an altitude between 1,500 and 3,000 meters. On the other hand, on cloudy days, with low pressure, the velocity

increases with altitude, especially near the lower cloud stratum. (Paper read, July 10th.)

Some of the results obtained during more than 100 ascents of *ballons-sondes*, 7 of which ascents were higher than 14,000 meters, 24 higher than 13,000 meters, and 53 of which reached 9,000 meters, were discussed by de Bort in a paper read before the Academy on August 21st, last. The most important conclusions reached are as follows: I. The temperature at different altitudes shows notable variations during the course of the year, which are much greater than was supposed as the result of the older observations made in balloons. II. It appears that there is a fairly well-marked tendency to an annual variation of temperature as high up as 10,000 meters, the maximum being reached towards the end of summer, and the minimum at the end of the winter. This phenomenon is much complicated by the marked variations from day to day, which are related to the conditions of atmospheric pressure.

CENTIGRADE *versus* FAHRENHEIT SCALE.

THE discussion as to the relative merits of Centigrade and Fahrenheit scales has lately come up again in connection with the use of these scales in meteorological work. In *Nature* for August 17th, Buchanan points out that the zero on the Centigrade scale occurs at such a place as to make nearly half of the readings come below zero. Hence the scale must be read upward half the time and downward half the time, which is awkward. Furthermore, the averaging of the results is extremely troublesome, and mistakes are easily made. Clayton (*Nature*, Sept. 17th), agrees with the opinion expressed by Buchanan, and makes the novel and ingenious suggestion that if the Centigrade thermometer is ever adopted for meteorological purposes by the English-speaking nations, the freezing point of water should be marked 273° on the scale and the boiling point 373°. By this method meteorologists would have at once the temperatures concerned in the change of volume of gases, and embodied in many formulæ, and the difficulty of the inverted scale, above referred to, would be eliminated.

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*NOTES ON INORGANIC CHEMISTRY.*

A PAPER on Solid Hydrogen was read by Professor Dewar at the Dover meeting of the British Association and is reprinted in the *Chemical News*. It is only since the fall of 1898 when it has been possible to obtain liquid hydrogen in quantities of one or two hundred cubic centimeters, that attempts could be made to solidify it. The principle used was that of a vacuum tube containing liquid hydrogen immersed in a bath of liquid hydrogen contained in an outer vacuum tube connected with an air pump. When the pressure in the outer tube is reduced below 60 mm., the hydrogen suddenly solidifies into a white froth-like mass like frozen foam. In the inner tube the upper part of the solid hydrogen is frothy, but below it is a clear solid resembling ice. The solid melts at a pressure of 55 mm., or under a pressure of 35 mm. at 16° absolute (— 257° C.). The boiling point of liquid hydrogen at 760 mm. pressure is 21° absolute (— 252° C.). The foamy structure of the solid hydrogen is doubtless due to the fact that rapid ebullition is substantially taking place throughout the entire liquid, owing to its extreme lightness, for the specific gravity of liquid hydrogen is only 0.07 at its boiling point, and its maximum density not over 0.086. The lowest temperature now obtainable is from 14° to 15° absolute (— 259° to — 258° C.), reached by the evaporation of solid hydrogen in a vacuum.

A NEW method of separating the active constituents of racemic compounds is described by Marckwald and McKenzie in the last *Berichte* of the German Chemical Society. It is based upon the fact that while isomeric acids of the fatty series have nearly the same affinity, and the same limit of ester formation, the speed of the latter depends very markedly upon the structure of the acid molecule. In the described experiment racemic mandelic acid and menthol were heated together for an hour—menthyl mandelic ester was formed and that portion of the mandelic acid which was unacted upon was recovered and found to be lævorotary; the dextro-rotary acid was thus changed to the ester first. While perhaps of no practical application, this method is of theoretical interest, as it adds a purely chemical method of