

(4) The dark *Ha* Flocculi. (Arcetri, Meudon, Mt Wilson, Ewhurst, Kodai-kanal, Coïmbra, Madrid, Cambridge.)

The character figures for phenomena (2, 3, 4) should be assigned on a scale of numbers 0, 1, 2, 3, 4, 5. The numbers should refer to the *area* and *intensity* of the flocculi, 0 representing absence or rarity of flocculi, and 5 extreme abundance and intensity.

(c) On days when any of the phenomena (2, 3, 4) show unusual features, such as great activity of change or unusual brilliancy, this should be indicated by a special footnote.

(d) It is recommended that character figures should be published quarterly or bimonthly for a period beginning from January, 1928, by the Observatoire Fédéral, Zurich (Director, Professor W. Brunner) in a special *Bulletin*.

(e) It is recommended, as a matter of convenience, that this *Bulletin* should give for each Greenwich day, in addition to the above character figures referring to a limited sector of the sun's disc, the following solar numbers referring to the whole solar disc:

(5) The Wolf relative sun-spot numbers.

(6) The intensity of the ultra-violet radiation as measured at Mt Wilson.

(7) The solar constant as measured by the Astrophysical Observatory of the Smithsonian Institution.

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Commission 14. (LONGUEURS D'ONDE.)

In the absence of Mr Babcock, President, Professor Fowler acted as Chairman and requested Dr Meggers to act as Secretary.

The Commission held two meetings and discussed the Draft Report. Various corrections and additions were made, and the provisional recommendations were voted upon.

On the proposal of Professor Fabry and M. Buisson, the third line of the Report, p. 77, was amended by substituting for "defined the metre in terms of this standard", the statement, "adopted a relation between this standard and the metre".

Professor Fowler explained the present position with respect to the primary standard and suggested that no action be taken until the International Committee on Weights and Measures has had an opportunity to reconsider the specifications adopted provisionally in September 1927. These specifications appear to have been inadvertently based upon the Draft Report of Commission 14 in 1925 (*Trans. I.A.U.* 2, 47) and not upon the final recommendation of the Commission (pp. 188, 232). It was accordingly decided to omit recommendation No. 1 (p. 84) of the Draft Report.

It may be mentioned, however, that Mr Babcock is of opinion that if the condition be imposed that a cadmium lamp must give measurable interference fringes when the difference of path is at least 200,000 wave-lengths, it is unnecessary to prescribe limits for the temperature, current strength, or volume of the lamp; it is, however, important to retain the provision that the lamp shall be non-luminous at ordinary temperatures when connected to the usual high-voltage source, in order to suppress light from gaseous impurities (*e.g.* nitrogen or carbon bands), which contribute too much background to the interference pattern when the standard is isolated by a red filter instead of by a dispersing apparatus.

Recommendation No. 2 was adopted, and assigned the number (1).

A discussion of further possible progress in the specification of standard wave-lengths focussed attention upon certain characteristics of low-pressure sources, either vacuum-arc or furnace spectra. Dr Meggers expressed the opinion that, as compared with the Pfund arc, the low-pressure sources have the following advantages: (1) sharper lines and less self-reversal; (2) no appreciable pressure displacements or pole-effects; (3) simpler specification; (4) probably greater luminosity with larger permissible current strength; (5) closer correspondence with solar spectrum conditions; (6) consistency with standards in the extreme ultra-violet, which are necessarily derived from vacuum sources. In this connection, Dr Freundlich described the vacuum furnace which has been studied extensively at the Einstein Turm in Potsdam. Arising out of the discussion, it was recommended:

(2) That vacuum-arc and furnace spectra be investigated carefully to determine if their use will improve the system of secondary standards.

In explanation and correction of Table I it was decided that the following two paragraphs, which had been communicated to the General Secretary by Mr Babcock, should be inserted before the last line on p. 84 of the Draft Report:

"The intensities in the second column are taken from the work of Burns (*Publications of the University of California, Lick Observatory Bulletin*, No. 247, 1913). Being derived from the partially integrated light of a short iron arc, they sometimes differ considerably from the intensities found in the arc specified for the production of standards of wave-length. The letters *r* and *R* indicate narrow and wide reversals, respectively, as observed by Burns. A revised scale of intensities, obtained with the specified arc, would be of real service to spectroscopists.

"In the third column is given the classification of nearly every line according to its behaviour under increase of pressure on the source of light. Gale and Adams (*Mount Wilson Contr.* No. 58; *Astrophysical Journal*, 35, 10, 1912) divided the iron lines into four groups, *a*, *b*, *c*, and *d*, while St John and Miss Ware (*Mt Wilson Contr.* No. 75; *Astrophysical Journal*, 38, 209, 1913) added group *e*. Recent work by Babcock (*Mt Wilson Contr.* No. 350; *Astrophysical Journal*, 67, 240, 1928) has resulted in the elimination of group *c* and in a numerical definition of the remaining groups in terms of energy levels in the iron atom. The original classification has been modified in the third column to correspond to the present state of the subject."

In view of a further communication from Mr Babcock, pointing out the desirability of making the data of the wave-length report to correspond as fully as possible with Dr St John's revision of the Rowland Solar Tables, it was agreed

that all the letters *c* on pp. 89, 90 of Table I in the Draft Report should be changed to *b*; namely for $\lambda\lambda$

4407.714	4442.343	4494.568
4408.419	4447.722	4528.619
4430.618	4459.121	4630.126

Group *c* will thus be eliminated from the Report.

It was suggested that the wave-lengths measured in the ultra-violet by Buisson and Fabry (*Journ. de Physique*, 7, 389, 1908) and by Burns (*Bull. Bur. of Stand.* 12, 179, 1915) be quoted for comparison with the computed values in Table II, which are based upon term values derived from Table I. These are as follows:

Buisson and Fabry:

2874.176	3075.725
2941.347	3125.661

Burns:

2941.348	3116.638	3184.900
3075.726	3125.665	3199.527
3083.747	3129.340	3236.227
3091.582	3134.115	

Dr Mecke gave an account of recent spectroscopic work at the Bonn Laboratory; it includes the determination of standards in the arc spectra of iron, nickel and copper, wave-length measurements in the spectra of iodine, germanium, argon, and the secondary spectrum of hydrogen, and experiments to establish the wave-length of the $K\alpha$ line of the Röntgen spectrum of copper relative to the primary standard in the cadmium spectrum.

At the suggestion of Professor Fabry, recommendation No. 3 was amended by adding the words "and in the ultra-violet below λ 2800".

Recommendations Nos. 4, 5 and 6 were adopted without change, while recommendation No. 7 was adopted with the substitution of "to longer and shorter wave-lengths" for "in both directions".

Commission 15. (ROTATION SOLAIRE.)

Dr St John stated that the rotation results obtained at Mt Wilson since those of Adams and Plaskett showed a continuous decrease, but the most recent results from spectra obtained under exceptionally good conditions this spring indicated a slight increase, the value of the sidereal rotation at the equator being now 1.94 km./sec.

Father Rodés then gave an exposition of a research in which he obtained a value of the sun's diameter by taking the mean equatorial velocity derived from spectroscopic observations for the 25 years 1889-1913, and combining this with the observed mean rotation period of 24.852 days from observations of spots, faculae, flocculi, and $H\alpha$ filaments. In this way from the mean spectroscopic velocity of 2.0358 km./sec. a value of the solar diameter was obtained in close agreement with the adopted value from trigonometric methods, and his conclusion therefore was that the above value of the velocity must represent the true equatorial velocity.

Coming to the question of the change of speed with solar level, Dr St John referred with satisfaction to the agreement between the Mt Wilson results and those of Evershed, which showed an increased angular speed at higher levels in