REPORT OF THE COMMITTEE ON STANDARD EQUINOXES.

BY PHILIP FOX, CHAIRMAN.

At the Cleveland meeting, the Chairman of this Committee suggested to the Council that the Society should urge the adoption of standard equinoxes in publications involving star positions. This was, of course, no new suggestion; but has been brought forward from various sources, most forcibly perhaps by Ristenpart as a result of his experience and tremendous labor in the Geschichte des Fixsternhimmels Bureau of the Berliner Akademie. In order to facilitate the adoption of standard equinoxes, he suggested the selection of 1925 and computed tables for the reduction from various dates to this equinox. These were published by the Observatory of Santiago de Chile. These tables are given also for each year in the Berliner Jahrbuch.

At the San Francisco meeting, this matter was again brought forward in a letter to the Council, from which the following quotation is made:

"In all sorts of astronomical publications the star positions are given, and for a great variety of equinoxes. Following Burnham, many double star observers use 1880. Others, following the example of Aitken and Hussey, have adopted 1900. And still other dates are in use. In other fields, a tremendous variety of equinoxes are to be found. Even in the A.G. catalogue, there are three equinoxes in use, 1875, 1900, and 1905. For the purpose of pointing the telescope, intervals closer than fifty years are not necessary; and for the discussion of star positions, a vast amount of labor could be avoided if the multiplicity of equinoxes might be reduced to few.

"For the purpose of opening discussion, I propose the following resolution:

"THAT in the future, the members of the American Astronomical Society, in giving star positions, shall adopt no date intermediate between 1900 and 1950, and if possible that the Society may persuade foreign astronomers to adopt the same practice.

"THAT the next equinox to be adopted for general use shall be 1950.

PHILIP FOX."

At this meeting, a Committee was appointed with the following personnel: Messrs. Fox (Chairman), Eichelberger, Leuschner, Schlesinger, Eric Doolittle. The Committee was given power to add to its number, and accepting this power, the Committee has invited the Astronomer Royal, Mr. Dyson, and Mr. R. T. A. Innes to serve.
The Chairman circulated a letter to the various members of the Committee, in which the suggestion made in the original letter was modified as follows:

"I am inclined to believe that the suggestion that we adopt no date intermediate between 1900 and 1950 might be modified, and that we should adopt at this time the equinox 1925. The Ristenpart tables will facilitate this reduction. I still personally believe that it would be better to adopt no equinox between 1900 and 1950; but it may be easier to unite on the intermediate date."

Replies were received from members of the Committee, and the following extracts are taken from them.

Schlesinger. There is no question that the present custom of astronomers, the adoption of an equinox near the middle epoch of their observations, is a very wasteful one. In the preparation of our zone catalog of 7200 equatorial stars, compiled with a small doublet, I adopted 1875 as the equinox in spite of the fact that the epoch of these observations is forty years later, I can see no disadvantage that outweighs more than the merest fraction of the very obvious advantages.

My opinion is that for the present, this Committee should restrict its action to the recommendation of three equinoxes, of which only one is in the future; 1875, 1900, and 1925. When peace is declared in Europe, the Society should ask the Astronomische Gesellschaft, the Royal Astronomical Society, and the Société Astronomique to appoint similar committees to act with ours and to agree if possible upon a procedure that will apply to all observations in the future, perhaps the adoption of 1925, 1975, 2025 etc. I therefore move that this Committee present to the Society for action the following resolution:

WHEREAS, the use of many equinoxes for the publication of star positions has entailed a large amount of unnecessary computing,

RESOLVED that the American Astronomical Society urge its members to refer their observations to one of the following equinoxes to the exclusion of all others: 1875, 1900, and 1925.

Etcheberger: I have been mulling over your suggestion and talking about it. I have found just as many different opinions as to what should be done as I have consulted different persons.

Neither your original motion to hold to 1900 until we go to 1950, nor the suggestion to substitute 1925 for 1950 appeals to me.
If any action is taken, I suggest that a tentative scheme be formulated and that the Astrophotographic International Committee according to whose suggestions most of the meridian circle work of the world is now being carried on, be consulted before final action is taken.

It seems to me that possibly the following set of equinox dates may be the most advantageous: 1900, 1920, 1940, 1960 etc., for if Greenwich, for instance, cannot be induced to conform to the new dates, no greater confusion will be introduced as the dates suggested are included in those now on the Greenwich list, and further, as Pulkowa has been issuing its fundamental catalogues at twenty year intervals, it might more readily adopt the suggested scheme than one made upon a different interval.

**DoLittle:** The matter mentioned in your recent favor seems to me to be of the very greatest importance, and if it shall be by any means possible to secure a practically universal acceptance of a standard equinox for star places, an immense amount of wholly unnecessary labor will be saved for us all. As you know the epoch 1880.0, now chosen for all double stars, is rapidly growing out of date: epochs of 1900, 1910, and even 1920 are separately chosen by discoverers, besides a few other dates, and this in one restricted department of our science alone. It is so all along the line, and I am sure everyone would welcome an attempt to secure a greater uniformity, even if this was not wholly successful. Every convert to the standard equinox, (whatever it may prove to be), would lessen the labor of whoever used the results in that particular case.

Of the two dates mentioned by you, I would unhesitatingly and strongly favor 1950.0. This date is already nearer us than the epoch 1880.0, and it seems to me is quite near enough. Of course, 1900.0, and 1910.0 are already out of the question, and extended works whose completion will take several years more will have been published but a short time before 1925.0 will have come. I feel quite sure that for double star purposes, fifty year intervals are small enough: it seems to me that anything much less than this serves only a temporary purpose.

**Crawford:** If an outside opinion will be of any avail, I should like to express mine as being in favor of the 1925 equinox.

**Dyson:** Although I am in sympathy with the idea of bringing out star catalogues to the epoch 1925.0, I am afraid it is not possible for me to join your committee. It happens that a catalogue, for which I am responsible, will be brought out for equinox 1910.0. The arrangements were made and precessions
computed years ago, and I am not prepared with a diminished staff to alter this now. It would, therefore, be inconsistent for me to join your Committee.

Innes: I am in receipt of your letter of the 24th of June last enclosing a copy of your circular letter on the adoption of a uniform equinox and your proposed motion.

Just amongst other things—for double stars I could not use 1880 because the Cordoba Catalogue and the C. P. D. were for 1875 and the latter gave 25 years' precession offhand: 1900 was therefore easier than 1880.

You say that for the purpose of pointing the telescope, intervals of 50 years would suffice. This is so for bright objects, but for faint objects I think 25 years is long enough. But for rough purposes almost any equinox would suit because it is so easy to apply approximate precessions. The difficulty comes when one requires places of the utmost precision.

You will have seen by my recent papers on the determination of proper motions with the blink microscope—including U.O. Circular No. 35 now being issued, that I am changing my point of view somewhat.

At present, I feel we ought to consider each Carte du Ciel region as an entity and catalogue with all precision the places of say eight stars of the 9th magnitude and without large proper motion as the reference stars which fix the position of that area with reference to our moving equinox and equator. Of course, we must use the brightest stars as intermediaries, but the number of those can be very strictly limited. Beyond this program, we require no places of precision. The photographs and the blink microscope do the rest.

The essence of my advocacy is that we adopt as our framework of reference, not the brightest and nearest stars, all in more or less discordant motion, but the fixed fainter stars.

If, however, astronomers insist on enormous catalogues of precision, then the only logical and economical device is to adopt a fixed set of coördinates such as a Galactic System, and I have shown that essentially it is as convenient to compute to or from as any other system.

If I could reply more definitely and you indicate on what lines, I will willingly do so.

Pickering: We are constantly using the epoch of 1855, which is now as distant as 1975, and in twelve years will be as distant as 2000. 1875, a nearly universal epoch, is more distant than 1950. I fear, however, that compilers of precise posi-
tions of the stars would find it difficult to carry forward their positions, not only from the necessity of using the third, or even the fourth term, but also owing to the unknown proper motions. It is so usual to publish positions for the beginning of the year in which they were observed, that strong objections will be made to a long interval. Even in photographic work with doublets, where we use the positions for 1900, and set directly by the circles, the deviation of the required region from the center of the plate is troublesome. Accordingly, it would seem that 1925 would be best suited to our needs for the next twenty years, and then that the epoch of 1950 could advantageously be adopted.

It would be a good plan for the Committee to send to a hundred selected astronomers a statement of the advantages of each different date. Their replies would doubtless have great weight. Perhaps a distinction should be made between catalogues giving precise positions and those giving physical properties; also, between catalogues which would require many years in their preparation and those made up at once from existing material.

A very useful catalogue might be prepared by the Committee of four or five thousand stars, perhaps including those of the magnitude 6.00 and brighter, giving the precise position for the adopted date, proper motion, parallax, radial velocity, photographic and photovisual magnitude, and class of spectrum. Other constants, such as galactic longitude and latitude, might also be included. The catalogue might include stars of special interest, as those having large parallaxes or motions. It might be useful work for the society to preserve such a catalogue in type and secure specialists who would keep the constants up to date each year. For instance, a compilation of the best results for parallax and radial velocity, brought up to date would be extremely convenient for investigators by statistical methods.

The replies show practical unanimity for the desirability of adopting standard equinoxes though there is naturally divergence as to actual dates suggested.

In view of the suggestion of 1950, it seemed necessary to locate someone who would undertake the computation of tables similar to those of Risteparf, if the plan were to be at all feasible. Following this idea the Chairman consulted with Professor Malcolm McNeill, of Lake Forest University, who, after consultation, expressed his willingness to undertake the computation of such tables; so if and when the Society sees fit to adopt this plan, assistance will be available to further its realization.
At the Swarthmore meeting, this whole matter was discussed by the Committee, but rather briefly; however, they came to a conclusion which was adopted by the Council and recommended for practice by members of the Society:

"THAT in any publication involving star positions, no equinox should be used intermediate between the ephemeris 1900 and 1925."

It is hoped that this restriction, which will greatly reduce the amount of labor now involved in the treatment of star positions, will find universal adoption by members of the Society and observatories of the country, and that eventually it may extend even farther.

At the Albany meeting in the summer of 1917, the Society will give this matter further consideration. In the meantime, if any member has suggestions bearing on this matter, the Chairman would be very happy to receive them.