Early Photographs of the Planets.

Table VII.

Distribution of the Differences $\log r_{\text{obs}} - \log r_{\text{comp}}$ from Trigonometrical ($\Delta_u$) and Spectroscopic ($\Delta_\text{sp}$) data.

- $\Delta_u > +1.0$, $+0.8$, $+0.6$, $+0.4$, $+0.2$, $+0.0$, $-0.2$, $-0.4$, $-0.6$, $-0.8$, $-1.0$, $< -1.0$
- Numbers $\Delta_\text{tr}$: $4$ $0$ $1$ $2$ $3$ $6$ $7$ $5$ $2$ $1$ $0$ $0$
- Numbers $\Delta_\text{sp}$: $1$ $0$ $1$ $3$ $4$ $6$ $8$ $9$ $2$ $0$ $2$ $0$

Table VIII.

Masses of Dwarf Stars of Different Spectral Types.
(Unit = $\odot$).

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<td>1.2</td>
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<td>1.88</td>
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<tr>
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<td>0.94</td>
<td>1.01</td>
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<td>0.9</td>
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<td>0.7</td>
<td>0.75</td>
<td>..</td>
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On some Early Photographs of the Planets by Light of Different Colours.
By W. H. Wright.

In the George Darwin Lecture for 1928,* which had for its subject the photography of the planets by light of different colours, I stated, or rather implied, that the first observations of the planets with selective filters undertaken for analytical purposes were made in 1912 by Professor R. W. Wood. My attention has since kindly been called by members of the staff of the Lowell Observatory, through the intermediary of Professor Russell, to two excellent sets of observations of this kind that were made respectively by MM. A. de la Baume Pluvinel and F. Baldet † in France, and by G. Tikhoff ‡ in Russia, on the approach of Mars in 1909.

Pluvinel and Baldet, observing from Pic du Midi, appear to have been especially interested in photographing details on the Martian surface, and when they found ordinary violet sensitive plates did not reveal these features they discarded them in favour of plates sensitive to the

* M.N., 88, 709, 1928.
† C.R., 149, 838, 1909.
‡ Pulk. Mitt., 4, No. 42, 1911; see also Obs., 33, 41, 1910.
less refrangible region of the visible spectrum, supplemented by a yellow
colour-screen, which met their requirements. They described some of
the differences between violet and orange photographs, namely, the
complete absence from the former of the dark areas ordinarily seen in
the telescope, and the relatively great strength of the polar caps. At
the southern, or summer pole, the cap was small and bright, while the
northern rim was marked by a large pale area. Limb light was pro-
nounced in the pictures taken by violet light.

Tikhoff at Pulkova, photographing by red, orange, and green light,
found a progressive weakening of the planet's dark markings with
increasing refrangibility of the light used, and a simultaneous strength-
ening of the polar caps and limb light. Fading of the markings and the
development of limb light he attributed to the action of the Martian
atmosphere, suggesting that the effect would be still more pronounced in
blue light. From this suggestion we may conclude that he was unfamiliar
with the paper of Pluvinel and Baldet, published a year or more earlier,
in which the surmise was verified. Tikhoff explained the observed
chromatic characteristics of the south polar cap without recourse to
the planet's atmosphere; its weakness in red light and strength in
green led him to believe that its colour is not white but greenish, and
he suggested that the cap is composed of green ice.

In the same paper Tikhoff discussed photographs of Saturn taken
in different colours, and recorded several of the phenomena later de-
scribed by Wood. Finally, he expressed the opinion that observations
of this kind provide a valuable means for studying the constitution of
the planets.

The observations at Pic du Midi and Pulkova, taken together,
establish some of the principal facts that have been brought to attention
by more recent observers. That the suggestions they afforded were not
taken advantage of is difficult to explain on any other ground than that
these early observations were overlooked or forgotten. Wood, who
seems generally to have been regarded as the pioneer observer in this
field, certainly knew nothing of them, for they anticipate some of his
more important findings respecting Saturn; and it can fairly be inferred
from literature of the period since his publication that they have not
generally been known to students of planetary phenomena.

It may be appropriate to enumerate a number of phenomena which,
in addition to those described above, have been detected in the
more recent observations of Mars, especially as one of them bears on
Tikhoff's interpretation of the polar cap. These are: the darkening
of the limb in photographs taken by light of longer wave-lengths,
especially near opposition; the larger size of the planet in short-wave
photographs; the occurrence of clouds of two types in the Martian
atmosphere; and the relatively high content of violet in the light of
the southern cap when it is close to the limb. Tikhoff failed to detect
limb-darkening, and as a consequence excluded atmospheric absorption
as an explanation of the faintness of the polar cap in his red photographs.
It may be remarked that he did not observe under the best conditions
for the detection of limb-darkening, because Mars was at considerable
The Longitude of the Royal Observatory, Cape of Good Hope, from Wireless Signals, October–November 1926. By H. Horrocks, M.A.

(Communicated by H.M. Astronomer.)

Wireless Observations and Apparatus.—The observations of the Bordeaux signals (8h 1m–6m) and Annapolis signals (10h 10m–15m) at the Cape Observatory during the period of the International Longitude Programme were made by Dr. Halm with a four-valve receiving set (two H.F. amplifiers and two L.F. amplifiers). The apparatus, designed by Halm, by means of which the signal times were recorded, consists of a gramophone motor, the rotating table of which completes an electric circuit operating a chronograph once per revolution. The position of the electric contact along the circular path of the contact-maker can be varied by the observer so as to make the beats of the Fues chronograph synchronise with the signals to which he listens, the motor having been so regulated that the period of revolution agrees very closely with that of the signals. The second pricker of the chronograph records the beats of the standard clock.

The chronograph was brought into operation towards the end of each minute, and the record corresponding to the commencement of the dash was measured, each wireless time-determination thus depending on five signals.

Clock Error.—This was derived from the observations of clock stars in the current observing programme with the reversible transit-circle, the determinations being smoothed graphically. Eichelberger's star places were used. Observations were secured on 38 nights during the above programme, ten clock stars being observed whenever possible, though on several occasions only three or four observations could be obtained. The clock in use as standard was Riefler 150.

Personality in Wireless Observations.—No correction can be applied on this account. Reference will be made later to a series of simul-