

XXIX. "On the Induction of the Explosive Wave and an Altered Gaseous Condition in an Explosive Gaseous Mixture by a Vibratory Movement." By LEWIS T. WRIGHT. Communicated by Professor ODLING, F.R.S. Received June 13, 1887.

(Abstract.)

The author refers to the conclusions of Berthelot and Vieille that the phenomenon of the explosive wave is quite distinct from that of ordinary combustion, each being marked by well-defined limits called by them the *régime* of detonation and combustion respectively. The transition from the one to the other is accompanied by violent vibratory movements.

Mallard and Le Chatelier separate the combustion of an explosive mixture inflamed at the open end of a tube, closed at the other, into four different and succeeding phases—

- (1.) Uniform propagation of flame ;
- (2.) A vibratory movement ; followed in some cases by
- (3.) The explosive wave of Berthelot and Vieille.
- (4.) Spontaneous extinction of flame.

The author has specially studied the connexion between the vibrating stage and the explosive wave with a certain mixture of coal gas and air (in large glass tubes) which sharply exhibits the various features of the four stages described by Mallard and Le Chatelier.

The points determined were these, that the detonating stage (explosive wave) is never initiated without preceding vibratory movements on the part of the flames.

That with the same mixture the vibrating period is of definite duration culminating in the explosive wave stage.

The necessary connexion between the two stages being proved, the author investigated the question whether the explosive wave condition is communicated layer by layer by the contact of the flame itself, or whether the whole column of unignited gas in the tube adjacent or distant from the flame is "induced" by the vibrating flame into a more receptive condition which enables the chemical reaction between the molecules to proceed at a more rapid rate than usual.

The phenomena exhibited by the flame suggest this latter explanation, and the author by the application of a weak spark test has been enabled to prove that the whole column of gas, either adjacent or distant from the vibrating flame, is in an altered condition after being submitted to but a portion of the vibratory action which normally initiates the explosive wave.

An electric spark of low tension not capable of igniting the uninduced explosive mixture invariably does so, after the vibrating has been set up.

It is suggested that the tremor sent through the unignited gas synchronised some of the molecular vibrations, so that the molecules capable of reacting perform their translatory movements in some measure together, and that when a focus of inflammation is present more reacting molecules come into the sphere of inflammation in a given time, and therefore the rate of inflammation is more rapid.

XXX. "Note on Communication entitled 'Preliminary Note on a Balanoglossus Larva from the Bahamas' ('Roy. Soc. Proc.,' vol. 42, p. 146)." By W. F. R. WELDON, M.A. Communicated by Professor M. FOSTER, Sec.R.S. Received June 16, 1887.

In a paper, communicated to the Royal Society in March last, I described a series of Balanoglossus larvæ, found by me in the Bahama Islands. The series extended from a larva with one pair of gill-slits to a form resembling in many ways a normal Tornaria; but the differences between this larva and the normal European form were so great as to induce me to believe that a process of degeneration was going on, and that the Tornaria-like creature was the oldest, not the youngest, of the series.

On seeing my paper, Professor Spengel, whose researches on Balanoglossus are well known, wrote to me, informing me that I was altogether mistaken in my interpretation of the larvæ which I had found, and that my series belonged in fact to the normal order of development.

By the courtesy of Dr. Spengel I have been enabled to inspect his magnificent series of preparations, illustrating the whole life-history of Balanoglossus, and so to become convinced of the truth of his statement; I now, therefore, take the earliest opportunity of withdrawing my previous statement, and desire to express my regret at having placed such an erroneous doctrine on record in the 'Proceedings' of the Society.

I beg also to thank Dr. Spengel most sincerely for his kindness to me in this matter.