Graphical Methods in Nautical Astronomy.

As the author of the article in NATURE of October 24, 1918, in which the diagram referred to by Dr. Hutchinson last week was first brought to the notice of your readers, may I be permitted to supplement the information as to previous efforts in the same direction? When the diagram first appeared in this country Rear-Admiral Parry, Hydrographer to the Admiralty, also set on foot an inquiry similar to that of Dr. Hutchinson, and very courteously sent me the result of his investigation. From his report it appears that "an account of the 'Nomogramme' was published in *Petermann's Mitteilungen* (vol. ii., pp. 182 and 249, 1913), and was illustrated by a skeleton diagram similar in principle to these charts, and the method for using it was fully explained." This, in point of time, is fifteen years later than the date of the paper of M. d'Ocagne, who, so far as appears at present, is clearly entitled to the credit claimed for him as first in the field.

The share of Mr. Littlehales, however, is marked by two features of interest:—(1) That he seems to have been the first to prepare and publish the diagram in a form that promises to be useful in the navigation of air and ocean, and (2) that the simplicity of treatment which deduces the principle and graduation of the chart directly from a general formula of spherical trigonometry renders the theory of the matter intelligible to many nautical persons to whom the mysteries of "Nomographie" are as a sealed book.

H. B. GOODWIN.

March 15.

The Oldest Mosquitoes.

THE REV. PETER BELLINGER BRODIE, in his "History of the Fossil Insects of the Secondary Rocks of England," gave a figure of a small fly which he named *Culex* (?) *fossilis*. This insect, from the Purbeck strata, would be by far the oldest mosquito known, were it a veritable *Culex*. Unfortunately, it is impossible to form any definite opinion, and as positive evidence of the antiquity of the Culicidæ the specimen must be dismissed as valueless. On general grounds it is very improbable that the group is so ancient. In Handlirsch's great work on fossil insects several Culicidæ are listed from the Oligocene Tertiary; but Handlirsch did not know that two species described by Scudder, from Wyoming and Utah respectively, are actually much older, coming from Eocene rocks. The one from Utah is of little value, and presumably not a true *Culex*; but that from the Green River beds of Wyoming has the unmistakable features of a genuine mosquito, showing the long proboscis and the short palpi of the female. According to Schuchert's estimates of geologic time, this should be more than two million years old at the very least. Scudder's insect, called *Culex damnantorum*, is 6 mm. long, with a proboscis 1.9 mm. It doubtless tormented the Eohippus and related mammals of this general period. Whether it carried any pathogenic protozoa we can, of course, never know. It is now possible to put on record a second Eocene mosquito, found by Mr. Dean E. Winchester, of the U.S. Geological Survey, at Smith's Ranch, in the vicinity of the Cathedral Bluffs, in western Colorado. It is represented by a female, preserved in lateral view, 5.2 mm. long, the wing about 4.2 mm., thorax about 2 mm., palpi about 0.4 mm., and the distinctly curved proboscis 3 mm. The stout abdomen is like that of true *Culex*, obtuse at the end, not tapering as in *Aedes*. The longer proboscis readily separates it from Scudder's insect, so it must stand as a new species, to be called *Culex winchesteri*,

after its discoverer. The horizon is considered to be Green River, approximately equivalent to that of the Wyoming locality.

The oldest British mosquitoes, setting aside Brodie's very dubious Purbeck specimen, are three species from the Oligocene of Gurnard Bay, in the Isle of Wight, also collected by Brodie. These were described by the present writer in 1915, and are in the U.S. National Museum. One of them is so beautifully preserved that it shows the wing-scales.

While writing on fossil Diptera I take occasion to note that my *Mesomyites concinnus*, another of the Gurnet Bay fossils, is evidently a member of the peculiar Tipulid genus *Styringomyia*, and should be called *Styringomyia concinna*. I am indebted to Mr. C. P. Alexander for suggesting the correction. The specimen is in the British Museum.

The Gurnard Bay locality, which furnished Brodie with large and important collections, seems not to have been investigated in recent years. Most of Brodie's collection is at the British Museum, and will, when fully described, add greatly to our knowledge of Tertiary insects.

T. D. A. COCKERELL.

University of Colorado, Boulder, Colorado.

Proposed Magnetic and Allied Observations during the Total Solar Eclipse of May 29, 1919.

SPECIAL magnetic and allied observations will be made at certain stations inside and outside the shadow belt of the total solar eclipse of May 29 next by the Department of Terrestrial Magnetism of the Carnegie Institution of Washington and by various magnetic observatories, institutions, and individuals. The probable stations of the Department of Terrestrial Magnetism are (1) La Paz, Bolivia; (2) Huanacayo (north of belt of totality); (3) near Sobral, Brazil; (4) Ile Principe or Libreville, French Congo; and (5) various field stations within the zone of visibility. At station (3) complete magnetic and electric observations will be made.

The general scheme of work proposed by the Department of Terrestrial Magnetism is as follows:—

(1) *Simultaneous magnetic observations* of any or all of the elements, according to the instruments at the observer's disposal, every minute from May 29 next, 9h. 58m. a.m. to 4h. 32m. p.m. Greenwich civil mean time, or from May 28, 21h. 58m. to 4h. 32m. May 29, Greenwich astronomical mean time.

(To ensure the highest degree of accuracy, the observer should begin to work early enough to have everything in complete readiness in proper time. Past experience has shown it to be essential that the same observer should make the readings throughout the entire interval. If possible, similar observations for the same interval of time as on May 29 should be made on May 28 and 30, to afford some means of determining the undisturbed course of the magnetic declination.)

(2) *At magnetic observatories* all necessary precautions should be taken to ensure that the self-recording instruments will be in good operation, not only during the proposed interval, but also for some time before and after, and eye-readings should be taken in addition wherever it is possible and convenient.

(It is recommended that, in general, the magnetograph should be run on the usual speed throughout the interval, and that, if a change in recording speed be made, every precaution possible should be taken to guard against instrumental changes likely to affect the continuity of the base line.)

(3) *Atmospheric-electric observations* should be made to the extent possible with the observer's equip-