

and a portion of the anterior segments dirty yellowish white. I do not yet know the perfect insect. The larva feeds on the wild balsam. The general colour of this larva at once reminded me of two abnormally coloured larvæ of the common death's-head moth that I had brought to me from a potato field in Jersey some years ago, together with others of the ordinary colour.

One was full grown and another half grown. The general colour of these was brown with fine black markings and without a trace of green. The anterior segments were a pale dirty cream colour. There were no ocelli or diagonal stripes on the sides.

I have not seen recorded any similar case of abnormal colouring in the larva of the death's-head moth, but the fact is interesting as indicating a common ancestry in two moths which are probably now classed in different genera.

E. R. JOHNSON

Surgeon Major, Bengal Medical Department

Shillong, October 16

[The form of death's-head larva alluded to is not uncommon; it is a dimorphic condition and finds its parallel in many larvæ of Sphingidæ. ED.]

The Fertilisation of the Common Speedwell

ALTHOUGH it is the wrong time of the year for observing flowers, it will perhaps not seem out of place to draw the attention of your readers to the fertilisation of the common Speedwell (*Veronica officinalis*). The flowers in the plant hang downwards, so as to bring the nearly flat corolla a little under the perpendicular. The two stamens project outwards and downwards on each side of the pistil, which also hangs down, but not so much as the stamens. These latter are very much narrowed at the base. The flower is in this species, proterandrous, and the corolla, as soon as the stamens have shed their pollen, becomes slightly loose.

It at first sight seems quite impossible for either cross or self-fertilisation to take place, as the stamens are quite away from the pistil, and, owing to the position of the flower, insects are compelled to alight in front.

One morning last summer, however, in considering the structure of the flower, &c., I was led to conclude that the explanation must lie in the insect's mode of settling upon it, and accordingly watched two or three plants. In about half an hour's time I had the pleasure of seeing a large fly in the act of fertilisation. As the corolla was flat, and the flower hung down, there was no foothold there, so the insect clasped each of the stamens with its forefeet. Being thin at the base, they were drawn together, and the anthers meeting just below the pistil, dusted the front of its head with the pollen.

On comparing a large number of flowers, I found that when just open, the pistil stood up above the point at which the two anthers would meet, but that in older flowers, especially after the anthers had shed their pollen, it was inclined downwards. If this observation is verified, it will show a most striking adaptation for preventing self-fertilisation.

I may add that in one of the smaller flowered species, *V. hederifolia*, the stamens and pistil are quite close to each other, so that self-fertilisation must here be the rule. The corolla is also not so easily detached.

A. MACKENZIE STAPLEY

The Owens College, Manchester, November 20

Wartmann's Rheolyzer

YOU gave in NATURE a report on "Wartmann's Rheolyzer." I beg to say that I invented and constructed the same apparatus long ago, and described it in the "Sitzungsberichte d. Wiener k. Akad. d. Wissensch., July, 1877, under the name of "Rheonom." Some months after that a fair report of my paper appeared in "Beiblätter zu Wiedemann's Annalen." My instrument was for some years in the hands of several physiologists. Prof. Yeo was present when I made experiments with it in Prof. Ludwig's laboratory in Leipzig in the year 1878, and Prof. E. du Bois-Reymond has it also in his collection of physiological and physical instruments for more than five years. There is no doubt that Prof. Wartmann was not acquainted with my apparatus when he described his, but I cannot be expected to see my invention ascribed to another and keep silent. So you will oblige me very much in correcting the above-mentioned mistake in your paper.

ERNST VON FLEISCHE

Vienna, Währingerstrasse 11, November 30

Pollution of the Atmosphere

THERE was a letter in NATURE some time since, calling attention to the pollution of the atmosphere by the burning of coal; and it was calculated that in the year 1900, all animal life would cease, from the amount of carbonic dioxide; but the author had overlooked the fact that the rain is continually cleansing the atmosphere of this, and the fall of this rain on the ground, and the combination of this with various salts; besides, the oceans alone would absorb their own bulk at normal pressure, but at an increased pressure of, say half a mile deep, would dissolve more than we are likely to need for hundreds of years.

But there are other products of combustion, or rather of incomplete combustion, that are not brought down in this manner by rain, as hydrogen and the hydrocarbons, chiefly marsh-gas and ethylene. The latter has, I believe, been observed by the spectroscope on the Alps, and was supposed to have come from space.

Since the year 1854 (as near as I can estimate) there has been burnt 10,000 million tons of coal; and if we say (in its consumption by household grates, leakage by gas-pipes, &c.) 1-100th escapes, then 100 million tons of hydrogen and hydrocarbons are floating in the atmosphere, or 1-10,000,000th part in bulk; if we say the average proportion of hydrogen to be .45, and of marsh gas .35, and of ethylene .4, we have .84 per cent. of gases that are lighter than air, and it is more than probable that the law of diffusion of gases, as demonstrated with jars, does not apply to the atmosphere. The cases are not parallel: in the air we have unconfined space, pressure, and temperature diminishing infinitely, conditions favourable to the lighter and the gas with the greater amount of specific heat rising and maintaining its elevation, especially as we know that in large halls carbonic dioxide is found in larger quantities on the floor. According to Prof. Tyndall's researches, hydrogen, marsh gas, and ethylene have the property in a very high degree of absorbing and radiating heat, and so much so that a very small proportion, of only say one thousandth part, had very great effect. From this we may conclude that the increasing pollution of the atmosphere will have a marked influence on the climate of the world. The mountainous regions will be colder, the Arctic regions will be colder, the tropics will be warmer, and throughout the world the nights will be colder, and the days warmer. In the Temperate Zone winter will be colder, and generally differences will be greater, winds, storms, rainfall greater.

H. A. PHILLIPS

Tanton House, Stokesley, November 23

A Modern Rip Van Winkle

WHEN Mr. Evans asks whether it is impossible for "the so-called flint implements and flint flakes to have been formed by natural causes" he surely must have had a scientific nap of forty or fifty years. He can answer his question by going to any good museum and inspecting the beautifully and clearly manufactured implements which the Curator will show him.

November 28

SAITBURN

GOOLDEN'S SIMPLE DIP-CIRCLE

A DIPPING-NEEDLE suitable for the requirements of schools and science classes has long been a desideratum, there having been no instrument obtainable hitherto which would at a moderate cost afford results of sufficient accuracy. Between the mere needle suspended in a simple stirrup of brass, and the delicate and complicated dip circles of standard pattern there has been no intermediate form of instrument. This deficiency, has, however, been remedied by Mr. Walter Goolden, M.A., Science Master in Tonbridge School, who, in conjunction with Mr. C. Casella, has designed the form of portable dip-circle depicted in the figure, which possesses several novel points. The needle, which is $3\frac{1}{2}$ inches in length, is poised upon an accurate axis working in sapphire centres, and magnetised once for all. In order to ensure the coincidence of the centre of gravity with the centre of suspension, two very light adjustable counterpoises are fixed to the needle, one of them being capable of being moved parallel to the length of the needle, the other lying at right angles to the first, and