cases. At any rate, the action of light upon the sense organs, which in all embryos are developed out of all proportion to their ultimate conditions, must remain an all-important element in its effect upon the nervous system. In embryos so transparent as those of many young fishes are, which might be said to be nothing but eyes, brain, and notochord, the action of light must be infinitely more potent upon their nervous system than it can possibly be in older stages, when the muscular system has assumed the control.

The pigment cells appear early in the egg. In some fishes, immediately before the little fish is hatched, two colour elements are to be found, black and yellow; but in the majority of cases the black alone is present, the yellow element appearing subsequently, and, last of all, the red. Pouchet's experiments seem to show that the blue pigments are only a dimorphic condition of the red pigments. This, by the way, would account for why a lobster turns red when cooked. The proper mixture of the three colours—black, red, yellow—enables the flounders to imitate most admirably the general effect of their feeding-grounds; so much so that often it requires a most practised eye to detect them. The rapidity with which they can change their colour is also quite striking. Agassiz frequently removed a jar containing a young flounder, which he figures, from a surface imitating a sandy bottom to one of a dark chocolate colour, and in less than ten minutes the black pigments would obtain a preponderance.

The question of the form and development of the pigment cells is also discussed in the memoir. As to the causes of colour in the animal kingdom we would seem to be only on the threshold of an interesting and novel field of inquiry, and it would seem, says Agassiz, very hazardous to infer from a physiological point of view, as has been frequently done on philological grounds, that Homer's colour descriptions indicate a gradual development of the sense of colour in the early races of mankind.

E. PERCEVAL WRIGHT

Since writing the above we have received from Prof. Japetus Steenstrup "Fortsatte Bidrag til en rigtig Opfattelse af Oiestillingen hos Flyndrene," with four plates. This supplemental memoir is in Swedish, and gives a *résumé* of what has been written on the subject since the paper in which the illustrious author first called attention to it, with criticisms thereon. An advance sheet of Agassiz's paper also enabled him to quote the chief details of his observations. The memoir also contains a description with beautiful figures of a Plagusia form, which was captured while its eye was just about to traverse the head obliquely and to take its place on the other side as the upper eye. It also gives a series of figures which make clear the connection that exists between certain frequently met with monstrous forms of flat-fish and the normal forms. One of these thus illustrated is the "malformed brill" figured in Yarrel's "British Fishes."

THE BROWN INSTITUTION

IT is now just seven years since the Brown Institution was opened, under the auspices of the Senate of the University of London, as a place for the study of the diseases of animals. It was at that time placed by the Senate under the direction of a committee comprising the most eminent members of the medical profession, with Dr. Sharpey as their chairman. Dr. Burdon-Sanderson was appointed superintendent, with Dr. Klein—who had then recently migrated from Vienna to London—as his coadjutor. A hospital had been built for the reception of diseased animals, and placed under the care of a highly qualified veterinarian, Mr. Duguid, and in connection with it a good and sufficient laboratory had been erected for the purpose of carrying out pathological and therapeutical experiments. No provision could be made from the funds of the Institution for the expenses of such investigations, it having been found necessary to devote the whole available income to the purely charitable purposes which the founder had associated with the investigation of disease in his testamentary statement of the objects he had in view. Pecuniary aid for research was, however, not wanting. The work done in the laboratory was, during the first three or four years, for the most part conducted at the instance of Mr. Simon, who was at that time at the head of the Medical Department of the Privy Council, and it was thus provided for by annual grants of public money. For a time all went on favourably, and it seemed possible that the Brown Institution would eventually fulfil the functions and acquire the importance of those State-supported establishments for research which have recently accomplished so much for the advancement of medical science in Germany. But, alas! clouds soon began to gather. That strange, popular agitation which culminated in the passing of the "Vivisection Act" showed itself to be specially hostile to those systematic experimental investigations which, at the present moment, are absolutely necessary for the elucidation of fundamental questions in pathology. Accordingly, the Brown Institution became a prominent object of attack. When the Act was passed it became apparent that the realisation of the hopes which had been entertained was no longer probable, for it was soon found that, in their bearing on pathological inquiries, the restrictions imposed really amounted to prohibitions.

These circumstances affected the working of the institution in such a way as seriously to diminish its prospect of usefulness. Early in the present year Dr. Burdon-Sanderson, baffled in his plans, resigned his appointment. His resignation has been followed by that of Mr. Duguid, who has accepted a more lucrative position under Government; and finally Dr. Klein, who became a candidate for the vacant superintendentship, and was supported by the unanimous recommendation of the Committee, but was rejected by the Senate of the University, who thus showed that the possession of an academical title confers none of the academical spirit. At the present moment, therefore, the Brown Institution is represented only by the buildings and the endowment. The men who have done its work, and whose names have been hitherto identified with it, have retired. The prospect is discouraging, but not quite so bad as it seems.

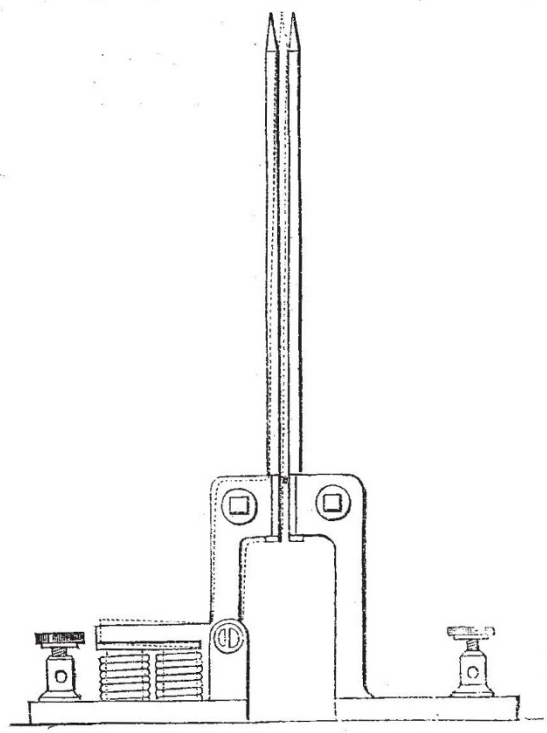
The services of Dr. Klein being no longer at their disposal, the Committee proceeded at once to invite other candidates to come forward, and on their recommendation a distinguished graduate of the University, and an energetic and able pathologist, has just been appointed to the vacant office. From Dr. Greenfield's antecedents we feel sure that he will (failing Dr. Klein) prove to be as good a man for the post as could possibly have been selected. Nor will he experience any difficulty in finding sufficient scope for his energies. Whatever obstacles may have been placed by ill-advised legislation in the way of some important lines of scientific inquiry, there are others which remain accessible. One of these lines was opened by Dr. Burdon-Sanderson three years ago. In the beginning of 1876 a grant of 500*l.* was made by the Royal Agricultural Society for the carrying out of scientific investigations at the Brown Institution, as to the nature and origin of some of the destructive contagious diseases of animals which prevail in this country. The results of these inquiries have already been, in part, printed, and others are in course of publication. In consequence of the resignation of Dr. Sanderson and of his veterinary coadjutor Mr. Duguid, the progress of his work has been temporarily arrested. But it is gratifying to be able to state that at the Annual Meeting of the Royal Agricultural Society which took place on

the 12th inst., an additional sum of 250*l.* was voted for their prosecution, and that they will be actively resumed as soon as Dr. Greenfield has completed his arrangements.

The interval of inactivity has been used by the committee for carrying out important improvements of the premises in Wandsworth Road, so that Dr. Greenfield will enter on his new duties with many advantages in his favour—an excellent laboratory, sufficient resources, fruitful work already in progress, and a committee including such men as Busk, Gull, Paget, Quain, Sharpey, and Simon to back him. We feel confident that the wisdom of the appointment will be justified by the result, and that the new chapter in the history of the Brown Institution which will begin with the year 1879, will be a successful one.

ON SOME IMPROVED METHODS OF PRODUCING AND REGULATING ELECTRIC LIGHT[1]

IN a former communication to the Society I directed attention to the fact that when the electric light is produced from the ends of two carbon pencils placed parallel to each other, if the strength of the electric current, the thickness of the carbons, and the distance between them are rightly proportioned, the carbons will burn steadily downwards until they are wholly consumed, without any insulating material between them. To initiate the light by this method, it is necessary to complete



the electric circuit between the carbons by means of some conducting substance, which volatilises on the passage of the current, and establishes the electric arc between the points.

When a number of such lights are produced simultaneously from the same source of electricity, any interruption in the continuity of the current extinguishes all the lights in the same circuit, and each pair of carbons requires to be reprimed before the lights can again be established. This defect, as will be obvious, would cause great inconvenience when the lights are not easily accessible, or are at considerable distances apart.

In the course of my experiments it was observed that when the electric circuit was completed at the bottom of a pair of carbons close to the holders, the arc immediately ascended to the points, where it remained so long as the current was transmitted. My first impression of this peculiar action of the arc was, that it was due to the ascending current of hot air by which it was surrounded. This, however, was found not to be the cause, as the arc travelled towards the points in whatever position the carbons were placed, whether horizontally or vertically in an inverted position. Moreover, when a pair of carbons were held in the middle by the holders, the arc travelled upwards or downwards towards the points, according as the circuit was established above or below the holders. The action was, in fact, recognised to be the same as that which determines the propagation of an electric current through two rectilinear and parallel conductors submerged in contact with the terrestrial bed, which was described by me in the *Philosophical Magazine*, August, 1868.

In all the arrangements in general use for regulating the electric light, the carbon pencils are placed in the same straight line, and end to end. When the light is required, the ends are brought into momentary contact, and are then separated a short distance to enable the arc to form between them. The peculiar behaviour of the electric arc when the carbons are placed parallel to each other, suggested to me the means of lighting the carbons automatically, notwithstanding the fact that they could only be made to approach each other by a motion laterally, and to come into contact at their adjacent sides. To accomplish this object, one of the carbon holders is articulated or hinged to a small base plate of cast iron, which is so constructed as to become an electro-magnet when coiled with a few turns of insulated wire. The carbon holder is made in the form of a right-angled lever, to the short horizontal limb of which is fixed an armature placed over the poles of the electro-magnet. When the movable and fixed carbon holders are brought into juxtaposition, and the carbons inserted in them, the upper parts of the two carbons are always in contact when no current is transmitted through them, as shown by the dotted lines in the engraving.

The contact between the carbons is maintained by means of an antagonistic spring inserted in a recess in one of the poles of the electro-magnet, and reacting on the under side of the armature. One extremity of the coil of the electro-magnet is in metallic connection with the base of the carbon holder, while the other extremity of the coil is in connection with the terminal screw at the base of the instrument from which it is insulated. The coils of the electro-magnet are thus placed in the same circuit as the carbon pencils.

When the alternating current from an electro-magnetic induction machine is transmitted through the carbons, the electro-magnet attracts the armature and separates the upper ends of the carbons, which brings them into their normal position, and the light is immediately produced. When the circuit is interrupted, the armature is released; the upper ends of the carbons come into contact, and the light is produced as before. When several pairs of carbons are placed in the same circuit, they are, by this arrangement, lighted simultaneously.

H. WILDE

[1] Supplement to Paper read at the Manchester Literary and Philosophical Society, November 26 (see NATURE, vol. xix. p. 78). Communicated by the Author.

INFLUENCE OF THE STRAITS OF DOVER ON THE TIDES OF THE BRITISH CHANNEL AND THE NORTH SEA[1]

THE conclusions are:—

1. The rise and fall of the water-surface and the tidal streams throughout the North Sea north of the

[1] Abstract of a paper read at the Dublin meeting of the British Association.