

ZOOLOGICAL SOCIETY.

March 24, 1857.—Dr. Gray, F.R.S., in the Chair.

ON THE NEST AND EGGS OF THE WAXWING (*BOMBYCILLA GARRULA*, TEMM.). BY JOHN WOLLEY, JUN., ESQ.

The Waxwing, as observed in Lapland, makes a good-sized and substantial nest, but without much indication of advanced art. It is of some depth, and regularly shaped, though built of rather intrac-table materials. As in those of many other birds in the Arctic forests, the main substance is the kind of lichen commonly called tree-hair, which hangs so abundantly from the branches of almost every tree. This lichen somewhat resembles a mass of delicate root-lets, or perhaps may be compared to coarse brown wool; but some of it is whitish, and in one nest there is a little of this mixed with the ordinary brown or black. This main substance of the nest is strengthened below by a platform of dead twigs, and higher up towards the interior by a greater or less amount of flowering stalks of grass, and occasionally pieces of equisetum. It is also interspersed with a little reindeer lichen, perhaps a sprig or two of green moss, and even some pieces of willow cotton. There may also be observed a little of the very fine silvery-looking fibre of grass leaves which probably have been reduced to that condition by long soaking in water. In one of the nests examined there were several pen-feathers of small birds as an apology for a lining. Of other nests which are to be found in the same forest, it most resembles, but is considerably less than that of the Siberian Jay, which however is less securely put together, but has many more feathers and soft materials for a lining.

The nest of the Waxwing is built on the branch of a tree, not near the bole, and rather, as one of the observers has said, standing up from the branch like a Fieldfare's or other Thrush's nest, than supported by twigs touching it at the sides, as the nests of many birds are supported. Of six nests, four were in small Spruces, one in a good-sized Scotch fir, and one in a Birch—all placed at a height of from 6 to 12 feet above the ground. The tree in several instances was unhealthy, thin and scraggy in its branches, to which there hung a good deal of hair lichen; and the nest seems generally much exposed, though from its resemblance to the lichen hanging near, it might escape the eye. The nests found were in parts of the forest considerably open, once or twice on the side of low hills, near a river, or with an undergrowth of dwarf swamp-loving shrubs. But at present we have scarcely enough examples to show that there is a preference for any particular kind of ground.

Five seems to be the ordinary number of eggs; in one nest only there were as many as six. They have a pale salmon(?)—coloured ground, upon which are distributed pretty equally good-sized purple spots, some with more and some with less deep colour, but nearly all

of them having a shade or penumbra, such as is common especially in eggs of the Chaffinch. The only very marked variety I have yet seen, has short streaks and much smaller and more numerous spots than usual, of which markings a considerable proportion are of a pale yellowish-brown. The eggs may be about an inch in length, but hardly enough have been obtained to determine the average dimensions. Marked differences in size in the eggs of the same nest have not yet been observed; but, as with other birds, we find that one nest may have all its eggs considerably larger than those of another nest.

In the backward and cold spring of 1856, Waxwings had their full complement of eggs about the 12th of June.

The writer abstains for the present from offering any remarks on the distribution of this bird in the breeding season, hoping that upon this subject, as upon the habits of the Waxwing in the summer, he may hereafter have some more complete observations to communicate.

YOUNG OF THE WAXWING.

A young bird caught on the 5th of August, as it fluttered from the nest, had a general resemblance to the adult, though all the colours were more dull. The wax-like ends to the wing-feathers, the yellow tip to the tail, the black patch between the eye and the beak are all there, whilst the rich mahogany of the under tail-coverts is of a quieter brown; the blooming vinous colour of the head and back has not yet emerged from a homely neutral, and the crest is but just indicated by the longish feathers of the crown. The most marked difference between the adult and young is in the throat and under surface generally. There is at present scarcely a trace of the deep black patch of the chin, and the delicate tint of the general under surface of the adult is replaced by mottled neutral and white. This upon examination is found to owe its appearance to those longer webs, which arising towards the root of each feather, extend as far outwards as the webs which arise nearer its tip, being very pale or white, and thus relieving, on both sides, the last-mentioned darker webs.

LAPLAND OWL. *Strix lapponica*, Temm.

Two nests of the Lap Owl were found in Finnish Lapland in 1856. In one near Sodankyla there were two eggs, and when one of the birds was shot, a third egg was found ready for exclusion. They were placed on the jagged end of the stump of a large Scotch fir, about 12 feet from the ground, at which spot the tree had been snapped across by some storm, the upper part not yet entirely separated, but sloping downwards till the greater part of its weight was supported by the ground.

The other nest was near the Aunasjoki, at the top of a lowish Scotch fir. Some time previously in the same year a bird had been shot at this spot, which was found to be a female with eggs inside. The nest was not observed until after the shot was fired. At the second visit on the 28th of May, there were two eggs in the

nest, and again a bird was shot, which turned out to be a new female with a fully-formed egg inside, through which the bullet had passed. The skin is now in England. The birds seemed on both occasions remarkably fearless.

The eggs are smoother, and, as might be expected, considerably smaller than those of the Eagle Owl. The dimensions of the two in the last-mentioned nest are 2 in. \times 1.6 in. and 2.1 in. \times 1.65 in.

At the meeting of Scandinavian naturalists in Christiania last summer, before I heard of these two nests having been found, I was able to announce that the Lap Owl generally makes its nest on the top of a stump. I had received several reliable accounts from different woodsmen, but had never found a nest myself, or been able to get the eggs, which indeed have, I believe, hitherto been unknown to ornithologists. It appears that three is the ordinary number of eggs.

TENGMALM'S OWL. *Strix Tengmalmi*, Gmel.,

lays its eggs in holes of trees and occasionally in egg-boxes. When once established it cannot easily be made to leave its quarters, and it can, as it is said, keep possession against a much larger bird; yet from the present nest (the only one I have had the good fortune to meet with), after having laid four eggs, the mother was ejected by a Golden Eye. The dimensions of the egg accompanying this paper are 1.32 in. \times 1.05.

Muoniovara, February 2nd, 1857.

ON THE SKULL OF A SPECIES OF MECISTOPS INHABITING THE RIVER BÍNUË OR TSÁDDA, IN CENTRAL AFRICA.

BY DR. BALFOUR BAIKIE, F.R.Geogr.S., ETC.

The genus *Mecistops*, from the fewness of its numbers and the retired localities which it inhabits, is but little known, scarcely any mention of it being found in zoological writings. It was first distinguished as a species of *Crocodilus* by Cuvier, from a specimen still preserved in the Museum of the Royal College of Surgeons in London, and which he named *C. cataphractus*. Since that time two other species have been described, *M. Bennettii* or *M. leptorhynchus* from Western Africa, and *M. Journei*, said to be from New Guinea. With the exception of this latter species it is quite an African genus, inhabiting the various rivers falling into the Atlantic. In the 'Proceedings of the Zoological Society' for 1835, p. 128, the *C. leptorhynchus* of Bennett is said to have come from Fernando Po; but I should think that this, except established on undoubted authority, must be incorrect, chiefly because in that island the physical conditions requisite for its existence are wanting. Fernando Po is a small volcanic island, totally without the muddy rivers delighted in by *Crocodylidae*, and possessing nothing beyond streams which, during the rainy season, are tumultuous mountain torrents with rocky beds. It is much more likely that the specimen alluded to was obtained from some of the numerous rivers opening into the Bight of Biafra, opposite to Fernando Po, and that it came to England *viâ* Fernando

Po, that island being a common point of call for vessels on their way home.

In August 1854, while at the town of Ojogo on the river Bínué, my assistant procured from a native the skull of a *Mecistops*; and as this was the only occasion on which I met with its remains, and as I never saw one in the river, I conclude that it is there a comparatively scarce species. I have since described the animal to Dr. Barth, who informs me that during his lengthened wanderings he never remembers to have met with it. Crocodiles again were everywhere to be seen, and in many places most abundant.

The skull seems from its appearance to be that of an adult animal. Its extreme length is $22\frac{1}{4}$ inches, the greatest breadth being $9\frac{1}{4}$ inches, or nearly in the proportion of $2\frac{1}{2}$ to 1. From this it may be inferred to be most probably *M. cataphractus*, that being the proportion of the length to the breadth in that species, while in *M. Bennettii* (if distinct) it is said to be as 3 to 1. It has seventeen alveolar sockets on each side of the upper jaw, and fifteen in the lower, in which particulars it agrees with the characters originally given by Cuvier in the 'Ossemens Fossiles,' "la longueur de sa tête étant comprise deux fois et demie dans sa largeur." * * * "On lui compte dix-sept dents de chaque côté à la mâchoire supérieure et quinze à l'inférieure," 4 ed. tom. ix. p. 116. In each are intermaxillary sockets; but for various reasons I am inclined to believe that this is the case only in the adult, and that in the young animal there are five intermaxillary teeth on each side. The ninth remaining upper tooth is the most prominent, and it is distant from the extremity of the snout $7\frac{1}{2}$ inches.

In all essentials the skull of the *Mecistops* shows it to be properly a member of the family *Crocodylidae* rather than the *Gavialidae*. The teeth are irregular, the sides of the jaws are not parallel, there is a distinct swelling opposite the ninth remaining upper molar, and the lower canines are received in notches in the upper jaw.

The skull is considerably depressed, much produced anteriorly, and the extremity of the snout somewhat enlarged. Upper surface smooth. Forehead nearly flat, pitted, sides not raised, converging anteriorly. Cranial fossæ nearly circular, resembling those of the *Gavial*. Orbits rather more convergent than in the *Crocodyli*, and the nasal aperture more circular. Nasal bones more prolonged than in *Gavialis*, yet not reaching, as in the *Crocodyli*, the nasal opening, but distant from it an inch and a half. Anterior spine of middle-frontal very long, slender, tapering, and pointed. Lacrymal bones lengthened and narrow. Notch for lower canines about an inch beyond posterior edge of nasal foramen, and about half an inch from the anterior extremity of the nasal bones. Anterior palatine foramen small. Palatine bones tapering and pointed anteriorly.

Extreme length of lower jaw $24\frac{1}{2}$ inches, suture $5\frac{3}{4}$ inches in length, extending to opposite the seventh tooth on each side. Narrowest portion of lower jaw between fifth and sixth teeth, where it does not exceed an inch and three-eighths. Tenth and eleventh teeth nearly equal, the latter being rather the larger, but by no means exceeding

the others in the same proportion that it does in *Crocodilus*. Its attenuated snout, narrow jaws, and small teeth would seem to indicate that it lives principally on fish.

Thus while it offers some analogies with the *Gavialidæ*, its true affinities are undoubtedly with the *Crocodilidæ*, though it may be held to represent the former in the African and other rivers which it inhabits.

April 28, 1857.—John Gould, Esq., F.R.S., V.P.Z.S., in the Chair.

OBSERVATIONS ON THE SPECIES OF THE GENUS MANATUS.

BY DR. J. E. GRAY, F.R.S., F.L.S., V.P.Z. & ENT. SOC. ETC.

Dr. Balfour Baikie having requested me to examine the skull of the Manatee from Africa, which he described at a preceding meeting, I am induced to send you the following observations.

There appears to be considerable confusion respecting the nomenclature of the skulls of these animals.

MM. Cuvier and De Blainville figure the skeleton and skull of the American Manatee (*M. australis*) from the same specimen sent from Cayenne in the Paris Museum. This animal differs essentially from all the four skulls from the American coast which are in the British Museum Collection, in the great elongation of the front of the lower jaw, and the comparative length and narrowness of the nasal opening. A copy of the front part of Cuvier's figures is given by Dr. Harlan as that of *M. americanus*. On the other hand, the four skulls (two of which come from the West Indies and one from Cuba) in the British Museum all agree with the skull figured by M. Cuvier as the *Lamantin du Sénégal**, and also with that (which is probably from the same specimen as Cuvier's in a more imperfect state) which De Blainville figures under the name of *M. latirostris* of Harlan, in the short rounded form of the front end and the prominence of the gonyx on the under side of the lower jaw, and in the shortness and breadth of the nasal opening; and this appears to be different from the skull which De Blainville figured under the name of *M. Senegalensis*. The skeleton of a young female specimen from Jamaica is figured by Sir Everard Home (Lectures, iv. t. 54), and the head of this skeleton is copied under the name of *M. australis* by Wagner (Säugeth. t. 381. f. 4), and the animal is figured from a drawing by Mr. Gosse in the Figures of Animals published by the Christian Knowledge Society, as the *Manati*.

The more adult of the Museum skulls exactly agree with Dr. Harlan's figures of the skull on which he founded *M. latirostris* from the coast of East Florida.

I am inclined to believe that all the skulls from America in the British Museum, and that of a very young specimen in the same Collection, belong to one species, though they vary considerably in the height of the intermaxillary bones, in the comparative length

* The front part of this figure is copied by Dr. Harlan for comparison with that of his *M. latirostris*.

and breadth of the nasal opening, the extent of the bending down of the front of the upper jaw, the completeness and incompleteness of the orbit, and in the smoothness, roundness, or angularity and rugosity of the gonyx of the lower jaw; but I think that all these differences may be referable to the age and sex of the specimens, the upper jaw being more deflexed and lengthened as the animal increases in age. All the older specimens have a small, conical, rugose, bony prominence in the middle line of the front of the lower jaw, and the apex of the coronoid process truncated and expanded into an angle behind and before, as represented in De Blainville and Cuvier's figures of *M. australis* and *M. latirostris*. This is even the case in the skull of a very young animal with only the milk teeth.

On the other hand, in Dr. Baikie's skull of *M. Vogelii*, and in M. De Blainville's figure of *M. Senegalensis*, the coronoid process of the lower jaw is narrow above, with the hinder upper part obliquely rounded off, and with a slight angle in front; so that this is probably the character of the African species. I may also remark, that the front of the lower jaw of Dr. Baikie's specimen is produced and very differently shaped from that of any of the American skulls, and in this character it differs from M. De Blainville's figure of *M. Senegalensis*; but this difference may be only in consequence of its youth.

Dr. Harlan observes:—"Cuvier estimates the teeth at 36, nine on each side; in both my specimens they do not exceed 32, eight on each side."

In the very young skull above mentioned, which has holes for the rudimentary upper cutting or canine teeth, there are only 24, viz. six on each side; and the two hinder on each side must have been hidden in the gums. In the older skulls some have eight and others nine on each side, but in most of them only six on each side are perfect; as the anterior one on each side drops out as the new ones are formed behind, and in each of the skulls two hinder on each side are in process of development.

But the question of the permanent specific difference between the *M. australis* from Cayenne, the *M. latirostris* from East Florida, Jamaica and Cuba, and between *M. Senegalensis* of Blainville (not of Cuvier, which is like the first) and *M. Vogelii*, must wait for solution until a larger series of skulls of these species can be procured, and until the other parts of the skeleton can be compared; it being always borne in mind that, at least according to my experience, the skulls and other parts of the skeleton of the animals are quite as liable to vary in form and structure as any of the external soft parts by which they are moulded.

ON THE GENUS NECTURUS OR MENOBRANCHUS, WITH AN ACCOUNT OF ITS SKULL AND TEETH. BY DR. JOHN EDWARD GRAY, F.R.S., F.L.S., V.P.Z. & ENT. SOC. ETC.

Dr. Kaup lately sent to me the skull of the *Proteus of the Lakes*, *Necturus maculatus*. As it presents some peculiarities, I am in-

duced to lay a figure and some observations upon it before the Society.

1. It is the general belief of the inhabitants of Lake Erie that the bite of the *Proteus of the Lakes* is poisonous.

Dr. Holbrook observes that by the fishermen these animals are regarded "as poisonous, and are consequently seldom taken in hand."

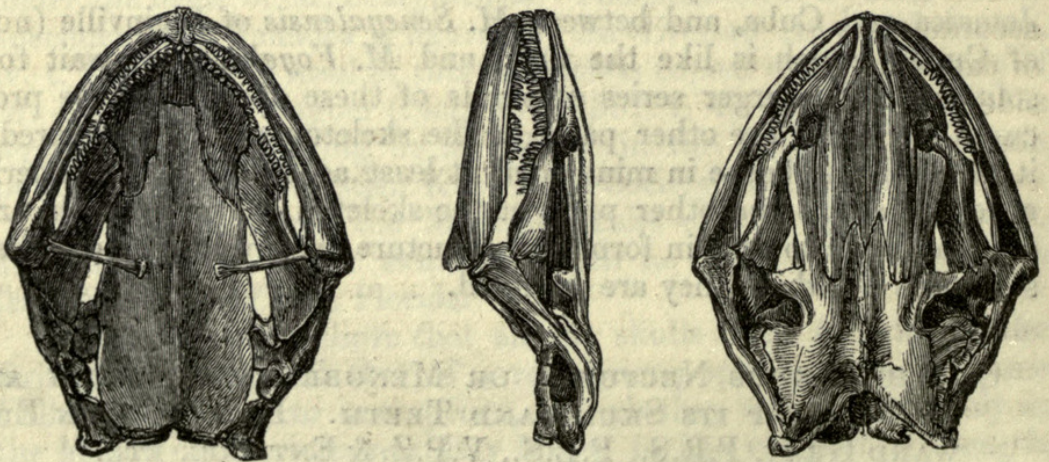
The Hon. Miss Amelia Murray in her 'Letters' mentions this animal as caught in a net at Detroit, under the name of *Fish Lizard* (vol. i. p. 172), and observes: "The fishermen said its bite was very poisonous, and it had the yellowish-brown lurid look which seems to appertain to venomous reptiles; but Dr. Kirtland says it is perfectly harmless."

And this latter opinion appears to be the almost unanimous impression of the naturalists of America.

Yet the examination of the teeth will almost justify the popular belief, and at least render it very desirable that the animal should be examined in its living state, and that its bite be submitted to careful experiment.

The upper jaw of the skull is furnished with two series of small, acute, uniform, nearly transparent, conical, slightly curved teeth, the outer series being placed on the narrow intermaxillary bone, the inner series on the front edge of the vomer and on the outer edge of the lateral processes of the pterygoid bone. The lower jaw has a single series of similar teeth, which lock between the two series above described.

All these teeth have a conical cavity on the hinder part of their base, with a short linear slit on the middle of the inner side, and an oblong perforation above the slit in the middle of the inner side of the tooth. The form of these teeth is exactly similar to the fang of poisonous Serpents; that is to say, the cavity is not a hollow in the substance of the tooth itself, but is formed by the sides of the teeth being produced and folded together, leaving a conical cavity in the inner side of the base, as is easily proved by the examination of the teeth, which shows that the cavity is lined with enamel; and the



junction of the two lateral expansions is rarely complete, but marked by a more or less distinct or continued slit between the basal notch

and the subcentral foramen. In the poisonous Snakes the duct of the poison occupies this cavity ; and the similarity of the form and structure leads to the idea that it may be used for the same purpose in the *Proteus of the Lakes*.

The chief difference between the teeth of the *Proteus of the Lakes* and the fangs of Serpents, is, that in the former the upper aperture of the cavity is nearer to the centre of the tooth, some distance from the apex, while in the fang of the Serpent it is generally near to the tip.

I know of no other instance of a Batrachian having this structure of its teeth, nor do I know any instance, except in the Mexican Lizard, called *Heloderma horridum*, in which *all the teeth* are uniformly furnished with a basal cavity and foramen ; and this Lizard is said to be noxious, but the fact has not been distinctly proved.

2. When Dr. Barton, in his paper on the *Siren*, first described the Hell-bender (*Protonopsis horrida*), he considered the *Proteus of the Lakes* as the young state of the latter species.

The skull bears more affinity to the skull of that animal than to that of any other Batrachian, and the difference between them is just such as one might expect between the larva and adult of other similar animals ; and it will be observed that the *Proteus of the Lakes* is only known in its larva-like state, and *Protonopsis*, as far as I know, only in its adult form.

The first great, and indeed almost insurmountable, argument against regarding the *Proteus of the Lakes* and the Hell-bender as two states of the same species, is the geographical distribution of the animals as given by the American herpetologist.

Thus Holbrook, for example, states, “The *Menopoma Alleghaniensis* (Hell-bender) is found in the Alleghany river and its tributaries, and doubtless inhabits many of the branches of the Ohio and Mississippi rivers ;” and *M. fusca*, “the waters of the mountainous regions of North Carolina and Georgia ;” while the *Proteus of the Lakes* (*Menobranchus maculatus*) has as yet been found only in Lake Champlain and Lake Erie and their tributary streams.

It is true that a second species of the genus, *Menobranchus lateralis*, according to Dr. Holbrook, “has a wide range, it being found in many of the rivers and streams that open into the Mississippi on its eastern side ; but I am not aware of its existence west of that river. Say found it as far north as Pittsburg in Pennsylvania, and Troost as far south as Cumberland river in Tennessee :” and further, “the *Menobranchus lateralis* was first described by Say from a specimen taken by a hook in the Alleghany river.” He proceeds : “At first I was disposed to believe that the *M. maculatus* and *M. lateralis* were one and the same animal, but I am now convinced that the latter is at least a well-marked variety, if not a distinct species ; it is more slender in proportion, its colours and markings different ; it is found only in the western waters that run into the Mississippi, while the former inhabits the rivers and streams that flow into the northern lakes, and all the tributaries of the St. Lawrence river.”

From these remarks on the observations of other American herpe-

tologists, one may conclude, that though one species or variety of *Menobbranchus* is found in the same system of waters as the *Menopoma*, the *Menopoma* has not hitherto been observed in the same lakes, or indeed in the same district of country, where one variety or species, viz. the *Menobbranchus maculatus*, is alone found, and where it is abundant.

But an experienced American naturalist, Dr. Baird, has observed, that "the non-discovery of the adult is no argument against its existence. I had caught hundreds of the very remarkable larva of *Pseudotriton Salmoneus* near Carlisle, before I found an adult." (Journ. Acad. N. Sci. Philad. 1849, 292.)

Dr. Holbrook observes, that "the *Menobbranchus maculatus* is seldom taken except in the months of April and May, which is their spawning season. Their eggs are about the size of peas, and as many as one hundred and fifty have been counted in a single female."

This would lead one to believe that they are adult animals; but eggs have been equally found in the *Axolotl* of Mexico, which is regarded by most naturalists as a larva.

3. It is to be observed, that though the *Proteus of the Lakes* (*Necturus*) has a more distinct and separate opercular flap, united by a distinct fold under the throat, than either the *Proteus* of Carniola or the *Siren*, and in this respect more nearly resembles the *Axolotl* of Mexico and the larva of *Tritons*—yet, that, like the *Proteus anguinus* and the *Siren*, it has only two slits on each side of the neck, with a single free ray between them, the anterior and posterior cartilaginous ray being united to the skin, as in those genera; while the *Axolotl* and the larva of *Tritons* have the gill flat, quite free from the gill-rays, and there are three slits between the gill-rays as well as the larger anterior one, making four slits on each side, and the inner edge of the rays being toothed as in fishes.

From these considerations I am inclined for the present to consider the *Proteus of the Lakes* as a distinct kind of Batrachian, which is arrested in its development and never reaches the perfect state.

The skull is much more developed than in the other genera of *Meantia*, and in its outline and the disposition of its teeth it resembles that of the genus *Protonopsis* as figured by Cuvier (Oss. Foss. ii. 409. t. 26. f. 3, 4, 5), but there are no maxillary bones, and the nasal and frontals are more developed.

The exterior nostrils are on the upper surface of the margin of the nose, above the first third of the upper lip; and the inner nostrils are large, and, as in the other *Meantia*, not on the palate, but on the side of the mouth between the lips and the outer edge, near the hinder part of the series of vomerine teeth, nearly as they are in the genus *Axolotl*, well figured by M. Bibron (Herpet. t. 95. f. 2 a).

4. I may observe, that we have specimens both of *Necturus maculatus* and *N. lateralis* in the British Museum, the latter from the Ohio; and I cannot discover any difference between them, except that the one named *N. lateralis* has two broad, pale, dorsal streaks, and is about half the size of the other specimens; and I doubt if

these dorsal streaks are not the result of youth, and vanish as the animal increases in size, as is the case with the *Siren*.

5. While on these animals, I may observe, that Dr. Garden's specimen of *Siren* that was originally described by Ellis, which is now in the British Museum, shows a number of lines of mucous pores on the chin and on the head, the latter not being so distinct as the former, and a very distinct series of oblong white spots, forming an interrupted line along the upper part of the sides of the body, and continued to the middle of the sides of the tail; the spots on the hinder part of the body and tail being larger, more distinct, and closer. These spots evidently represent the lateral lines in *Tritons* and fish, and I have seen them mentioned in the modern descriptions of the animal.

MISCELLANEOUS.

On the Vitality of Seeds transported by Marine Currents.

By M. C. MARTINS.

BOTANISTS, struck by the facts establishing the transport of seeds by marine currents, have thought that the latter must have played a great part in the diffusion of the disjointed species of plants which form isolated colonies upon islands or continents separated by vast extents of sea. Geologists, surprised at the uniformity of the vegetation of the great archipelagos scattered in the ancient seas, were still more disposed to consider marine currents as the principal agents in the dissemination of seeds upon the surface of the globe. These *à-priori* conclusions have never been directly verified by experiment;—it has never been tried (1) whether many seeds are sufficiently light to float upon salt water; and (2) whether these seeds, after floating for a long time at the surface of the sea, still retain their germinative faculty.

To settle this question experimentally, the author selected some fresh seeds, of which the germination never fails, taking them from the principal families, and generally preferring those of large size, furnished with a hard and thick epispem, or those of littoral plants. The former should resist the action of salt water, from their volume and the impermeability of their envelopes; the others should have more chance of germinating if they fell upon a sandy shore.

Of 98 species, 55 floated, and 39 were specifically heavier than the water of the Mediterranean, the density of which, off Cette, is 1.0258. Four seeds had a specific gravity equal to that of salt water; these are, *Nelumbium speciosum*, *Datura Stramonium*, *Juglans nigra*, and *Gingko biloba*. Thus, of a certain number of seeds taken by chance, we may say that two-thirds float.

To try the action of sea-water upon floating seeds, the author endeavoured to place them in the same physical conditions to which they would be subjected when floating at the surface of the sea. A



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