

exhibited the poor animal dead. If it had been struck by the snake, 10-15 minutes would have elapsed before death. I still seemed convinced, and on his coolly asking for the chicken for his dinner, I said I could not think of allowing him to eat a poisoned animal, and so ordered it to be buried.

Having received their bakhshee-h, both men asked me for some brandy: as, at the moment, there was none in the house, and telling them so, one pointed to a large bottle of saturated tincture of ginger which was standing in the sun, and asked what it was. On my telling him, both asked for some, so I bade them sit down, and poured a mouthful down each gullet. The unexpected pungency of the shrub astonished them, but one of them, pressing his stomach with both hands, and with his eyes streaming with tears, gasped out "aur do" (more give). The other man said he had had enough. Both then rose, and shouldering their baskets, salaamed and left the compound.

Skin shedding among Snakes.—Though I have handled exuviae by the hundred, and some of them just cast, I have never witnessed the process of skin-shedding, nor, I believe, has any observer.

It is well known that the skin is always found inverted, and very often, quite entire; and the general impression is that the snake fixes itself in a bush, or strong grass, and then wriggles out of its skin. But I have found the skin on the floor of a bath room, and on the rough ballast of a railway.

I believe that fixture is obtained by means of the abdominal scales, and that then the *modus operandi* is as follows: the skin ready to be cast, yields round the snake's mouth only, and remains adherent to the extremity of the tail. As the animal advances the caudal extremity of the skin is inverted, that is, pulled inwards, and so the process goes on, and is completed by the tail passing through the mouth of the skin; and thus the direction of the abandoned skin is directly opposite to the direction taken by the skin-casting snake. That is, if the mouth of the skin lies east, the snake went out to the west.

Take the finger of a glove, and pass a knotted thread inwards through its tip, then pull gently on it, and the tip of the glove will pass inwards and downwards, and ultimately pass through the base of the finger, which will now be uppermost.

Peshawar

H. F. HUTCHINSON

(To be continued.)

A Plague of Rats

I HAVE read with great interest in NATURE, vol. xx. p. 65, a note of Mr. Orville A. Derby's on plagues of rats in Brazil. The same thing occurs sometimes in the south of Chile, Araucania, Valdivia, and Llanquihue, when the Coligue, and other species of the Bambuseæ have flourished and fructified, an occurrence which happens every 15-25 years. These grasses, with solid canes, unbranched, of sometimes more than 10 metres long and 8 cm. thick, flourish only once in their life, when they are 15-25 years old, and then their fruits ripen in astonishing quantity. This causes an enormous multiplication of rats and mice in the woods, animals rather rare commonly; and at the end of the same or the beginning of the next year, these animals have finished with their food, and are then obliged to migrate to the cultivated district, where they are very noxious. The Indians collect the seeds of the Coligue as food, as the Brazilian natives seem to do with the fruit of the bamboo. I had occasion to observe this fact in 1869 or 1870, when I lived in Valdivia, and when almost all the Coligues of the province flourished at once and died afterwards; and I had heard it already before from the natives.

FEDERICO PHILIPPI

Santiago, Chile, August 17

Solar Halo

ON Monday, September 22, about 12 o'clock, on the coast at Burnham, Somerset, my little boy called my attention to a large, clearly-defined, white circle, of which the zenith might be the centre; on the southern side of the circumference was the sun, above which were the arcs of two other circles, one of which was flattened. They united at a small distance above the sun, and displayed rather dull prismatic colours; between the points where these arcs joined the large white circle were two rather oval-shaped patches, also showing prismatic colours. The appearance lasted about an hour and a half.

G. MAPLETON

Badgworth Rectory, Weston-super-Mare, September 23

CHEMICAL ACTION

WHY are the properties of bodies so profoundly modified by the action called chemical? Why do *certain bodies only* act chemically upon one another? What exact meaning is to be attached to the expression "chemical affinity?"

These questions, and questions such as these, have engaged the attention of chemists since chemistry began to be an exact science.

The products of chemical action are innumerable: chemical science is encumbered with a multitude of compounds, and each day additions are made to the number; but no general theory of chemical action has yet been broached which suffices to explain the known facts.

The consideration of the initial and final distribution of matter in a system upon which chemical action is exerted, has almost entirely engaged the attention of chemists, to the exclusion of the study of the course of chemical change, the conditions modifying this change, and the nature of the force which causes the change.

The molecular theory of matter furnishes us with a fairly complete answer to the question—Wherein consists the essential characteristic of chemical action?

Chemical action, says this theory, results in the production of new molecules, mechanical action results in changes in the rate of motion of existing molecules.

But why are new molecules formed only when certain bodies are brought into contact and not when other bodies are placed under similar conditions?

Because the first substances exert chemical affinity upon one another, whilst the others do not.

But what is chemical affinity?

The expression affinity was originally used to denote a resemblance between certain substances which exerted an action of some kind upon one another. But when the study of chemistry advanced, it was found that those bodies which most readily exerted mutual chemical action, were, as a rule, unlike in their chemical habitudes.

The expression affinity was, however, retained to express the fact that one body exerted chemical action upon another. This affinity could not be measured in terms of any unit, hence chemists were content to draw up tables of relative affinities. These tables were for the most part based upon qualitative reactions, and supplied merely empirical information.

In the year 1780 Bergmann formulated a general theory of chemical affinity: the main points insisted upon by Bergmann were, that the affinity between two bodies is independent of the masses of the bodies brought into mutual contact, and that the value of this affinity is constant under similar conditions. Bergmann further supposed that the relative affinity values of various substances may be empirically represented by the amounts of these bodies which mutually combine together: thus in the formation of a series of normal salts, the affinity of the acid is greatest according to Bergmann, for that base, the greatest amount of which is taken up by the acid. Conversely a base has the greatest affinity for that acid which combines with it in greatest quantity.

The latter part of Bergmann's theory could no longer be upheld when the atomic theory of Dalton had introduced clearer views concerning the quantitative action of chemical substances upon one another. But the atomic theory was not opposed to the view that the affinity between the bodies is independent of the masses of the bodies brought into mutual contact.

In the year 1803 Berthollet published his theory of chemical affinity, a theory which was essentially opposed to that of Bergmann. The French chemist said that the chemical action of one substance upon another is proportional to the mass of the acting body and to its affinity for the second substance. Berthollet thus considered not only the affinity of one body for another, but also the masses