of its excursions in search of pond life, the neighbourhood visited being Totteridge and Mill Hill. Mr. W. Burton obtained two small phials of the water for examination, and the first pipette of water turned out into the trough contained a minute fly, which Mr. Burton kindly brought to me, when I immediately identified it as the *Polynema natans* (Lubbock, *Trans. Linn. Soc.*, vol. xxiv. 1864, p. 135, plate 23).

As this capture was, for the fourth time, the result of chance, Mr. Burton and I set out (May 6) to search for more specimens. After dipping our nets in and carefully examining the contents for over two hours, my patience was at last rewarded by seeing a beautiful female, struggling to free its wings from the mass of minute vegetation gathered in the dipping net. After a few hours more search, I found four males, which, together with the female, I transferred to an observation tank, where all soon disported themselves in the liveliest manner, swimming, or rather flying, under water for over four days, during which period they did no., to my knowledge, once leave the water. I have since obtained others, which are under close observation, and in course of time I hope to trace out their life-history.

Perhaps, owing to the microscopic dimensions of many of the *Mymaridae* (Haliday), very few entomologists have paid any attention to this most interesting and fascinating family of beautiful "Fairy Flies," to whose industry we are no doubt largely indebted for our freedom from "blights" of many kinds. They are, indeed, mere specks, scarcely visible to the eyes of ordinary folk, and yet they have their place in nature.

I am inclined to think that when the type collection of the *Mymaridae*, made by the late Mr. Haliday, has been thoroughly examined, this name *Polynema natans* will have to give place, so far as the genus is concerned. I hope that before very long we shall have figures of all the genera in this most interesting group.

FRED. ENOCK.

Halley's Chart.

I HAVE been much interested with the letter of Dr. L. A. Bauer in your last number, as I happen to possess a map, or chart, bound up with a number of Dutch, German, and French maps of the end of the seventeenth and the first years of the eighteenth centuries. The latest map with a date is 1704. This English map is evidently the same as 974 (4) mentioned by Dr. Bauer. It is entitled "A new and correct chart showing the Variations of the Compass in the Western and Southern Oceans, as observed in y^e year 1700, by his Ma^{ties} command by Edm. Halley." The dedication reads as follows, in Latin: "Majestati semper Augustæ Gulielmi III. D.G. Magnæ Britanniæ Fra. & Hib. Regis Invictissimi. Tabula hæc Hydrographica Variationum Magneticarum Index. Devotissime Consecratur a Subdito Humillimo Edm. Halley." At one side of the map is the following: "The curve lines which are drawn over the seas in this chart do show at one view all the places where the variation of the compass is the same: The numbers to them show how many degrees the needle declines either Eastwards or Westwards from the true North: and the double line passing near Bermudas and the Cape de Virde isles, is that where the needle stands true without variation."

The chart is in excellent condition, but has no name or printer on it. The only indication is "J. Harris, Sculp." The course of a vessel going from and returning to England is clearly marked.

THOS. WARD.

Northwich, May 27.

ON THE LINE SPECTRA OF THE ELEMENTS.

I THINK Lecoq de Boisbaudran was the first who called attention to the fact that the line spectra of the elements are by no means so irregular as they seem to be at first sight. He discovered the similarity in the spectra of the alkalis and alkaline earths, and pointed out how the lines in the spectra of these two families seem to be shifted towards the less refrangible side with increasing atomic weight. Mascart, in 1869, found two strong triplets of lines in the ultra-violet spectrum of magnesium, similar to the strong green triplet so prominent in the solar spectrum. He says: "Il semble difficile que la reproduction d'un pareil phénomène soit

un effet du hasard; n'est-il pas plus naturel d'admettre que ces groupes des raies semblables sont des harmoniques qui tiennent à la constitution moléculaire du gaz lumineux? Il faudra sans doute un grand nombre d'observations analogues pour découvrir la loi qui régit ces harmoniques." But the wave-lengths corresponding to these rays were then not accurately known, and so the most interesting feature concerning the oscillation frequencies, or the number of waves which pass any fixed point in unit of time, remained unnoticed. It was later on shown by Hartley, that the differences between the wave-numbers of the three lines seem to be the same for all the triplets. This constant difference of wave-numbers repeated in a number of doublets, of triplets, and of more complicated groups of lines, has now been observed in the spectra of many elements. There are repetitions of doublets in the spectra of sodium, potassium, rubidium, caesium, copper, silver, aluminium, iridium, thallium; of triplets in the spectra of magnesium, calcium, strontium, zinc, cadmium, mercury, manganese, and of more complicated groups of lines in the spectra of tin, lead, arsenic, antimony, bismuth. In all these cases the differences seem to be absolutely constant. For, notwithstanding the great accuracy with which Rowland has taught us to determine the wave-lengths, the law holds good. As an example, I give the list of doublets in the spectrum of thallium, according to Prof. Kayser's and my determinations. The number of waves passing a fixed point in unit of time, is equal to the distance the light travels in unit of time divided by the wave-length. If we measure the wave-lengths in vacuo, the distance the light travels is the same for all rays. We may then choose as unit of time, the time that light requires to travel one centimetre, so that the wave-number is simply equal to $1/\lambda$, λ being the wave-length in vacuo, measured in centimetres. In this manner, we get rid of the necessity of settling the velocity of light, which as yet has not been measured with anything like the accuracy with which the wave-lengths are known.

λ	Difference.	Estimated limit of error.
18684.2	...	0.32
26476.6	...	0.63
28324.1	...	0.74
36117.1	...	4.90
30952.1	...	0.90
38744.8	...	4.50
33569.4	...	1.20
41365.1	...	2.40
34217.7	...	6.80
42010.2	...	7.30
34526.2	...	8.20
42321.4	...	
35372.1	...	
43164.7	...	
36879.2	...	
44671.0	...	
37503.0	...	
45293.8	...	
38305.0	...	
46096.8	...	
38663.3	...	
46452.4	...	
39157.0	...	
46947.3	...	

The mean of the twelve differences, assuming their weights to be inversely proportional to the square of the estimated limit of error, is 7792.5. When the wave-lengths are not reduced to vacuo, the differences are also very nearly constant, because the reduction alters them all nearly by the same amount. But it was a source of satisfaction to me, that the reduction brought all the deviations from the mean value well within the limits of error, whereas without the reduction the second difference had been just beyond the limit. These twelve doublets do not comprise half the number of wave-lengths that have been