

and there is apparently an absorption of energy which does not appear either in the form of expansion or of sensible heat as temperature. At this high stage the specific heat of some of the simple gases has increased threefold, while some gases have a greater rate of expansion than others.

The same thing occurs with other simple gases, but at a much lower temperature, as, even within 0° and 200° , where dissociation cannot be entertained, chlorine and other halogens differ considerably from N or H, and at 1600° , if an air thermometer indicated 1600° for a given expansion, a chlorine one would register by expansion 2400° for an equal temperature, though with a much greater absorption of heat by the chlorine.

This difference is dependent on the fact that at 1600° the comparative density of chlorine has diminished one-third; or, in other words, that its volume, as compared with H, instead of being 1, has become 1.5; or, to put it in another way, that under these conditions, the specific heat of Cl is threefold that of H.

Quite apart from these extreme cases the specific heat is never a constant value; it takes more heat to raise a given weight of substance 1° at one temperature than another.

The specific heat increases with temperature, but differently for different substances:—

	0° to 100°	0° to 300°
Iron	= '1098	'1218
Platinum	'0335	'0343
Mercury	'0330	'0350

The differences here are both distinct and small, but Be (glucinium) increases twofold within a moderate range, and we have seen that between -50° and 600° carbon increases its specific heat sevenfold, or, as Mr. Sprague expresses it: "The heat relation of each substance is described by a particular curve; and the small differences observed in some cases are not errors, but actual differences of the several curves, and where there is approach to identity it is accidental, due to the temperature of observation being within a limit at which the curves are near their commencement, and have barely begun to separate."

However tempting or fashionable it may be to rush into hypothetical explanations of half-digested truths, yet I have taken some pains to keep within facts, which are in some respects incipient and but little understood.

If the causal differences in the production of light and sound had been fairly or patiently entertained, the "luminiferous ether" would never have been invented, which now crosses our path, as an "opaque fact, stopping the progress of further knowledge."

If a little more humility and patience had been evinced in respect of the expanding facts connected with gaseous volumes and specific heats, the old equivalents would never have been doubled, trebled, or quadrupled, to mar the symmetry of a beautiful science.

I quite agree with M. Troost, who, in repudiating the hasty references to dissociation, &c., observes: "The only consequences which necessarily flow from the experiments at high temperatures, or at low pressures, are that the coefficient of expansion is variable with the temperature, or that the coefficient of compressibility varies with the pressure." Also with the final conclusion of M. Berthelot: "The only law absolutely and universally applicable to the elements is the invariability of the relations of weight according to which they combine. This notion, and that of the energy brought into play in their reactions, are the sole and only firm foundations of chemical science."

SAMUEL E. PHILLIPS

A Carnivorous Plant

WITH reference to Prof. Moseley's letter in your issue of May 22 (p. 81) on "A Carnivorous Plant preying on Vertebrata," I may mention that in 1881, when surveying at the Paracel Islands in the South China Sea, I saw a somewhat similar occurrence. The tide was low on the reef on which I was strolling and admiring the lovely forms of coral existence. As I neared a pool cut off by the tide from the sea, I noticed amongst other submarine verdure a very ordinary-looking flesh-coloured weed about one foot high and of similar girth. My appearance alarmed numbers of tiny fish, which darted to the cover of overhanging ledges, but I noticed about half a dozen apparently seeking cover in the weed. Bending down closer, I saw that they were lying helpless about the fronds, with very little life left in them. Putting my hand down to pick up one of the half-dead fish, I found my fingers sucked by the weed, the fronds of which

closed slightly on them. The fish were not caught by the head especially, but held anywhere round the body. The death seemed to be slow and lingering, and where the fish had been held its skin was macerated. These captives may have been caught some time, and were in different stages of exhaustion. I regret being unable to name the plant, or the young fish. They were from an inch to an inch and a half long. The plant had a dirty and rather slimy look about it. ALFRED CARPENTER

H.M.S. *Myrmidon*, Suakim, Red Sea, June 24

Phosphorescence of the Jelly-Fish

THE conclusions arrived at by Mr. Verrill (NATURE, July 17, p. 281) cannot fail to be of interest to all who have ever speculated on the significance of the luminosity displayed by so many *Acalephæ*, *Medusæ*, and other marine organisms. When in the tropics, in 1875, very similar ideas occurred to me, and in an address on the phenomena of cyclical propagation delivered to the Essex Field Club on January 28, 1882, I ventured to put forward the following views, which, as the address is still in manuscript, I will beg permission to quote:—"It was in the Bay of Bengal, when on the Eclipse Expedition of 1875, that I first saw shoals of *Medusæ* in their full splendour. Speculating on the meaning of the vivid colours and brilliant phosphorescence of these creatures, I came to the conclusion that both these characters might be protective danger-signals of the same nature and fulfilling the same function as the bright colours of distasteful caterpillars according to Wallace's well-known theory, or the phosphorescence of the *Lampyræ* according to Thomas Belt ('Naturalist in Nicaragua,' p. 320). The 'urticating' powers of the jelly-fish would certainly make them unpleasant, if not absolutely dangerous, to predatory fish, and their bright colours and luminosity at night may thus be true warning characters."

R. MELDOLA

London, July 21

Fireball

RECORDED personal observations, such as that of Miss Annie E. Cocking (NATURE, p. 269) last week, must needs be so rare that every detail of them—especially where the description is clear and simple—is of weight and value. What strikes my own mind as of much interest in this one is that, as the strange and fateful visitant sank towards the carpet, "at this instant a peal of thunder crashed over the house—it was the very loudest the writer had ever heard." This would seem to show that, whatever the nature of the insulator which envelopes these floating Leyden jars, their connection is maintained unbroken with the cloud of origin until the moment of discharge; and that, whatever causes the "crash," a peal of thunder takes effect rather in the cloud than at the point of contact. This agrees also with the descent of a fireball in the sea at Margate, mentioned in to-day's papers, where the crash of thunder occurred while the ball was yet in sight. But it is still another question whether these floating globes, which only discharge themselves on contact, do not in some important respect differ in their nature from the commoner "fireball" discharged with the directness, if not all the speed, of a lightning flash out of a thundercloud. It is a question towards the solution of which only observations such as that for which we are indebted to Miss Cocking can materially help us.

HENRY CECIL

Bregner, Bournemouth, July 21

Animal Intelligence

THE following instance of animal intelligence may interest some of your readers. While walking through the forest here the other day, I found a young jay upon the ground scarcely able to fly. As I stooped down to examine it I was somewhat startled by a swoop made at my head by the old birds, their wings actually touching my hat. Determined not to be driven away, I remained by the young bird, whereupon a succession of like swoops were made at my head; these I easily succeeded in parrying with my stick, although the old birds frequently came in different directions. After about a couple of minutes the old birds seem to have come to the conclusion that nothing could be achieved in this fashion, and one of them, flying to some little distance, kept calling to the younger one, who half hopped, half flew after her. I of course followed; and now occurred what seems to me a striking instance of animal sagacity. The pines here are covered with lichen and a long, hairy kind of moss,