to each hind foot. Passing its whole life in perpetual darkness, it is blind and colourless, except the external gills, which are red. This animal retains during the whole of life not only the gill aperture on each side, but also the external plumose gills which are transitory in the Anoura and in all the Urodela hitherto mentioned. Here then we first meet with an animal which may be said to be a permanent and persistent Tadpole, yet rather like an Eft-tadpole than like that of the Frog.

A North American Urodele, misnamed (for it is silent enough) *Siren*, also presents us with permanent external gills, and it offers another interesting resemblance to the tadpole of the frog in that it is furnished throughout life with a horny beak. It has also another remarkable character in which it stands alone in its class. Hitherto every relative of the frog has had, like it, four limbs in the adult condition. In the Siren, however, we for the first time make acquaintance with a creature belonging to the class (though not to the *order*) of frogs and toads, which is devoid altogether of hinder (or pelvic) limbs, being in this respect like the whales and porcupines amongst beasts, and like the little lizard, *Chirotes*, amongst reptiles.

Another North American Urodele, *Menobranchus*, possesses throughout the whole of life both gill openings and external gills. But it is furnished with four limbs, and in other respects more or less resembles in appearance, as it does in size, the genus *Menopoma* before noticed.

Finally there is a genus of this order (*Urodela*) which has of late presented circumstances of peculiar interest. This is the Axolotl of Mexico, which was long considered by Cuvier to be a large Eft-tadpole, possessing as it does permanent gills and gill-openings, with some other characters common to the Eft-tadpole stage of existence. At length, however, its mature condition was considered to be established by the discovery that it possesses perfect powers of reproducing its kind.

For some years, individuals of this species have been preserved in the Jardin des Plantes at Paris, and a few years ago one individual amongst others there kept was observed, to the astonishment of its guardian, to have transformed itself into a creature of quite another genus—the genus *Amblystoma*, one rich in American species, Since then several other species have transformed themselves, but without affording any clue as to the conditions which determine this change—a change remarkable indeed, resulting as it does not merely in the loss of gills and the closing up of the gill-openings, but in remarkable changes with respect to the skull, the dentition, and other important structures.

There is, moreover, another and very singular fact connected with this transformation. It is that no one of the individuals transformed (although we must suppose that by such transformation it has attained its highest development and perfection) has ever yet reproduced its kind, and this in spite of every effort made to promote reproduction by experiments as to diet and as to putting together males and females both transformed, also transformed males with females untransformed, and males untransformed with females transformed. Indeed, the sexual organs seem even to become atrophied in these transformed individuals. Moreover, all this time the untransformed individuals have gone on bringing forth young with the utmost fecundity, no care or trouble on the part of their guardians being required to effect it.

A fact more noteworthy could hardly be imagined in support of the view of specific genesis put forward recently.* Here we have a rapid and extreme transformation taking place according to an unknown internal law of the species which transforms itself. No one, moreover, has been able to detect the conditions which determine such transformation (though it takes place under the eyes, and in the midst of the experiments of its observers). This latter fact affords abundant evidence how obscure and recondite may be the conditions which determine the transformations of specific genesis, and how utterly futile are observations as to an apparent homogeneity of readily appreciable conditions. They are so since it seems to be just such recondite ones which really determine the changes just referred to, and probably, therefore, other changes analogous to them.

It may be a question whether the genus *Menobranchus* may not also be a persistent larval * form, and one which now never attains its once adult form. If so, it is most probable that its lost state was similar to that of the exclusively American genus *Spelerpes*, the larva of which *Menobranchus* much resembles. With respect to *Proteus* and *Siren* no conjecture of the kind can yet be made.

Individuals belonging to the common English species (*Triton cristatus*) occasionally retain some of the external characters of immaturity, in spite of having attained reproductive capability; and a European species (*Triton alpertris*) often matures the generative elements while still, as to external appearance, more or less in its tadpole stage of existence. The adult condition, however, is normally and generally attained by it.

The geographical distribution of the *Urodela* is very remarkable. North America is the head-quarters of the order, and, with rare and trifling exceptions, the whole are confined to the Northern hemisphere. The exceptions are certain forms which extend down the Andes into South America, and one or two species of *Amblystoma*, which similarly descend along the highlands of South Eastern Asia. Urodeles are absolutely wanting in Hindostan, Africa south of the Sahara, the Indian Archipelago, Australia, and New Zealand. As might be expected, that part of Asia which is nearest to North America, namely China and Japan, is the region of the old world most richly peopled by species of *Urodela*. Altogether the world's surface may be divided according to its Urodele population into three regions. The first will comprise Europe, Africa north of the Sahara, and North Western Asia. The second will include Japan and Eastern Asia. The third will be formed by North America, with a slight extension southwards into South America—a division which by no means coincides with that indicated by the *Anoura*.

The above two orders (*Anoura* and *Urodela*) comprise all the animals most nearly allied to the common frog, of all those outside its own order. There is, however, another small ordinal group of animals which remains to be here noted, because of all existing creatures they come nearest to the frog, after the *Urodela*.

(*To be continued.*)

* See Genesis of Species, chap. xi.

* The young of the Frog or Eft is called a larva.

INAUGURATION OF THE LINNEAN SOCIETY'S NEW ROOMS

Opening Address by the President

IT is now seventeen years since the Government first recognised the claims of our Society to encouragement and assistance on the part of the State, as one which devoted itself to scientific pursuits unremunerative to its members, but tending directly or indirectly to public benefit; and since then a sense of the justness of such claims on the part of pure natural science has become gradually more general. We are no longer in the days when a Peter Pindar could turn the Royal Society and its president into ridicule as boiling fleas to ascertain whether they turned red like lobsters. The *Times*, instead of a short leader dismissing the British Association meetings in a similar strain of banter, devotes daily, during the time of its session, half a dozen columns to the details of its proceedings. And our own department in natural science is now admitted to be one of the most im-

portant branches of general science, specially important in its relation to our material prosperity. Our food and raiment, the essentials of life, are derived exclusively from the animal and vegetable kingdoms, and biological products contribute largely to many of our luxuries, whilst on the other hand some of the greatest calamities with which we are afflicted are due to the rapid development of animal or vegetable life. Many are the associations, under Government as well as individual patronage, devoted to the improvement and increase of useful animals and plants; and of late attention has been also devoted to the arrest of the ravages of the noxious ones, the balance of natural selection being disturbed by the interference of agriculture and animal education. The due study of the means of restoring this balance, of turning it more and more in our favour, of calling in to our aid more and more of the hitherto neglected available species, or of the hitherto latent properties of those already in use, of checking the progress of blights and murrains, requires a thorough knowledge of the animals and plants themselves, and that thorough knowledge can only be obtained by that scientific study not only of particular animals and plants supposed *a priori* to be useful or noxious, but of *all* animals and plants, which it is the special province of our Society to promote. And in this respect I think it will be generally admitted that we have not been neglectful of our duty, and that we have done our part in rendering effective the support we have of late years received from Government as well as from individuals, and in establishing a sound claim for its increased continuance. Besides the aid afforded to scientific researches by our largely augmented library, the great value of the papers published in the recent volumes of our Transactions and Journal has been acknowledged abroad as well as at home. It is in our Society, for instance, that the great Darwinian theories were first promulgated; and it must be recollected that the five or six hundred copies of our publications regularly sent out, place the researches they exhibit at once at the disposal of the leading followers of the science in all parts of the world. It is true that these great additions to our efficiency are not entirely due to Government patronage, but are the direct results of the reforms introduced by Dr. Hooker in 1855. Those reforms, however, would have lost much of their effect had we remained confined to our old quarters in Soho Square. Cramped for space in those obscure and dingy rooms, it required a strong devotion to science to induce an adequate attendance at our meetings; and saddled with a heavy rent, we could neither purchase books for our library nor find room on our shelves for those presented to us.

In the spring of 1856, however, an opening was made for our obtaining rooms in Burlington House. I was then on the Council, and joined heartily in the conviction of the importance of availing ourselves of the opportunity, notwithstanding the heavy expense it might entail, which I felt confident we could cover by a subscription amongst our fellows. Our President undertook the preliminary negotiations, and at the meeting of our Council on June 11 a letter was officially communicated to us addressed by the Secretary of the Treasury to the President of the Royal Society, allowing the temporary location in Burlington House of the Linnean and Chemical Societies with the Royal Society, upon certain conditions; those which affected us being, that the Royal Society should be put in possession of the main building of Burlington House on the understanding that they would, in communication with the Linnean and Chemical Societies, assign suitable accommodation therein for those bodies, and that the Fellows of the three societies should have mutual access to their three libraries for purposes of reference. Our Society, at a special general meeting held on the 17th of the same month, authorised the Council to take the necessary steps for carrying out the proposal of the Government, and in the following February 1857 the Royal Society assigned to us the rooms which we have since occupied under the above conditions. A subscription was organised which ultimately amounted to nearly 1,100*l.*, sufficient to defray all expenses of parting with our old rooms and fitting up the new ones, with a very small surplus, which was carried to the general account. In the same month of February I was associated with our then active and zealous President and Secretary, and with Mr. Wilson Saunders as a Removal Committee, and on Tuesday June 2 the Society was enabled for the first time to meet in their new rooms.

Our position, however, although so great an improvement upon Soho Square, was not yet quite satisfactory. It was provisional only, and under the wing, as it were, of the Royal Society, and liable at any time to be exchanged for a worse or a better one as the case might turn out. This uncertainty is now removed. The Government, rightly understanding the relations which ought to prevail with the scientific societies judged to be deserving of their support, obtained from Parliament adequate means for providing ample accommodation to the six societies here located, without reserving any right of interference with or control over their scientific operations. Thus our new quarters have assumed a permanent and independent character, the rooms have been built and fitted up expressly for our Society, and, having followed out all the arrangements, I feel bound to acknowledge the effective manner in which the liberal intentions of Government have been promoted and carried out in detail by the architects, Mr. Barry and the late Mr. Bankes. When the plans for the new building were first being prepared, some six or seven years since, we were applied to for particulars of the accommodation we should require for our library and meetings, for the transaction of the business of the Society and for the residence of our librarian and porter. We were not consulted, it is true, about the general arrangements in relation to the other societies, and we have to regret the cessation of that close juxtaposition and intimate intercourse with the Royal Society which was so agreeable to us, but in all other respects our requisitions were fully complied with in the plans prepared and sent to us for approval, and the only alteration since made has been the curtailment of a portion of the basement premises in favour of the post-office, which rather inconveniently limits the stowage room for our stock of Transactions. With this sole exception we have the space we asked for, and the bookshelves and such other fittings as have been provided by Government have been worked out in the most satisfactory manner.

Our removal here has necessarily been attended with considerable expense, the precise amount of which cannot yet be calculated, but it will probably exceed 600*l.* The Council have, however, not thought it necessary to call for any special subscription. The investments made during the past year have been partially with a view to the present occasion, and the gradually increasing sale of our publications and general appreciation of the value of our labours has been so far adding to our receipts that we closed last session with a much larger balance in hand than usual, and we hope to clear ourselves of the liabilities we are incurring, without reducing our invested funds much below 2000*l.* At the same time, we must not conceal from ourselves that we shall be called upon for a considerable increase in our expenditure. Our enlarged accommodation, combined with high prices, will add much to our household expenses. We are threatened with a repeal of the Act which exempts us from parochial rates. Nearly the whole of our library having within the last three weeks passed through my hands, I have become convinced that it will require a large outlay in binding, as well as in filling up gaps to render it really efficient. And, above all, we must bear in mind that the chief means we have of promoting the scientific objects for

which we are associated, the only way in which we can render them available to our numerous Fellows resident in our colonies, is through our publications, and heavy as have been of late years our printer's and artists' bills, they will and ought to become heavier and heavier still. To render fully available the assistance we have received from Government, we require continued and increased support from our Fellows, and from the scientific public. We reckon already among our Fellows the great majority of those who have acquired a name in zoology, or botany, and I sincerely hope that all men of means who take a sincere interest in biological pursuits will think it a pleasure as well as a duty to contribute directly or indirectly to the support of the Linnean Society of London.

With regard to future arrangements in the new phases of life into which the Society has entered, the Council has kept in view three great objects, the endeavour to render our Meetings attractive, the extended usefulness of our library, and the steady maintenance of our publications. On meeting-nights the library will be open at 7 o'clock, the chair will be taken in the meeting-room at 8 o'clock, as at present, and after the meeting the Fellows will adjourn to tea in the Council Room upstairs, opposite to, and in direct communication with the library. The extended shelf-room in the library has enabled a classification of the books which will render those most frequently consulted much more readily accessible than heretofore; and as evidence that there is no relaxation in our publishing department, I have to announce that besides the two numbers of our Journal, one in Zoology, and the other in Botany, which have been sent out since our last meeting, two new parts of our Transactions are in the course of delivery, the concluding one of Volume XXVIII., and the second of Col. Grant's Volume XXIX. The first part of Volume XXX. is in the printer's hands.

INAUGURATION OF THE CHEMICAL SOCIETY'S NEW ROOMS

ON Thursday night last the Chemical Society met for the first time in the new apartments assigned to it in the right-hand front wing of Burlington House. The event was a notable one, and it is not often that such an occasion happens to the president of a hard-working body of scientific men as last Thursday fell to the lot of Dr. Odling when he rose to welcome the fellows to their new home, and he might well feel it his duty to break for once the tradition which imposes silence on the president on the first night of the session.

Dr. Odling accordingly rose and proceeded to bid them welcome to the new rooms, and then to give in a few words a general statement of what had been done in relation to the taking possession of them by the society. This it seems had been by no means an easy matter, as but a few days back the society was still in its old quarters without a book of its library moved, and the present apartments were in a damp and generally unfinished state.

Thanks, however, to the exertions of the Council and especially of the Junior Secretary (Dr. Russell), who were most kindly met and aided in their endeavours by Mr. Barry (the architect) and the Clerk of the Works; the new rooms were got into a habitable condition, the books in great part placed in their cases, and the meeting-room provided with seats in time for the first meeting of the session.

The rooms in question at present in use consist of the library, a noble room on the second floor, well capable of holding the books of the society for some time to come. That for meetings, below the library and overlooking Piccadilly, is capable of seating nearly twice the number of listeners that could be provided for in the old quarters. The seats, however, are somewhat crowded, and though the room is provided with double windows there is a considerable noise from the street. The president, however, held out hopes of a wooden or asphalt pavement being before long laid down in front of the building, and we hope a point of such importance will not long be neglected by the authorities. The most noticeable point, however, is a laboratory, placed on the right-hand side of the meeting-room and opening into it with double doors immediately behind the lecture-table. This, though at present not quite ready for use, is supplied with every fitting of a good laboratory, and will shortly be provided with the necessary apparatus and re-agents. According to the president, "whatever may be its subsequent use, it is intended at present to place it at the disposal of those authors who may wish to illustrate their papers with experiments." We do not know whether the words of the president imply an intention on the part of the society to aid research by granting the use of its laboratory in such cases as it may think deserving, but in any case the society deserves the thanks of every scientific man for so admirable an innovation as a room for the preparation of experiments.

Dr. Odling in his speech alluded to the "childish pleasure, childish in its earnestness and simplicity," with which a chemist looks upon a new experiment. We quite agree with him as to the fact of its existence, but we think that this desire to see answers a far higher purpose than that of mere pleasure. The science of the chemist is essentially a science in which, to quote a popular phrase, "seeing is believing," and nothing can be more wearisome than the constant repetition of the description of reactions, or the recounting of qualitative or quantitative results unenlivened by a single experiment. Such descriptions quite fail to lay hold upon the mind, except at the expense of a wearisome strain, and the consequence is that many a valuable paper loses half or all its effect when read (which should be to raise discussion), simply because in an attempt to describe facts the author loses sight of the necessity of succinctly generalising therefrom.

In the meantime what have the other societies affected by the changes in Piccadilly been doing to provide for the experimental illustration of papers? and especially what has the Royal Society done in the direction to which we have alluded? We are informed on the best authority —nothing! The rooms of the latter consist as did the temporary ones, simply of those requisite for the accomodation of the library and for the *reading* of papers. Now is the Chemical Society right? If so the Royal Society is wrong. It has not done all when it has provided comfortable reading-rooms for its members, and a place where its secretaries can read the papers to a few silent Fellows who are sparsely scattered over the benches. The reading and publication of papers is not all that a great and wealthy society can or ought to do for the advancement of science. Why should its laboratories not exist as well as its library?

There is no reason why the meetings of the societies instead of being, as some of them now are, dull reunions only attended by the Fellows as a matter of duty, should not be made more useful to men of science. What could be better than to see them attended by the more advanced of the younger students of science, as the meetings of the Chemical Society now very often are, who might there see how the better known workers demonstrate their discoveries, and how their papers are examined and discussed. Unless some attempt is made to give the other societies a greater grasp over the several classes of workers to which they more directly appeal, they will infallibly lose the guiding power they have hitherto had, and the advantages conferred by their organisation in the propagation of scientific knowledge will be lost. It behoves the Royal Society in particular to show the way to the others in following in the steps taken with