

to co-operate in any proceeding which may be thought most likely to induce the Government of the United States to continue the publication of them. FREDK. T. MOTT

Town Museum, Leicester, March 7

Origin of the Screw Propeller

I SHOULD like to remark, in reference to last week's letter on the origin of the screw propeller, that I have long considered the pectoral fins, which are so extremely useful and prominent upon soles, or the family *Pleuronectida*, as being highly suggestive of this more modern mode of propulsion. Anyone who likes to watch these extremely interesting fish in their swimming movements and graceful gyrations may witness the action and I think attribute to its movements more than is possible in the case of ash and other seed vessels.

Valentines

WILLIAM EARLEY

The Three Kingdoms of Nature

IN reply to your correspondent's question as to which of the three kingdoms "water" belongs, I beg to state that the strict scientific definition of a mineral, adopted in most mineralogies, is as follows: a mineral is any *inorganic, homogeneous, natural* substance.

This definition obviously includes water, which is accordingly always described in books on mineralogy; and the fact of water being a liquid at ordinary temperatures cannot of course exclude it from the list of minerals. Indeed, in some mineralogies, gases—such as carbonic acid, sulphurous acid, and even the air—are described as minerals. Water, like many other minerals, can exist in more than one form; thus, if the temperature of our globe were much lower than it is, we should only have water in the form of the transparent crystalline solid, known as ice, which—like other minerals, such as sulphur, metallic lead, metallic mercury, &c.—has its own particular point of fusion; thus: sulphur melts at 226° F., water at 32°, mercury at 39°. All these substances still further resemble one another in their capability of being converted into a gaseous form, at certain fixed temperatures. These facts—with many others—prove water to be as much a mineral as calcite or gypsum. E. G. C.

Upper Holloway, N., March 13

The Recent Storm

YESTERDAY'S storm appears to have been a true cyclone, and to have passed nearly centrally over here about half-past one o'clock. I first noticed the barometer at 11 A.M. I forward observations:—

Sunday.		Barometer.	
10	A.M.	Wind and rain S.	...
11	"	Strong ditto	... 27
12	"	Ditto from S.W.	... 26.9
12.30	P.M.	Increased ditto	... 26.85
1	"	Great gale, S.W.	... 26.8 falling still. ¹
1.20	"	Ditto, S.W.	... } At
1.35	"	Calm	... } lunch.
2	"	{ Strong wind from N. with driving sleet...	26.8 rising.
2.30	"	Gale, snow and sleet.	26.85
3	"	Ditto, rather increased	26.9
4	"	Brisk breeze, N.	27
5	"	Slight breeze, N.	27.35
11	"	...	27.9

Being a rise $1\frac{1}{10}$ inch in seven hours.

Staplehurst, Kent, March 13

T. S. USBORNE

Bed-time

CAN any of your readers inform me on what ground the following saying is based, and to what extent it is true:—"One hour's sleep before twelve is worth two after."

March 10

VITA BREVIS

OUR ASTRONOMICAL COLUMN

COMET 1840 (II).—In *Astronomische Nachrichten*, No. 2,079, Dr. Kowalczyk, of Warsaw, publishes his investigation of a definitive orbit for the comet discovered at Berlin, by Prof. Galle, the present Director of the Observatory at Breslau, on the 25th of January, 1840.

* N.B.—This is $\frac{1}{10}$ lower than I ever saw it before.

This comet, which was last observed at Kremsmunster on the 1st of April, had already been made the subject of extensive calculation by Professors Plantamour and Loomis. The former, in 1843, discussing his own series of careful observations taken at Geneva, found (*Astron. Nach.*, No. 476) that a parabolic orbit represented the comet's course within the probable limits of error of observation; on including the series taken at Berlin he found the most probable orbit to be an ellipse, but of great excentricity to which little weight was considered to attach. Loomis, on his side, taking into account the effect of planetary perturbation during the interval of the comet's visibility, also found an ellipse, but with a more moderate excentricity, the period of revolution being about 2,420 years; the sum of the squares of the errors in the ellipse is diminished to one-third of the amount with the best determinable parabola. Loomis's investigation will be found in the "Transactions of the American Academy," vol. viii.; his orbits are not included in the extensive collection in Dr. Carl's "Repertorium der Cometen-Astronomie," a work which, notwithstanding its great utility to the student of this branch of the science, is yet not complete or free from numerical errors.

Kowalczyk starts with the parabolic elements obtained by Plantamour in 1843, comparing them with the whole course of observations. After introducing the corrections for aberration and parallax, and the earth's positions from Leverrier's tables, instead of those from the Tables of Carlini used by previous computers and by the usual method of equations of condition for ten normal places, he finally arrives at an elliptical orbit, very closely agreeing with observation, and showing a period of revolution of 3,789 years.

BERLINER ASTRONOMISCHES JAHRBUCH, 1878.—The Berlin Ephemeris for 1878 has been received during the past week. In its speciality—the ephemerides of the minor planets—Prof. Tietjen has evidently made a very vigorous and successful effort to keep pace with the frequent additions to the list; his volume contains approximate places for every twentieth day during the present year of 144 of the 160 small planets hitherto detected, and accurate opposition ephemerides of 71, occupying together one-third of the entire work. The collective table of elements to No. 147 inclusive is not the least important part of this volume of the *Fahrbuch*.

Prof. Tietjen continues to transfer to the Berlin work—of course after reduction to that meridian—the places of the moon from our *Nautical Almanac*, which, by order of the Admiralty, is invariably published three complete years in advance of that to which it applies, and considerably earlier than any other of the national ephemerides. The economy of labour of computation thereby effected, which is probably found by the conductor of the *Berliner Fahrbuch* of material assistance for the production of his extensive work on the minor planets, might possibly be extended in other directions. An ephemeris of the moon from Hansen's Tables, employed for all the European ephemerides, admits of pretty complete check at a small expense of calculation, and there appears to be no advantage derivable from an independent work involving such heavy labour as the computation of the moon's positions through a whole year. Prof. Tietjen contents himself with a few direct calculations from the Tables which he says "invariably exhibit a satisfactory agreement" with the results in the *Nautical Almanac*.

PHYSICAL SCIENCE IN SCHOOLS

WHEN I claimed for science a position of educational equality "both as regards range and time with classics and mathematics," I intended to express the amount of science teaching in the school curriculum which alone can satisfy the upholders of a scientific education. I am as fully aware as Mr. Wilson is of the