The magnitudes given for the whole object range from 9·0 to 11·0, and show no marked increase or decrease with the date. While some observers report a stellar nucleus, others say that there is no definite nucleus, but there is a central condensation in the nebulosity forming the head. A short tail is reported by the majority of observers, M. Guillaume, using the equatorial *coudé* of the Lyons Observatory, with a power of 360, giving the length on August 11 as about 1·5′, and the direction as towards E.

From observations made on August 11, 13, and 15, Dr. Kobold has calculated parabolic elements and an ephemeris, the former giving the time of perihelion as August 30·018 (Berlin M.T.). The later part of the ephemeris is given below :—

Ephemeris for 12h. (M.T. Berlin).

1910	α	δ	Mag.
	h. m.	° ′	
August 24 ...	15 46·6 ...	+16 15·0	
,, 25 ...	15 45·4 ...	+16 18·8 ...	10·7
,, 26 ...	15 44·2 ...	+16 22·4	
,, 27 ...	15 43·1 ...	+16 25·9	
,, 28 ...	15 42·1 ...	+16 29·2	
,, 29 ...	15 41·0 ...	+16 32·3 ...	10·9

Owing to the short arc yet observed, the elements are, of course, somewhat uncertain. From this ephemeris we see that the comet is now moving very slowly in a direction slightly N. of W. through the constellation Serpens.

PHOTOGRAPHS OF DANIEL'S COMET, 1907*d*.—The advantages to be secured from widespread cooperation, especially in the study of the physical features of comets, are well illustrated in a paper by Prof. Barnard which appears in No. 194, vol. xlix., of the Proceedings of the American Philosophical Society. There Prof. Barnard publishes twenty-five plate reproductions of photographs secured by him, with the 3·4 and 10-inch Bruce portrait lenses, during the period July 11 to September 8.

The physical changes depicted from day to day are very remarkable; but Prof. Barnard shows, by comparing his plates with series taken at Lick and Juvisy, that much shorter periods produced such great changes that some of the features became recognisable with difficulty. The time difference in the case of the Lick photographs is, generally, about two hours, for the Juvisy plates about six hours, yet even in the comparison between Yerkes and Lick there are very distinct changes shown. In several cases it is shown that a detached portion of the tail, although receding from the head, was still moving sunwards in the path followed by the comet.

PRECESSION AND THE SOLAR MOTION.—In No. 614 of the *Astronomical Journal* Prof. Boss publishes the results of an investigation of the proper motions of more than 5000 stars, uniformly distributed over the whole sky, and deduces therefrom the position of the solar apex and corrections to Newcomb's values for precessions and for the equinox of 1874. For the position of the apex he derives, for 1875·0, R.A.$=270·52° \pm 1·08°$ to $\pm 1·53°$, dec.$=+34·28° \pm 0·90°$ to $\pm 1·28°$. Other solutions, for selections of stars, such as those of different magnitudes or large proper motions, are obtained, but they show no sensible modifications of these values.

For the velocity of the sun in space Prof. Boss finds 24 km. per second as a useful constant to adopt for the present, and is of the opinion that the value (19·9 km.) determined from spectroscopic observations is open to objections inherent to that method.

Further, he finds that his results strongly support the hypothesis of the random motions of the stars, an hypothesis which is directly opposed to the several ideas of definite "star drifts" which have been published in recent years.

CALCIUM VAPOUR IN THE SUN.—No. 1, vol. xxxii., of the *Astrophysical Journal* contains a paper, by Mr. C. E. St. John, which is full of important results concerning the distribution and the circulation of calcium vapour in the solar atmosphere. The research was undertaken in order to provide data for the better interpretation of spectroheliograms in so far as they reveal the disposition and inter-relation of the various solar layers. In 1872 Young observed the reversal of the H and K lines in disturbed regions, in 1883 Lockyer photographed them, and in 1892 Hale and Deslandres noted the reversals distributed over the entire disc.

With the splendid apparatus available at Mount Wilson, Mr. St. John has measured the various parts of the K line (K_1, K_2, and K_3), and, referring these measures to Fabry and Buisson standards, has determined the apparent displacement at various points on the disc, thus deriving data which indicate the conditions, altitudes, &c., under which the emitting vapours exist.

Among other results, he finds that the vapours producing the K_3 (absorption) line show a descending motion of 1·14 km. per sec., while the vapours producing the K_2 (bright) line have, generally, an ascending motion of 1·97 km. per sec. A comparison of the angular velocities obtained points to the vapour-producing K_3 being at a greater elevation than the hydrogen which produces the Hα line. A comparison of the wave-lengths of K_2 and K_3 at, and away from, the limb indicates that these intermediate and higher levels of the sun's calcium atmosphere are not greatly disturbed by currents parallel to the solar surface.

From measurements of the widths of K_3 and H_3, and reasoning from their behaviour in the calcium arc spectrum, it appears that the quantity of calcium vapour in the upper levels must be extremely small, while, from similar considerations of the K_2 and H_2 lines, the emitting vapours would be relatively thick and dense. In approximate figures, the 5000 km. depth of the solar envelopes above the photosphere is divided into 1500 km. for the upper (absorbing) atmosphere and 3000 km. for the emitting layer, leaving 700 km. for the layer which emits the bright chromospheric radiations. A curious result is that the K line persists for some 500 or 600 km. above the level at which the H line ceases to show.

On determining the wave-lengths of H_3 and K_3, a difference of 34·810 A. was found, which differs by 0·010 Å. from the value derived from Rowland's tables; this discrepancy is probably caused by an error of that amount in Rowland's wave-length for H.

Mr. St. John's paper takes up forty-seven pages of the journal, and there are other important results which are too numerous for full discussion in these columns.

OBSERVATIONS OF THE MOTION OF THE UPPER AIR.[1]

THE two publications before us evidence the progress which is being made in different ways in our knowledge of the upper currents of the atmosphere. Dr. Figee, invalided home owing to the trying climate of Java, has taken the opportunity of discussing the observations (286) of the height of clouds, made at Batavia, 7° S., 107° E., in 1896–7, and later observations of cloud-velocity. The results for *height* agree generally with the values obtained in the same period at Manila, 14° N., 121° E. The following table gives the heights in km., the mean values for Paris and Potsdam being added for comparison :—

Cloud	Ci.	Ci.S.	Ci.Cu.	A.Cu.	Cu.
Batavia	11·5 ...	10·6 ...	6·3 ...	5·4 ...	1·74
Manila	10·9 ...	11·4 ...	6·6 ...	5·3 ...	1·7
Paris and Potsdam ...	8·7 ...	7·6 ...	5·7 ...	3·3 ...	1·5

The *motion* of the higher clouds shows different features at the two places. In both the seasons, November–April, May–October, the drift is towards the south-west at Batavia, a result corroborated by the recent work of Van Bemmelen, while at Manila it is towards the south-west in the latter season, but nearly north in the former. The value of the results in Dr. Figee's paper can be rightly appreciated only when they come to be utilised in preparing an atlas of monthly charts showing the main features of the circulation at the cirrus-level, an atlas which is much needed at present.

The second paper is a discussion of fifty-one pilot-balloon

[1] (1) Royal Magnetical and Meteorological Observatory at Batavia: Report on Cloud-Observations at Batavia made during the International Cloud-year 1896–1897 and subsequent years. By Dr. S. Figee. Appendix ii. to vol. xxx. of the "Observations." Pp. 32. (Utrecht: Kemink and Sons, 1910.)

(2) "Velocità e Direzione delle Correnti Aeree alle diverse Altitudini Determinate a Mezzo dei Palloni-Sonde e Piloti." By Dr. G. Pericle. Pp. 55—126; 5 plates. (Milana: U. Hoepli, 1910.)

ascents made at the Geophysical Observatory, Pavia, during 1908. The balloons were observed to heights exceeding 10 km. in six cases, and exceeding 5 km. in thirty-one additional cases. The ascents were made generally during comparatively calm weather, so that the results cannot be taken as representative of average conditions, a restriction applying, of course, to all pilot-balloon observations.

The values of the observed wind are collected in a convenient table, which is accompanied by a brief description of the general pressure distribution on the days of the ascents, and by diagrams showing the paths of the balloons and the wind at all heights for each ascent. An outstanding feature of the results is the large proportion of cases, thirty-two out of forty-four, in which the wind above 3 km. has a northerly component, compared with three cases in which an extensive southerly current was found. This agrees with the cloud observations at Perpignan and Pola, and is markedly different from those at Paris and Berlin.

Dr. Pericle finds that the wind usually veers with increasing height up to 2 km., veers as often as it backs from 2 to 5 km., and usually backs above 5 km. A sudden increase in the velocity of the wind was observed in thirty-one cases at heights between 2 and 4 km., and this was accompanied generally, but not invariably, by a change in direction. The average change is from 5·2 m.p.s. below the level of the discontinuity to 9·4 m.p.s. above it. The wind veered in passing upwards in thirteen cases, backed in thirteen cases, and did not change in five cases. The "backing" is usually larger than the "veering," the average value being 29° for the former and 18° for the latter. These results confirm the temperature observations in indicating the intermediate layer from 2 to 5 km. as the region where the more immediate causes of remarkable metcorological phenomena are to be sought.

E. GOLD.

FURTHER RESULTS OF THE JESUP NORTH PACIFIC EXPEDITION.[1]

FORCE of circumstances has prevented Prof. F. Boas from giving to science a complete monograph of the Kwakiutl, but he has given a further instalment in the publications of the Jesup North Pacific Expedition, which, so far as it goes, together with his study of the sociology of these interesting Indians (Report U.S. Nat. Mus. for 1895 [1897]), practically supersedes the reports published by the British Association. The present memoir deals with the industries of the Kwakiutl, but the author acknowledges the "many gaps and imperfections," which he has endeavoured to supply by correspondence; even so, we have an important contribution on the technology of a representative tribe of the north-west coast, a district in which the natives have developed a culture which differs markedly from that of other American Indians.

FIG. 1.—Kwakiutl Village at Newettee, Vancouver Island.

The two key-notes from the material side of this culture are the cedar tree and the salmon. The former is utilised for a large number of purposes, and as the wood splits easily large planks are readily made; hence we have a peculiar type of house construction. Also, the manufacture of chests and boxes is very characteristic; boxes are made by bending a board, a kerf having been made where the corners are to come; the two ends are then sewn together. In the late summer enormous numbers of salmon migrate up the rivers, thus affording food which, with proper preparation, can be stored for future consumption. Fishing is carried on by means of traps, nets, hooks, and with the spear. In some cases, also, combinations of fish-weirs and nets are used, or fish are speared or hooked in pounds

[1] "The Jesup North Pacific Expedition." Mem. Am. Mus. Nat. Hist., N.Y. Vol. v., pt. ii. "The Kwakiutl of Vancouver Island." By Franz Boas. Pp. 301-522 (plates xxvii-lii)+ix. Vol. viii., pt. i. "Chukchee Mythology." By Waldemar Bogoras (*loc. cit.*). Pp. 197. Vol. ix. pt. i. "The Yukaghir and the Yukaghirized Tungus." By Waldemar Jochelson (*loc. cit.*). Pp. 133; 1 map. (Leiden: E. J. Brill, 1909-10.)