

owing to its close proximity to the sun, and should be looked for immediately after sunset in the south-west quadrant, near to the horizon.

COMET 1906a.—Numerous observations of the new comet discovered by Mr. Brooks at Geneva, U.S.A., have been made, and from the positions determined on January 28, 29, and 30, the following elements and an ephemeris, of which a part is given below, have been calculated by Messrs. Crawford and Champreux:—

Elements.

T = 1905 Dec. 19.47 G.M.T.

$$\begin{aligned} \infty &= 86 \text{ } ^{\circ} 22 \\ \Omega &= 285 \text{ } ^{\circ} 27 \\ i &= 126 \text{ } ^{\circ} 49 \\ q &= 1.2826 \end{aligned} \left. \vphantom{\begin{aligned} \infty \\ \Omega \\ i \\ q \end{aligned}} \right\} 1906.0$$

Ephemeris 12h. G.M.T.

1906	a	h.	m.	δ	Brightness
Feb. 8	...	15	50.4	...	+70 37 ... 1.04
„ 12	...	15	05.9	...	+78 37 ... 1.05

Brightness at time of discovery = 1.0.

Thus it will be seen that the comet is now travelling due north, and is easily circumpolar, but it is in a better position for observations after midnight (Kiel *Circular*, No. 85).

A NEW METHOD OF DETERMINING THE MOON'S POSITION PHOTOGRAPHICALLY.—The chief difficulty in photographically recording the moon's position among the stars, for the purpose of determining the errors in the ephemeris, arises from the fact that if the exposures be long enough to record the faint, surrounding stars, the moon's image is tremendously over-exposed, and the star images are lost in the light-fog caused by the prevailing moonshine. Several methods of overcoming this difficulty have been proposed, and Mr. Wade, of the Helwan Observatory, Egypt, now suggests another, which, from his preliminary experiments, promises to be successful.

In this method the camera is mounted so that its optical axis passes horizontally through the centre of an ordinary cœlost, but the mirror of the latter, instead of being worked to a true plane, is figured as a prism, the two faces of which are inclined at an angle of $7\frac{1}{2}^{\circ}$, and the edge of the prism is arranged parallel to the polar axis. Thus the photograph obtained includes two fields which are, actually, separated by 15° in right ascension.

The cœlost is arranged so that one face of the prism reflects the moon's image into the camera, whilst the other face reflects the field of stars situated about 1 hour in right ascension from the moon, and therefore beyond the range of strong moonlight. Then the reflected lunar image is intercepted whilst the reflected star images are exposed for $2\frac{1}{2}$ minutes, when an instantaneous exposure on the moon is made. The operation is completed by exposing the star-field for a second $2\frac{1}{2}$ minutes. By this method Mr. Wade has obtained a number of successful negatives with a 2-inch visual achromatic Dallmeyer lens and a cœlost of 4 inches diameter (*Monthly Notices Royal Astronomical Society*, vol. lxxvi., No. 2).

A CATALOGUE OF SPECTROSCOPIC BINARIES.—A novel and important catalogue, published by the Lick Observatory as Bulletin No. 79, has just been received. It contains all the known particulars of the orbits of the spectroscopic binary stars discovered prior to January 1, 1905.

On that date 140 of these objects were known, 72 of them having been discovered by the Lick observers and 41 at the Yerkes Observatory.

When one remembers that the first of these interesting objects, ζ Ursæ Majoris, was discovered by Prof. Pickering so recently as 1889, it becomes evident that this field of research is likely to contain ample scope for further work; therefore in order to simplify matters for future observers Prof. Campbell and Dr. H. D. Curtis have collected all the known results into the present catalogue. In addition to the positions, magnitudes, spectral types, and orbital details of the binaries, the catalogue contains a valuable column in which the name of the discoverer

and references to the bibliography of each binary, together with brief notes, are given.

OBSERVATIONS OF THE LYRID METEORS, APRIL, 1904.—In No. 4067 of the *Astronomische Nachrichten* Dr. Jiří Kaván, of the Prag-Smichow Astronomical Institute, gives the results of his observations of the Lyrids on April 18, 19, 20, and 21, 1904.

Forty-five meteors were observed, twenty of them being recorded between 12h. 5m. and 15h. 25m. (M.E.T.) on April 19. From an analysis of the records, Dr. Kaván has deduced two radiant points for this shower as follows:—

$$\begin{aligned} (1) \alpha &= 278^{\circ} 0 \dots \delta = +30^{\circ} 5 \text{ (near } \beta \text{ Lyrae)} \\ (2) \alpha &= 247^{\circ} 0 \dots \delta = +31^{\circ} 5 \text{ (near } \zeta \text{ Herculis)}. \end{aligned}$$

REPORT OF THE MEETING OF THE SOLAR COMMISSION AT INNSBRUCK.

THE commission was constituted by the following action of the Southport meeting of the International Meteorological Committee thus reported:—

“Discussion of the relation of meteorology to astrophysics.”

“The members of the Committee had previously taken part in a discussion of this subject at a meeting of Section A of the British Association; and Mr. Shaw proposed that a Commission should be appointed to review and discuss meteorological observations from the point of view of their connection with solar physics. Mr. Shaw's motion was adopted, and MM. Lockyer, Shaw, Pernter, and Angot were elected to serve on this Commission with power to add to their number and to elect their officers.”

The following is the list of those who have been appointed members of this commission up to the present time:—

- M. A. Angot, Bureau Central Météorologique, Paris.
- Prof. H. J. Ångström, University, Upsala.
- Geheimrat oberregierungs von Bezold, Berlin.
- M. Teisserenc de Bort, Observatoire de Trappes, prés Paris.
- Prof. F. H. Bigelow, Weather Bureau, Washington.
- Prof. Birkeland, University of Christiania.
- Rev. G. R. Cirera, S.J., Observatorio del Ebro, Tortosa, Spain.
- Dr. W. G. Davis, Oficina Meteorologica Argentina, Cordoba, Argentine Republic.
- M. H. Deslandres, Observatoire d'Astronomie physique, Meudon, Seine et Oise.
- Sir John Eliot (secretary), 79 Alleyn Park, Dulwich, London; Bon Porto, Cavalaire, Var, France.
- Mr. G. E. Hale, Solar Observatory, Mount Wilson, California, U.S.A.
- Hofrat Prof. Dr. J. Hann, 19 Hohe Warte, Vienna, Austria.
- M. M. S. Hepites, Institut Météorologique, Bucarest, Roumania.
- M. Janssen, Observatoire d'Astronomie physique, Meudon, Seine et Oise.
- Prof. W. H. Julius, Rijks Universiteit, Utrecht, Holland.
- Hofrat Prof. Dr. N. Thege v. Konkoly, k. meteor. Reichsanstalt, Budapest.
- Prof. Dr. W. Köppen, Seewarte, Hamburg.
- Mr. S. P. Langley, Secretary of the Smithsonian Institution, Washington, U.S.A.
- Sir Norman Lockyer (president), Solar Physics Observatory, South Kensington, London.
- Dr. W. J. S. Lockyer, Solar Physics Observatory, South Kensington, London.
- Captain J. H. Lyons, R.E., Survey Department, Cairo, Egypt.
- M. E. Marchand, Observatory, Pic du Midi.
- Prof. H. Mohn, Meteorologische Institut, Christiania.
- Hofrat Prof. Dr. J. M. Pernter, Hohe Warte, Vienna, Austria.
- Prof. Riccò, University of Catania, Sicily, Italy.
- Prof. G. B. Rizzo, University of Messina, Sicily, Italy.
- Mr. A. L. Rotch, Blue Hill Meteorological Observatory, Cambridge, Mass., U.S.A.
- Sir Arthur Rucker, 19 Gledhow Gardens, London, S.W.

General Rykatcheff, St. Petersburg, Russia.
Prof. Dr. J. Scheiner, Konigl. Friedrich Wilhelms
Universität, Berlin.

Dr. W. N. Shaw, Meteorological Office, 63 Victoria
Street, London.

M. A. Silvado, Direction de Meteorologia, Morro de St.
Antanis, Rio de Janeiro, Brazil.

Prof. A. Steen, Meteorological Institute, Christiania.

Mr. R. F. Stupart, Canadian Dominion Meteorological
Service, Toronto.

Prof. J. Violle, Conservatoire des Arts et Métiers, Paris.

Prof. Dr. C. H. Wind, University of Utrecht, Holland.

Prof. A. Woeikoff, St. Petersburg, Russia.

Prof. Dr. Max Wolf, Grossherz Ruprecht-Karls Uni-
versität, Heidelberg, Germany.

Prof. A. Wölfer, Zurich Observatory, Switzerland.

At a meeting at Cambridge in August (18-23), 1904, Sir
Norman Lockyer was elected president and Sir John Eliot
secretary.

A provisional programme was considered, and the follow-
ing resolutions were passed or action taken:—

A letter received from Mr. Hale respecting the cooper-
ation of the Commission with the Committee on Solar
Research of the National Academy of Sciences was read,
and it was agreed to cooperate with the Committee on
questions of common interest.

Upon the initiation of the Committee a union was
formed for the study of solar phenomena, and Dr. W. J. S.
Lockyer was appointed later by correspondence to attend
the meeting of this union at Oxford in September, 1905,
as the representative of the Commission.

A scheme of solar observations was approved.

It was resolved (1) that in connection with the observ-
ations of solar radiation, observations of the transparency
of the air would be desirable, more especially (a) on the
visibility of distant and high mountains when possible; and
(b) photometrical observations of Polaris.

The following resolutions were passed:—

(1) That, in the first instance, for the purpose of com-
parison with solar phenomena, the meteorological observ-
ations to be considered should be monthly means of
pressure, temperature (including maximum temperature and
minimum temperature) and rainfall.

(2) That the members of the Commission be requested to
communicate to the secretary a short report of the data
available in their respective countries, and the number of
years over which they extend.

(3) That a circular be addressed to the various meteor-
ological organisations asking them to send to the secretary,
for the purposes of the Commission, a copy of the publi-
cations of their offices embodying the data specified in the
two preceding resolutions, and that the organisations be
also requested to obtain and forward copies of similar
publications from the colonies and dependencies of their
respective countries.

(4) That the Commission considers it is desirable that the
data for the purposes of comparison should be sent to the
president of the Commission, South Kensington (Solar
Physics Observatory), for tabulation and comparison. The
Commission attaches the greatest importance to this work,
more especially as it may lead to a practical system of
long-period forecasting, and hopes that if it be necessary,
an increase of staff at that observatory may be authorised
to bring all old observations up to date.

(5) That the establishment of magnetical observatories
in about lat. 70° N. (e.g. Boskop, in Norway) and in very
high latitudes of the southern hemisphere is of the highest
importance for the advancement of science.

Prof. Riccò informed the Commission that it is intended
to establish in Italy or Sicily a magnetic observatory with
self-recording instruments belonging to the Italian Meteor-
ological Office.

It was agreed that all communications for the Com-
mission should be received at a central address, viz. the
Solar Physics Observatory, South Kensington.

At the meeting at Innsbruck, September 11-15, 1905,
the following resolutions were adopted:—

(1) That for the sake of brevity the name of the Com-
mission be the Solar Commission of the International
Meteorological Committee.

(2) That the secretary be instructed to report the pro-

ceedings of the meetings of the Commission held at Cam-
bridge in August, 1904, and at Innsbruck in September,
1905, to the International Meteorological Committee, and
to ask that it will take the proper steps to bring their
suggestions before the International Association of
Academies.

(3) Que pour la pression et la température les chefs des
différents services météorologiques soient priés de préparer
une liste des stations qu'ils considèrent comme suffisantes
pour bien représenter les différents régimes météorologiques
que existent dans leur pays.

(4) Que dans le nord de Sibirie et le nord de l'Amérique
soient organisés des stations permanentes météorologiques
au moins deux ou trois sur chaque continent.

La Commission exprime le désir de recevoir communi-
cation des observations des îles dont les noms suivent;¹
insiste sur l'utilité d'assurer la permanence des obser-
vations météorologiques dans ses régions, et prie son prési-
dent de faire par intermédiaire du Comité international
des Académies officiellement auprès des divers gouverne-
ments les démarches nécessaires pour que des observations
météorologiques soient organisés et maintenues dans les
stations mentionnées ou ces observations n'existent pas
d'une manière régulière et permanente.

A form was prepared and approved for the tabulation
of the pressure, rainfall and temperature data.

Pour le but que poursuit la Commission, il est
désirable que dans toutes les stations, les valeurs normales
soient déduites des mêmes années (20, 25, ou plus) le
millésime de la première année se terminant par 1 ou 6
d'après les recommandations du Congrès météorologique
international de Vienne.

The normal period selected for comparison when possible
is the twenty-five year period from 1881 to 1905.

M. Angot presented a selected list of stations for
France which the Commission decided should be utilised in
the circular as an example of the requirements of the Com-
mission. In connection with this selection it was decided
that the proportion of mountain stations to plain stations in
any country should not exceed one to four.

The questions of magnetic and rainfall data were
taken up, and it was resolved

(1) That the Magnetic Commission should be asked to
assist the Solar Commission in the selection of magnetic
observatories, and to advise as to the amount and extent
of information which these observatories would be able to
give in order to assist in the investigation of the relations
of solar and terrestrial meteorology.

(2) That the suggestion of Mr. Langley that ten-day
means as well as monthly means be employed be referred
to the Magnetic Commission for opinion.

General Rykatcheff, president of the Magnetic Com-
mission, read a communication in reply to the request
mentioned above:—

“ Décision de la Commission magnétique par rapport à
la demande de la Commission solaire.

“ La Commission magnétique a pris certaines décisions
qui entrent dans les vues de la Commission solaire, celles
sont les décisions sur la publication des courbes troublées,
sur les listes des jours calmes et troublés, sur les
coefficients exprimant l'activité magnétique de chaque jour
et sur la publication d'une liste d'observatoires magnétiques.

La Commission magnétique décide que toutes ces publi-
cations seront communiquées aux membres de la Com-
mission solaire.

“ Si la Commission solaire trouverait que d'autres
données, que celles énumérées tout à l'heure sont désirables,
la Commission magnétique se déclare prête à collaborer
avec la Commission solaire en la priant toutefois de vouloir
bien préciser ses desirs!

“ Quant à la question des moyennes par décades la
Commission estime que cette question ne peut être résolue
que par le comité des directeurs, auquel elle sera remise.

“ La Commission magnétique estime qu'il serait bien
de diriger l'attention du futur Bureau permanent mag-
nétique sur les demandes de la Commission solaire.”

(3) Pour le moment on se contente de demander les
données relatives à la pluie aux stations que fournissent
déjà celles de la température et de la pression; on pourra

¹ The complete list will be given later in the official report of the meeting
of the Commission.

ultérieurement étendre le nombre des observations pluviométriques si la nécessité s'en fait sentir.

(4) Les chefs des services météorologiques et hydrographiques sont priés d'ajouter aux données météorologiques envoyées à la Commission, autant de données sur la niveau et la débit des rivières et des lacs qu'ils croient possibles et utiles.

(5) That the secretary be asked to prepare a regional statement of rainfall for India as an example of what the Commission desires in the way of reports of regional rainfall and variation of rainfall for each meteorological organisation.

Instructions were given to Dr. W. J. S. Lockyer for his action as representative of the Commission at the Oxford meeting of the Solar Research Union.

It was resolved that while thanking the Washington Weather Bureau for its courteous offer to publish in the Washington *Monthly Weather Review* the data collected by the Commission, the Commission is not yet in a position to decide upon the most appropriate form of publication.

It was decided that a circular should be sent to the various meteorological organisations in the following terms:—The Commission desire to direct attention to the concluding paragraph of Prof. Violle's report to the International Meteorological Committee, 1903, and would be greatly obliged if the Commission could be informed of the arrangements for observing solar radiation adopted at the observatories of the various meteorological organisations and the methods employed to render the observations comparable with those of other observatories.

A first list of places at which actinometric observations are made was presented.

It was resolved that "une circulaire sera envoyé aux directeurs des services météorologiques pour leur demander de designer les stations de leur pays où les observations actinométriques sont régulièrement faites. Dans le liste des stations il serait utile d'éviter les grandes villes où les conditions atmosphériques sont généralement défectueuses."

That steps should be taken to obtain observations from the places mentioned.

La Commission Solaire prie M. le Président de vouloir bien obtenir les courbes de la distribution de l'énergie solaire pour les observatoires qui ont déjà l'obligeance de communiquer les autres données indiqués dans les Comptes rendus des Seances de la Conférence de Cambridge, à propos de la physique solaire.

ANTHROPOLOGICAL NOTES.

L'ANTHROPOLOGIE usually devotes much space to archæology, and the recent number (vol. xvi., Nos. 4-5) contains three papers on that subject. Mr. H. Obermaier gives the first instalment of a most useful memoir on Quaternary human remains and the sites in Central Europe where they have occurred. Mr. A. Viré describes a prehistoric cave of the Solutré period at Lacave (Lot); the human bones were too fragmentary to have any value. Mr. E. Cartailhac and Father Breuil continue their account of the mural paintings and engravings of the Pyrenean caves; they give several illustrations; as is usually the case among primitive peoples, the representations of human beings fall greatly below the excellence of animal delineations. The authors come to the conclusion that in the cave of Marsoulas the earlier engravings with linear contours are associated with black paintings, while the later engravings, in which the contours are made with short lines to indicate hair, are associated with polychromatic paintings of animals. In a paper on the myology of a Negro, Messrs. R. Anthony and A. Hazard state that muscles are thick and short, thus indicating strength rather than agility. Hunting and agriculture among the populations of the Sudan are the subjects of a paper by Mr. J. Decorse. Mr. L. G. Seurat describes the marae, or stone altars, of the little frequented eastern islands of the Tuamotu Archipelago. Mr. C. Monteil discourses on the numbers and numeration among the Mandés, a large linguistic family of people of western

French Africa. The journal contains the usual valuable *résumé* of recent anthropological literature.

Two papers in the *Journal of the Asiatic Society of Bengal* (vol. lxxiii.) should not be overlooked. Mr. J. E. Friend-Pereira has discovered totemism among the Khonds, where the wider totemic exogamy has been hidden by the narrower and probably newer rule of the "local, communal, or family type." The "septs," as the author terms the totem groups, have the ordinary totem tabus of feeding, use and marriage, and myths of origin. He believes totemism "serves to mark to a primitive people who possess no written characters to record kinship and descent as they begin to get more remote in time the distinction between separate stocks of blood. In other words, totemism is merely a guide for the observance of the rules of exogamy: it is not the cause that originated or evolved these rules." He holds that the explanation of the origin of totemism must be sought for, not in its social, but in its religious aspect. Among the Khonds "the totem ranks as the spirit of the ancestor founder of the stock, who is also the chief tutelary deity of the stock, and the totem class is considered as a manifestation of the chief tutelary deity." Major P. R. T. Gurdon has a valuable short paper on the Khasis, Syntengs, and allied tribes of Assam, among whom mother-right so predominates that males can own only self-acquired property. There are traces of totemism. Ancestors are worshipped by the erection of remarkable memorial stones, of which two illustrations are given; this form of worship largely underlies the Khasi religious system. Divination by the breaking of eggs is very common. Major Gurdon is superintendent of ethnography in Assam, and is apparently preparing a monograph on the people under his charge which, judging from these notes, should be a valuable work.

The current number of the *Journal of the Anthropological Institute* (vol. xxxv., 1905) contains papers in all branches of anthropology. Physical anthropology is represented by a paper by Messrs. F. G. Parsons and C. R. Box on the relations of the cranial sutures to age, and by a critical paper by Dr. C. S. Myers traversing the conclusion of Miss Fawcett that in certain characters a progressive evolution has taken place in regard to the "prehistoric" and modern Egyptians. South African archæology has been much to the fore of late; the notes on the Great Zimbabwe elliptical ruin by Mr. Franklin White, and a paper on the stone forts and pits on the Inyanga Estate, Rhodesia, were written before Mr. Randall-MacIver's subversive views were published. Mr. T. W. Gann discourses on the ancient monuments of Honduras and on the natives now living there. In technology there is a beautifully illustrated paper by Mr. D. Randall-MacIver on the manufacture of pottery in Upper Egypt. Mr. N. W. Thomas enumerates the varieties of the canoes and rafts in Australia and their distribution. Mr. E. B. Haddon, in a well illustrated paper on the dog-motive in Bornean art, discusses the origin and degeneration of certain designs. Religion is represented by notes by Mr. R. E. Dennett on the philosophy of Bavili of Luango, West Africa. Finally, a report on the ethnology of the Stlatlumh, one of the Salish tribes of British Columbia, by Mr. C. Hill Tout, is a good example of a paper on regional ethnography. It will be seen that the journal maintains its high standard, both for the quality of its matter and the excellence of its illustrations.

A GAS CALORIMETER.

THE paper on a new gas calorimeter which was read before the Royal Society by Mr. C. V. Boys, F.R.S., on December 7, 1905, is of interest, partly on account of the causes which led to the design, and partly on account of the features which are original.

The agitation of the gas companies in favour of reducing the candle-power of gas on the ground that gas of lower candle-power is cheaper while the diminution of the light afforded by a luminous flame is of little consequence as incandescent lighting is so largely used, while it has succeeded in many cases in getting the statutory lighting power reduced, has on the other hand raised the question whether the value of the gas for heating purposes