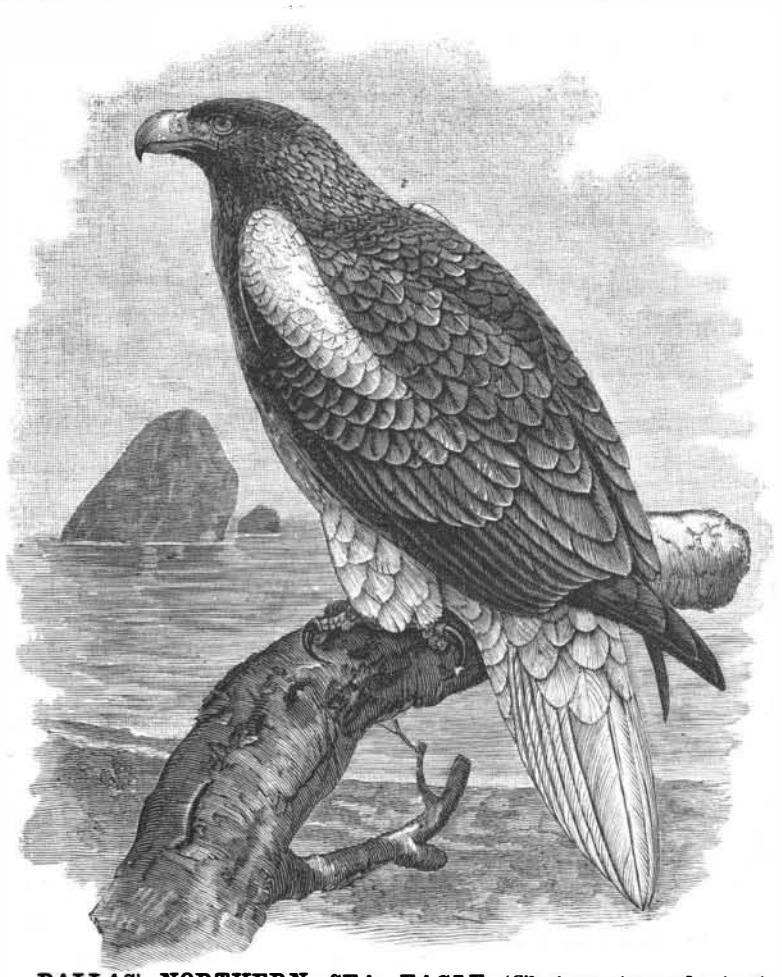
The Origin of Petroleum.

Professor Medelejef has advanced the theory that petroleum is of mineral origin, and that its production is going on and may continue almost indefinitely. He has succeeded in making it artificially by a similar process to that which he believes is going on in the earth; and experts find it impossible to distinguish between the natural and the manufactured article. His hypothesis is that water finds its way below the crust of the earth, and then meets with carbides of metals (particularly of iron) in a glowing state. The water is decomposed into its constituent gases. The oxygen unites with the iron, while the hydrogen takes up the carbon and ascends to a higher region, where part of it is condensed into mineral oil, and part remains as natural gas, to escape where it can find an outlet, or to remain stored at great pressure until a borehole is put down to provide it a passage to the surface. Oil-bearing strata occur in the vicinity of mountain ranges; and it is supposed that the upheaval of the hills has sufficiently dislocated the strata below to give the water access to depths from which it is ordinarily shut out.

PALLAS' NORTHERN SEA EAGLE.

(Thalassaetus pelagicus.)

This noble bird is found in Kamschatka, and during Dr. F. H. H. Guillemard's cruise in the Marchesa he made drawings of the same. Our engraving is from his book, and is therefore authentic. It is a magnificent bird, and is especially conspicuous from the large white shoulder patches and tail. It is very shy and difficult of approach.



PALLAS' NORTHERN SEA EAGLE (*Thalassaetus pelagicus*).

Natural History Notes.

A Steel Bird's Nest.—In the city of Soleure, Switzerland, there are quite a number of watch manufactories. According to *Isis*, Mr. Rueder, the owner of one of them, recently discovered on a tree in his garden a wagtail's nest constructed entirely of steel springs, and measuring nearly five inches in length. This nest, which was constructed with admirable skill, has been deposited in the cabinet of natural history of Soleure.

The Importance of Stomata in the circulation of the gases exchanged during respiration and the chlorophyl function is still disputed. The researches of Ungar, Sachs, Merget, and others have shown, it is true, that gases easily circulate through the stomata; but Mr. Boussingault, on the contrary, in his classical memoir on leaves, has established that the intensity of the chlorophyl phenomenon is independent of the stomata. We do not know, then, in what measure these orifices concur in causing the gases indispensable to respiration and to the chlorophyl function to enter the tissues. Mr. M. Mangin, in a note to the Academy of Sciences, presents the results of a certain number of experiments on this subject, and the following are his conclusions: The stomata are indispensable to the circulation of gases in aerial plants, and the closing of these orifices causes a more or less marked diminution in the respiratory gaseous exchanges, and a very great one in the chlorophyl gaseous exchanges.

The Locking of Birds' Wings.—In a paper read before the National Academy of Sciences, Prof. W. P. Trowbridge gave an account of a discovery that had lately been made by his son. This discovery is that birds of prey, and some others, have the power to lock securely together those parts of the wing holding the extended feathers, and corresponding to the human hand. The action of the air on the wing in this condition extends the elbow, which is prevented from opening too far by a cartilage, and the wings may keep this position for an indefinite length of time with no muscular action whatever on the part of the bird. While resting in this way, the bird cannot rise in a still atmosphere; but if there be a horizontal current it may allow itself to be carried along by it, with a slight tendency downward, and so gain a momentum by which, with a slight change of direction, it may rise to some extent, still without muscular action of the wings. Prof. Trowbridge also believed it possible for a bird to sleep on the wing.

Effect of Electric Light on Vegetation.—The electric lighting of the Winter Palace at St. Petersburg appears to have given rise to some unexpected and undesirable results. According to the *Electrician*, the sudden change from the sunless days of the northern winter to the blinding light of the banqueting halls, aided probably by the artificially heated and drier atmosphere of the rooms, causes the leaves of the plants used as ornaments to turn yellow, dry up, and fall off after being exposed to the light for a single night. The rapidity of the injurious action and its amount is in direct proportion to the intensity of the illumination, since plants partially shaded from the light, or in niches or similar places, were found to remain uninjured.

Preserving Plants for the Herbarium.—An excellent method of preserving the colors of flowers is given in the *Annals of Botany* by S. Schonland. It consists practically in a process of deoxidation by means of sulphurous acid. A saturated solution of sulphurous acid with water is mixed with methylated spirit in the proportion of three parts of the former to one of the latter. Plants with thick leaves are left for twelve or eighteen hours in this liquid, but delicate flowers only from five minutes to half an hour. After removal they are allowed to dry by exposure to the sun or to artificial heat and are then at once placed between sheets of drying paper in the usual way. If enough sheets are used, it is rarely necessary to change the paper. The above treatment not only preserves the color, but hastens the drying, so that sempervivums can be dried in two days and orchids and arums in one day. Plants which usually turn black in drying, such as *Melampyrum* and *Lathræa*, retain their natural color. In a few cases in which the color of the petals disappears, it returns when the plant is dry. The only difficulty attending the process is that of laying out delicate blossoms after treatment with the solution.

Habits of Ants.—On Thursday, December 1, Sir John Lubbock read a paper before the Linnean Society, in continuation of his previous memoirs, on "The Habits of Ants, Bees, and Wasps." He said it was generally stated that the English slave-making ant (*Formica sanguinea*), far from being entirely dependent on slaves, as was the case with *Polyergus rufescens*, the slave-making ant *par excellence*, was really able to live alone, and that the slaves were only, so to say, a luxury. Some of his observations appeared to throw doubt on this. In one of his nests the ants were prevented from making any fresh capture of slaves. Under these circumstances, the number of slaves gradually diminished, and at length the last died. At that time there were some fifty of the mistresses still remaining. These, however, rapidly died off, until at the end of June, 1886, there were only six remaining. He then placed near the door of the nest some pupæ of *Formica fusca*, the slave ant. These were at once carried in and soon came to maturity. The mortality among the mistresses at once ceased, and from that day to this only two more have died. This seems to show that the slaves perform some indispensable function in the nest, though what that is still remains to be discovered. As regards the longevity of ants, he said that the old queen ant, which had more than once been mentioned to the society, was still alive. She must now be fourteen years old, and still laid fertile eggs, to the important physiological bearing of which fact he called special attention. He discussed the observations and remarks of Graber as regards the senses of ants, with special reference to their sensibility toward the ultra-violet rays, and referred to the observations of Forel, which confirmed those he had previously laid before the society. Prof. Graber had also questioned some experiments with reference to smell. He, however, maintained the accuracy of his observations, and pointed out that Graber had overlooked some of the precautions which he had taken. His experiments seemed to leave no doubt as to the existence of a delicate sense of smell among ants. As regards the recognition of friends, he repeated some previous experiments with the same results. He took some pupæ from one of his nests (A) and placed these under charge of some ants from another nest (B) of the same species. After they had come to maturity, he placed some in nest A and some in nest B. Those placed in their own nest were received amicably, those in the nests of their nurses were attacked and driven out. This showed that the recognition is not by the means of a sign or password, for in that case they would have been recognized in nest B and not in nest A. Dr. Warsmann had confirmed his observations in opposition to the statement of Lespis, that white ants are enemies to those of another nest, even belonging to the same species. The domestic animals, on the other hand, can be transferred from one nest to another, and will be amicably received. In conclusion, he discussed the respective functions of the eyes and ocelli, and referred to several other observations on various interesting points in the economy of the social Hymenoptera.

Function of Raphides.—Dr. E. Stahl suggests that raphides, or needle-like crystals of oxalate of calcium, are not, as is usually taught, mere products of excretion in plants; but that they serve a useful function to the plant in protecting it from the attacks of herbivorous animals. He finds that snails will reject such parts of the plant as contain these crystals, and that they consume only those that do not. The poisonous properties attributed to *Arum maculatum*, and the burning taste of the leaves, are due solely to the enormous quantity of crystals of oxalate of calcium stored up in them.

Absorption of Water by Mosses.—Mr. J. Reynolds Vaizey, in a paper on the absorption of water by mosses, shows by a series of experiments made on *Polytrichum commune* and *P. formosum* that water can pass readily through the external cell walls of the leaf, although it will not do so through the surface of the fruit stalk. This he shows to be due to the fact that in the leaf there is no layer of cuticle present, and that the external walls of the cell have undergone some change, so that water is easily absorbed by them. The seta or fruit stalk, however, presents this structure at the base only; the surface of the seta, apophysis and sporangium is smooth and glistening, and not capable of absorbing water, in consequence of being strongly cuticularized, although water readily passes up the interior of the seta.

Fecundity of Fishes.—Fishes produce so many eggs that if vast numbers of the latter and of the fishes themselves were not continually destroyed, these animals would finally fill up all the waters. For example, man annually takes 60,000,000 or 70,000,000 codfish from the sea around the shores of Newfoundland. But even that quantity seems small when we consider that each cod yields about 45,000,000 eggs each season, and that even 8,000,000 have been found in the roe of a single cod. Were the 60,000,000 cod taken on the coast of Newfoundland left to breed, the 30,000,000 females producing 5,000,000 eggs every year, it would give a yearly addition of 150,000,000,000,000 young codfish. Other fish, though not equaling the cod, are wonderfully productive. A herring weighing six or seven ounces is provided with about 30,000 eggs. After making all reasonable allowances for the destruction of eggs and the young, it has been calculated that in three years a single pair of herrings would produce 154,000,000. Buffon calculated that if a pair of herrings could be left to breed and multiply undisturbed, for a period of twenty years, they would yield an amount of fish equal in bulk to the globe on which we live.

International Geological Congress.

The fourth session of this congress will be held in London from September 17 to 25 inclusive. Previous meetings were held in Paris in 1878, Bologna in 1881, and Berlin in 1885, at each of which a large number of geologists from all parts of the world were present. In Paris 21 countries were represented, in Bologna 17, and in Berlin 18. A circular has just been issued by the organizing committee of the London meeting, giving particulars of the congress and stating the general arrangements. A large and influential committee has been formed, including the chancellors of the chief universities, the presidents of the more important scientific societies and of those societies especially devoting themselves to geology, mining, etc., the Lord Mayor of London, and many of the chief government scientific officials. The honorary president of the congress is Professor Huxley, the president Professor Prestwich, and the vice-presidents are the president of the Geological Society, the Director-General of the Geological Survey, and Professor T. M'R. Hughes. Mr. F. W. Rudler is treasurer, Mr. T. W. Hulke and Mr. W. Topley are the general secretaries. To the last named all communications respecting the congress should be addressed at 28 Jermyn Street, London, S. W.