

have made in my travels of a zone of almost perpetual electrical discharge in the belt of the "doldrums" all round the world.

Anywhere in that belt, a more or less intermittent display of sheet lightning commences the moment the twilight of sunset has sufficiently faded away, and continues with varying intensity till the light of morning prevents further observation.

The localisation of this belt of lightning is very obvious as we run a section across the equator on board ship. There is very little electrical discharge in the high-pressure belt of anticyclones which encircle the earth approximately under the lines of the tropics; but as we approach the low-pressure band of the "doldrums," where the two trade-winds, or the two monsoons meet, then the display of lightning is of nightly occurrence, even if there are no actual thunderstorms.

This electric discharge has a diurnal period like every other meteorological element; for night after night, as I have slept on deck in Malaysia during the change of the monsoons, I have noticed a very marked diminution of the lightning after 1 or 2 a.m. If a total eclipse of the sun could last for twelve hours, I have no doubt that we should see more or less lightning all the time, with a regular set of diurnal variations.

Edlung and others have noticed the gradual decrease in the frequency of thunderstorms as we recede from the equator; but I wish to show now, not only that the discharge is of nightly occurrence, but that the locality of maximum effect is not so much on the equator as in the "doldrums." The sheet lightning may be the reflection of distant thunderstorms, or it may be the silent discharge of electricity. Meteorologists are much divided as to the possibility of the latter; but it is certain that the amount of sheet lightning is out of all proportion to the frequency of actual thunderstorms.

Is it not possible that we may find in this perpetual lightning, some clue to the origin of earth-currents everywhere? and in the diurnal variation in the discharge, some probable reason for the hourly variation of the aurora, and of some magnetic elements? No doubt it is at present difficult to connect the electricity of lightning with the electro-magnetic effects of terrestrial magnetism or the aurora; and though Edlung's theory is defective in this respect, I cannot help thinking that he is right in collating thunderstorms on the equator with the glow discharge of electricity on the Arctic circle; and it is in the hope that the discovery of the constancy of electrical discharge in the "doldrums" may perhaps assist in the evolution of a true theory of the aurora, that I have penned this short notice.

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21 Chapel Street, London, March 15

### Scorpion Virus

PROF. BOURNE'S experiments, related in the Proceedings of the Royal Society of January 6, 1887, seem to establish the fact that although the scorpion may be provoked to strike and wound itself or another scorpion, it is incapable, in either case, of causing any toxic action, however active the virus may prove in respect of other creatures. That it is, in short, with the scorpion as it is with the cobra or viper: they poison other creatures, but not themselves or each other.

Some years ago an exhaustive series of experiments brought me to the conclusion that a cobra is not poisoned by cobra virus, whether inoculated by its own fangs, by those of another cobra, or by a hypodermic syringe. The same in the case of daboia and other viperine snakes.

It seemed, however, that the bungarus, a less deadly snake than the cobra, occasionally is affected, though slowly, by the cobra virus, but that it escapes more frequently than it suffers; and when it does suffer the effect of the poison is greatly diminished. On the other hand, non-venomous snakes, lizards, frogs, fish, mollusca, and other low forms of life, all rapidly succumb to snake poison.

The details of these experiments are to be found in the "Thanatophidia of India," published in 1872, and in referring to them Prof. Bourne remarks: "They show conclusively that the cobra poison will not affect a cobra, and will not even affect the viperine pyas." I would correct the latter part of the quotation so far as to say that the pyas is a colubrine harmless snake, not a viperine snake, and that it rapidly succumbs to the cobra virus.

Prof. Bourne has helped to dispel another of the popular delusions which cling round venomous creatures.

March 14

J. FAYRE

### THE RELATION OF TABASHEER TO MINERAL SUBSTANCES

MR. THISELTON DYER has rendered a great service, not only to botanists, but also to physicists and mineralogists, by recalling attention to the very interesting substance known as "tabasheer" (NATURE, vol. xxxv. p. 396). As he truly states, very little fresh information has been published on the subject during recent years, a circumstance for which I can only account by the fact that botanists may justly feel some doubt as to whether it belongs to the vegetable kingdom, while mineralogists seem to have equal ground for hesitation in accepting it as a member of the mineral kingdom.

It is very interesting to hear that so able a physiologist as Prof. Cohn intends to investigate the conditions under which living plants separate this substance from their tissues. That unicellular Algæ, like the Diatomaceæ, living in a medium which may contain only one part in 10,000 by weight of dissolved silica, or even less than that amount, should be able to separate this substance to form their exquisitely ornamented frustules is one of the most striking facts in natural history, whether we regard it in its physiological or its chemical aspects.

Sir David Brewster long ago pointed out the remarkable physical characters presented by the curious product of the vegetable world known as "tabasheer," though so far as I can find out it has not in recent years received that attention from physicists which the experiments and observations of the great Scotch philosopher show it to be worthy of.

Tabasheer seems to stand in the same relation to the mineral kingdom as do ambers and pearls. It is in fact an *opal* formed under somewhat remarkable and anomalous conditions which we are able to study; and in this aspect I have for some time past been devoting a considerable amount of attention to the minute structure of the substance by making thin sections and examining them under the microscope. It may be as well, perhaps, to give a short sketch of the information upon the subject which I have up to the present time been able to obtain, and in this way to call attention to points upon which further research seems to be necessary.

From time immemorial tabasheer has enjoyed a very high reputation in Eastern countries as a drug. Its supposed medicinal virtues, like those of the fossil teeth of China and the belemnites ("thunderbolts") of this country, seem to have been suggested by the peculiarity of its mode of occurrence. A knowledge of the substance was introduced into Western Europe by the Arabian physicians, and the name by which the substance is generally known is said to be of Arabic origin. Much of the material which under the name of "tabasheer" finds its way to Syria and Turkey is said, however, to be fictitious or adulterated.

In 1788 Dr. Patrick Russell, F.R.S., then resident at Vizagapatam, wrote a letter to Sir Joseph Banks in which he gave an account of all the facts which he had been able to collect with respect to this curious substance and its mode of occurrence, and his interesting letter was published in the Philosophical Transactions for 1790 (vol. lxxx. p. 273).

Tabasheer is said to be sometimes found among the ashes of bamboos that have been set on fire (by mutual friction?). Ordinarily, however, it is sought for by splitting open those bamboo stems which give a rattling sound when shaken. Such rattling sounds do not, however, afford infallible criteria as to the presence or absence of tabasheer in a bamboo, for where the quantity is small it is often found to be closely adherent to the bottom and sides of the cavity. Tabasheer is by no means found in all stems or in all joints of the same stem of the bamboos. Whether certain species produce it in greater abundance than others, and what is the influence of soil, situation,