



CORRESPONDENCE ON THE SUBJECT OF NOTATIONS.

In preparing its publications, which are destined to circulate among different nations, the International Hydrographic Bureau has met with difficulty on the subject of the Notations to be used, particularly those for expressing different kinds of formulae.

As an example, we will cite the notations used to express latitude and longitude. It is found that latitude is designated in various ways. Ex. θ , φ or L . In these cases the longitude is designated by φ , λ or l .

Among these notations θ and φ have a symbolic value because they give the impression of a sphere divided parallel to the Equator for the latitude θ , and from pole to pole for the longitude φ .

The Bureau has corresponded on this subject with various authorities and in particular with the Union Astronomique Internationale and with the Union Géodésique et Géophysique Internationale.

We give below some extracts from this correspondence which will show the actual state of the question :

BUREAU HYDROGRAPHIQUE INTERNATIONAL— B.H.I. N° 2973/27-89/11.

Monaco, 23rd November 1927.

Monsieur BIGOURDAN, *Directeur du Bureau International de l'Heure, Membre de la Commission des Notations de l'Union Astronomique Internationale*, 6, rue Cassini, Paris (XIV.).

(Translated from the French).

The Directing Committee of the International Hydrographic Bureau has felt the need of adopting in its publications uniform notations, to designate in particular: latitudes, longitudes and azimuths.

Amongst the documentary researches which the Directing Committee has made in this connection, its attention has been particularly drawn to an article: "Notations et Unités adoptées par l'Union Astronomique Internationale", which was published in the Belgian Royal Observatory Almanac for the year 1927, pp. 157 to 166.

I have the honour to forward to you herewith a copy of a part of this article (*). The Directing Committee requests me to ask you if the International Astronomical Union has not published the official Account of Proceedings of the Meetings of the Commission of Notations, which is of particular interest to our Bureau.

The Directing Committee requests me to ask you to what extent the Notations proposed by the Commission have been adopted and followed by the different countries, as the International Hydrographic Bureau would greatly desire to conform, in all its publications, to any system of uniform notation which may have been agreed upon and adopted and to advocate the adoption of such a system by its Members".

(*) See below.

UNION ASTRONOMIQUE INTERNATIONALE (U.A.I.).

Paris, 25th November 1927.

(Translated from the French)

I have the honour to acknowledge the receipt of your letter dated 23rd November and I hasten to reply to it.

The Union Astronomique Internationale has published only a very summary official account of the Meetings of its Commission 3 (Notations) and this report is published in the *Transactions of the International Astronomical Union*, vol. II, Second General Assembly held at Cambridge 1925, edited by Prof. A. FOWLER, F.R.S., London. These notations are in general use in many countries and it seems to be certain that their use will spread rapidly.

I would add that the President of the 3rd Commission of the I.A.U. is Professor STROOBANT, Director of the Belgian Royal Observatory at Uccle and that, in consequence, the particulars in the almanac of this Observatory are obtained from the best source.

The Bureau then addressed the following letter to the International Geodetic and Geophysic Union :

BUREAU HYDROGRAPHIQUE INTERNATIONAL. B. H. I. N° 3064/27-89/11.

Monaco, 30th November 1927.

Monsieur le Général PERRIER, *Secrétaire-Général de la Section de Géodésie de l'Union Géodésique et Géophysique Internationale*,
140, rue de Grenelle, Paris.

(Translated from the French)

The International Hydrographic Bureau has felt the need of adopting a system of uniform notations in order to designate in its future publications elements such as latitude, longitude, etc..

In the course of our researches on this subject, we found that the International Astronomical Union had studied the question of Notations. I enclose an extract from the article which appears on page 157 of the Belgian Royal Observatory Almanac for the year 1927.

On the other hand, Monsieur BIGOURDAN has informed us that these notations are in general use in many countries.

I have the honour to ask you if the Department of Geodesy of the International Geodetic and Geophysic Union has also adopted a system of uniform notations; and if you would find it inconvenient to adopt the system of notations of the International Astronomical Union. Should it be possible to reach an agreement on this point, the International Hydrographic Bureau would like to conform to any such agreement in its publications and to recommend its adoption by its Members.

The International Hydrographic Bureau received the following reply from the Secretary of the Geodetic Department of the International Geodetic and Geophysic Union :

UNION GÉODÉSIQUE ET GÉOPHYSIQUE INTERNATIONALE.
SECTION DE GÉODÉSIE (Secrétariat N° 2364/27).

Paris, 13th December 1927.

(Translated from the French)

I have the honour to acknowledge the receipt of your letter 3064/27-89/11 of 30th November relative to the standardisation of notations in use by Hydrographers, Geodesists and Astronomers, accompanied by an extract from the Belgian Royal Observatory Almanac for 1927.

I was not unaware of the work of the Commission of Notations formed by the International Astronomic Union, but the question of any agreement on this subject between that Union and the Department of Geodesy of the Geodetic Union has never been considered and the latter has never examined the question of notations. I believe, myself, it is difficult to constitute a system of uniform notations for general use by hydrographers, geodesists and astro-

nomers and to change rooted customs—and still more difficult to settle the origins and the meanings used to compute the azimuths, the rectangular coordinates, etc.

Moreover, the notations of the Astronomical Union, enclosed with your letter, certainly cannot, in my opinion, be accepted without discussion by Geodesists. Certain of them violate established customs. Others are incomplete. There is repetition. Such as it now stands, this list has no chance of being adopted by Geodesists.

In any case, the Geodetic Department of the U.G.C.I. never having examined this question, I cannot inform you what its opinion on the subject of the notations advocated by the Astronomical Union may be, nor take any initiative in this direction. All I can do is to propose at the next General Assembly in 1930, at Stockholm, the constitution of a Commission on Notations which, if the Union so desires, could go into this question."

As a result of this correspondence, the Directing Committee intends to propose at the next Hydrographic Conference, in 1929, a discussion as to whether it is necessary to request the International Geodetic and Geophysic Union to put this question on the agenda of its General Assembly at Stockholm in 1930.

NOTATIONS AND UNITIES

ADOPTED BY THE INTERNATIONAL ASTRONOMICAL UNION

In 1919, the International Astronomical Union organised a Commission charged to make out a system of notations, as rational and as homogeneous as possible and taking into account long-established practices.

This Commission was at first composed of MM. BIGOURDAN, B. BOSS, DESLANDRES, DYSON, FROST, TURNER and STROOBANT, President. Certain members have been elected following the adhesion of new countries to the Union, others have been replaced, notably since the meetings at Rome in 1922 and at Cambridge in 1925; at the present moment, 1926, it is constituted as follows: MM. BIGOURDAN, CASTILLO, CHANT, GAUTIER, GRABOWSKI, HORN D'ARTURO, LEUSCHNER, SCHLESINGER, STROMGREN and STROOBANT, President.

We introduced a first scheme in 1920, which was modified after consultation with the other members of the Commission; the majority of the proposed notations were adopted at the Congress of Rome. This Congress also accepted the proposal made at this time by M. DE GRAMONT, likewise the system of abbreviations relative to the constellations and admitting three letters, advocated by MM. HERTZSPRUNG and RUSSELL. Certain units of length proposed by the Commission were also adopted.

Upon examination of the notations which then took place, a certain number of points had to be left in suspense; after further correspondence with the Members of the Commission and meetings held by the latter at Cambridge, and which were attended by other members of the Union, notably MM. CROMMELIN and MERTON, a list was drawn up, which can be considered as final. Certainly the notations given are in reality only recommendations

and, as we have been able to convince ourselves in the course of this long preparation, many astronomers will be induced only with difficulty to give up the use of certain letters, or symbols, which they have acquired the habit of using to represent such and such a quantity.

We have annexed to this list of notations the symbols for the various abbreviations adopted by the International Astronomical Union, and it is hoped that their use will spread more and more.

NOTATIONS

THE EARTH.

a Half major axis of the Meridian Ellipse.

b Half minor axis of the Meridian Ellipse.

$\alpha = \frac{a - b}{a}$ Ellipticity.

GEOGRAPHICAL COORDINATES.

L Terrestrial Longitude, reckoned from 0° to 180° or from 0 h. to 12 h. towards the West, from 0° to -180° or from 0 h. to -12 h. towards the East.

φ Geographical Latitude, positive to the North of the Equator, negative to the South.

φ' Geocentric Latitude.

ρ Terrestrial Radius, " a " being taken for unity.

HORIZONTAL COORDINATES.

A Azimuth, reckoned from 0° to 360° , in the direction S.W.N.E.

h Height above the real horizon.

Z Zenith distance.

R Refraction.

EQUATORIAL COORDINATES.

H Hour angle from 0° to 360° or from 0 h. to 24 h. in a backward direction, *i. e.* anti-clockwise.

α Right Ascension from 0° to 360° or from 0 h. to 24 h., in a clockwise direction.

δ Declination from 0° to 90° , positive to the North of the Equator, negative to the South.

ECLIPTIC COORDINATES.

λ Celestial Longitude from 0° to 360° in a clockwise direction.

- β Celestial Latitude from 0° to 90° ; positive to the North of the Ecliptic, negative to the South.
- Δ Distance of a star to the centre of the earth in astronomical units.
- σ Distance of a star to the centre of the earth, contracted.
- B Latitude of the Sun.
- S Solar Distance contracted, $S = R \cos B$.
- ε Obliquity of the Ecliptic.
- t Sidereal time.
- t_m New mean astronomical time or Universal time (U.T.).
- t_v True time.
- p Parallax.
- p_0 Equatorial horizontal parallax of the Sun, at the mean distance from the Sun to the Earth.

