A GIGANTIC TURTLE.

There exists at present upon Mauritius Island a gigantic land turtle belonging to Mr. Antelme, who received it in May, 1895, from the Six Islands or Egmont Islands, located in the Indian Ocean to the northeast of Madagascar. Accurate data and some photographs sent from Mauritius, by Mr. Sumeire, to Mr. T. Sanzier, at Paris, permitted the latter gentleman to give a description of this extraordinary animal that was embodied in a note presented by Prof. A. Milne-Edwards to the Academy of Sciences at its session of September 9 last, and published in the Comptes Rendus. We reproduce two of the photographs in the accompanying engravings.

The first, in which the turtle is seen in profile, gives an idea of the length, in a straight line, of the animal's carapax, which reaches 4·33 feet. The view of the back, with a reproduction of a metric measure and of four men holding the animal, gives a perfect conception of the size, length and form of this gigantic reptile, whose weight is 528 pounds. The length of the carapax in following the curve is 5·35 feet. This turtle, according to all probabilities, belongs to the species described by Dumail and Bibron under the name of Testudo Daudinii. —L'Illustration.

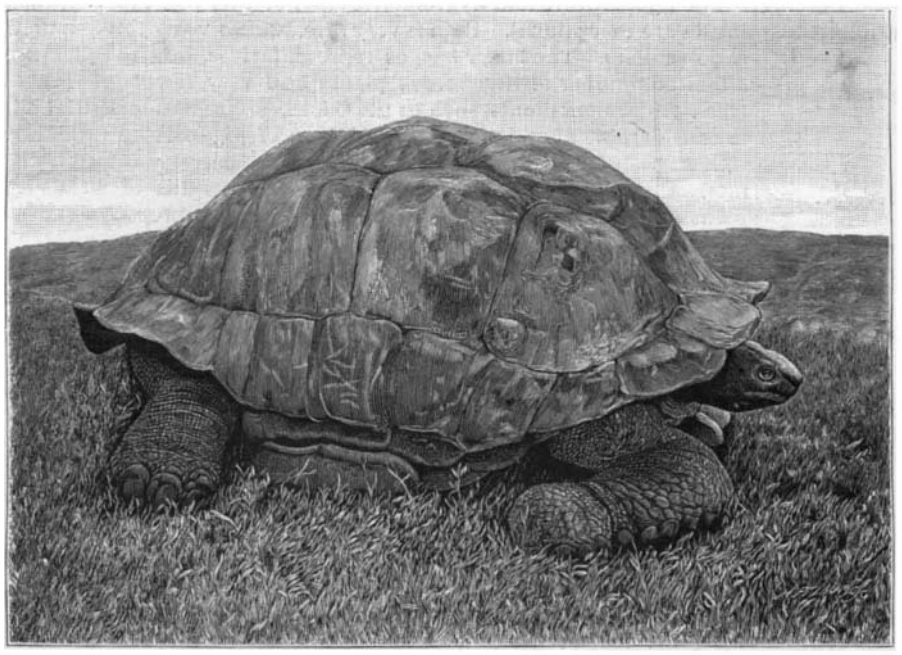

Fig. 1.—GIGANTIC TURTLE FOUND IN THE EGMONT ISLANDS—SIDE VIEW.

A Government Biological Survey.

BY JOHN ELFRETH WATKINS, JR., IN THE EVENING TELEGRAM.

Washington, June 16.—The Biological Survey will be the name of a brand new government institution to go into existence the first of next month. Mr. Morton, the Secretary of Agriculture, is to be its creator, and it will be conducted under the jurisdiction of his department. Just as the Geological Survey determines the mineral belts of the country, the new Biological Survey will determine its animal and vegetable belts.

The result is expected to be a tremendous economic advantage to our producers, declares the Washington Star. Our agriculturists, horticulturists, stock raisers and those engaged in any of the various animal or vegetable industries are, after a few years, to be given charts showing the exact portions of each State and Territory where certain animals and vegetables can be advantageously raised. These will be supplemented by a great catalogue containing every land animal and vegetable of the world, and indicating the areas in which they may be raised or cultivated by Americans.

Millions of dollars are thrown away each year by farmers and other producers, who plant seed in the wrong soil or climate, or who undertake to breed animals where the atmosphere and food resources are uncongenial. An efficient corps of naturalists will make a detailed survey of the whole country, counting and classifying the living species found in each county of each State and Territory. They will also note the conditions of climate, altitude and soil, and will note how far each condition influences the distribution of the species. No other country in the world has ever instituted a survey of this kind.

The chief of the new survey will be Dr. C. Hart Merriam, now chief of the division of ornithology and mammalogy in the Department of Agriculture. The field work will be performed by six naturalists to be distributed about the country and shifted from North to South, according to change of season. In a few weeks Dr. Merriam will start out upon a surveying tour in the far West. His equipment will consist of a light buckboard, with outriggers, to be drawn by mules. Upon the back of this will rest a large chest for containing specimens. The outriggers will hold the camp equipment and subsistence, which will include dry rations, to be eaten with such game as may be met on the way. The doctor will be accompanied by his first assistant, Mr. Vernon Bailey. Both will ride saddle horses, while a third man will drive the team and act as a packer.

This modest army of naturalists will wage bloody war against all animal life—not domesticated—met on the march. Before resting in camp each night they will set several hundred traps for catching nocturnal animals. As they proceed on the march by daylight they will rain showers of hot lead upon birds and beasts. For killing birds and small animals will be used shotguns with auxiliary barrels of from 0·22 to 0·32 caliber. These will fit inside the ordinary barrels, and will dispatch shot almost as fine as powder, so selected because it does not injure the specimens.

As each animal is trapped or shot it will be skinned and stuffed. Its skull will be saved and sealed in a glass bottle. Tags attached to each specimen will contain its name and the exact locality where it was found. Specimens of characteristic species collected in this manner throughout the country will be studied with reference to plotting the animal belts or zones. This work, which is of preliminary nature, is almost completed, characteristic species of almost every State having been collected by the division of ornithology and mammalogy.

Charts will be completed showing the belts occupied by each species, studied one at a time. The naturalists will have before them as many large topographical charts as the total number of species found. The zone of the mink, for instance, will be determined by taking each specimen of that species found in the field and making on a map a dot, showing the locality where each was killed. These dots will cluster, and the areas included in the clusters will be tinted in a representative color. The same process will be employed for plotting zones for each species of vegetable.

Besides indicating the sections of the country in which valuable animal and plant life can be raised with success, Dr. Merriam tells the writer that his survey will determine the zones in which injurious insects, animals and weeds abound, or are likely to migrate when certain species are introduced. This will further save our country, it is thought, many thousands of dollars. For instance, a farmer may want to plant potatoes on the side of a mountain. He will look at the biological map and first learn between what altitudes potatoes will flourish. He will next locate the potato bug zone. He will plant anywhere in the potato zone except that part intersected by the potato bug zone.

The same theory applied to other forms of life would hold good for level lands, all of which are included in one of the various zones. Minks, weasels, rats, mice, moles and other denizens of the field which prey upon produce will be located just as insects. In determining their zones, as well as those of weeds, it must be predicted whether they will prosper in new localities after the introduction of plants and animals upon which they depend for subsistence. Not only will persons living in affected zones be warned against raising certain things, but those adjacent will be advised to get rich by raising those things affected in the nearby injurious zones.

What foreign products are adapted to our zones? This, Dr. Merriam tells the writer, is the greatest of all economic problems to be solved by his survey. As soon as we know definitely where to put them, we can take any animal or plant species and find it a suitable climate. We have a sample here of practically every life-zone in the world. Foreign species introduced here in appropriate climates have, so far, seemed to prosper better than in their native climes. This, Dr. Merriam says, is for the reason that they get away from their natural enemies. The best example of this is the English sparrow.

By artificial selection, domestic animals can be adapted more widely to the different zones than wild ones, but there is a limit which frequently causes breeders of foreign species to lose many dollars. For instance, much money has been lost by American breeders who have striven to raise Jersey cattle in high zones where Holsteins will prosper, but where the former will perish.

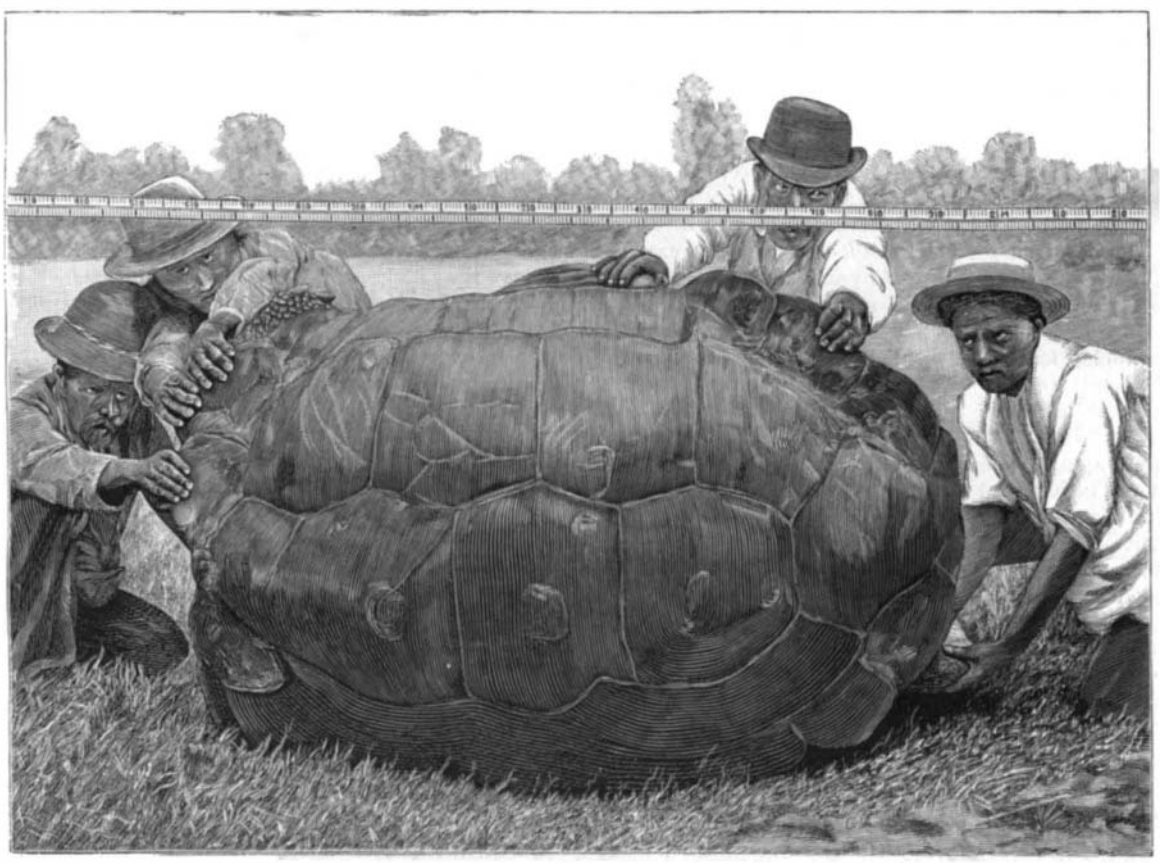

Fig. 2.—GIGANTIC TURTLE—DORSAL VIEW.

Suggestibility of Crowds.

The spontaneous phenomena which the Germans call Massenpsychosen—a word denoting a state of mind shared by a mass of people at once—are nothing more than Nature's experiments in suggestibility conducted on a large scale for our benefit. The panic is a familiar illustration. The terrifying suggestion which each man could easily brave alone becomes so intensified in being reflected upon him from a thousand frightened faces that he gives way and becomes for the time being an unreasoning struggling animal. During every great strike such phenomena are common. A crowd gathers, the spirit of disorder is abroad, and the soberest of citizens feels his fingers fairly itching for mischief. A stone is thrown, another, and then another, and in a few moments every man is vying with his neighbor to see how much damage he can do. In these cases the frequently repeated suggestions given by the words, and still more by the deeds, of others overcome the results of years of training in orderly habits, and when the excitement has subsided many a participant in the late riot may fall to wondering "what in the world possessed him." The colloquial phrase, like many another, enshrines a truth. He was indeed possessed—not by any evil spirit, to be sure, but by myriads of delicate physical impulses, which, streaming in through eye and ear, prompted him with almost irresistible force to violence.—Popular Science Monthly.

PROF. L. L. DYCHE, of the University of Kansas, has gone to Alaska with a view to Arctic exploration.

Notice to Our Readers.

In order to obtain the opinion of the readers of the SCIENTIFIC AMERICAN as to what invention *introduced within the last fifty years* has conferred the greatest benefit upon mankind, we publish the accompanying card, which please cut out and return to the editor. Those who preserve the paper for binding and do not desire to deface their files, or who read this notice at a library, will please answer by postal card. It is desired to get as full a vote as possible. The result of the vote will be published in the *Special 50th Anniversary Number of the* SCIENTIFIC AMERICAN *on July 25.*

Editor of the SCIENTIFIC AMERICAN.

Dear Sir:

I consider that.....

.....

invented by.....

has conferred the greatest benefit upon mankind.

Name.....

Address .....

Some Odd Inventions.

A very odd inventor was the famous Drummond, of Hawthornden; of such finished oddity, indeed, that he appears to have forgotten all about his wonderful notions after publishing them in the most conspicuous form possible. The tale has been diversely interpreted; we have room only for a mere hint of the facts. Drummond was a poet, of wide culture, of the most amiable disposition; well born and well to do; that is, a man whom one would not suspect of mechanical inclinations. Nor has any evidence been found to suggest that he had a secret leaning that way. But suddenly the realm of Scotland learned that this gentle scholar was prepared to turn out military engines of the most awful truculence in great variety. There could be no question of the fact, for his gracious Majesty Charles I announced it in a solemn proclamation, dated "Hampton Court, the last day but one of the month of September," 1626. In that document Drummond undertook to produce sixteen machines specified, and he had "not a few inventions besides." They all had long Greek names—a very characteristic touch—but he was good enough to translate them for the convenience of the vulgar. The descriptions are long also, which is a pity, for the quaint effect is lost in abbreviation.

First comes Baktrobrontephon, the Thundering Rod, "from the dreadfulness no less than the suddenness of its effect;" it appears to have been an improved carbine. Next, Lonkakontises, the Thrusting Pike—in the nature of a bayonet probably. Then Armakeraunos, the Thundering Chariot, vulgarly the Fiery Chariot, which we give up. Anoxibaliston, an open gun. Plastoskedastikon, vulgarly the Flat Scourer, for defending walls and ships. Probolekinetos, the elephant or cavalier errant, for attacking walls; a new kind of vessel called, "from its truly stupendous and terrible effect," Limenolotheutes, vulgarly Leviathan. After ten of these horrid marvels, we proceed to scientific invention; as the Anerometron for calculating the strength of winds; "a certain light kind of craft" which can sail against adverse breezes called Enaliodromos—the Sea Postilion, etc. The list ends with one "organic machine producing from a natural and never-wearied cause Perpetual Motion," which receives the name Aeikinetos, the Eternal Mover. Every line of the voluminous papers which Drummond left has been scanned again and again by admiring editors and biographers, and it can be asserted that no shadow of allusion to this extraordinary announcement can be found among them. But there it is, among the state papers, without possibility of error—"Our Faithful subject William Drummond, of Hawthornden," the hero is named.—London Standard.

Amount of Sleep Required.

"A healthy infant sleeps most of the time during the first few weeks," says the New York State Medical Journal, "and in the early years people are disposed to let children sleep as they will. But when six or seven years old, when school begins, this sensible policy comes to an end, and sleep is put off persistently through all the years up to manhood and womanhood. At the age of ten or eleven the child is allowed to sleep only eight or nine hours, when its parents should insist on its having what it absolutely needs, which is ten or eleven at least. Up to twenty a youth needs nine hours' sleep, and an adult should have eight. Insufficient sleep is one of the crying evils of the day. The want of proper rest and normal conditions of the nervous system, and especially the brain, produces a lamentable condition, deterioration in both body and mind, and exhaustion, excitability, and intellectual disorders are gradually taking the place of the love of work, general well-being, and the spirit of initiative."

THE VEGETATION OF LOWER CALIFORNIA.

Lower California is a peninsula that extends parallel with the North American continent from 32° to 22° north latitude, that is to say, a little beyond the Tropic of Cancer. It forms part of the Mexican States and its limits are: at the north, the Desert of Colorado; at the west, the Pacific Ocean; and at the east, the Gulf of California. Its width (from 20 to 25 leagues, on an average) is slight in proportion to its length (about 330 leagues).

The temperature and hygrometric state of this peninsula are exceptional. Rain is very rare, and so vegetation suffers. The latter has, as representatives, but a limited number of herbaceous plants and very few trees. Succulent plants, such as the Cactaceæ, are met in considerable abundance and sometimes of gigantic size. The order Fouquieraceæ, composed of some very interesting species, develops almost exclusively at this point of the globe. As for the yuccas, which dominate the series of arborescent species, they accommodate themselves perfectly to the conditions of excessive dryness of the country, and this has given them the name of desert palms. Finally, we also meet with two or three species of Prosopis, of the order of Leguminosæ, and a curious fig tree of which we shall speak further along.

It will be understood that in such a country the wealth of the soil lies in the metals that are extracted from its depths rather than in remunerative cultures. The flora of Lower California is therefore poor, and is not absolutely special to it, since it extends beyond the frontier into Arizona and the neighboring territory that the United States have taken away from Mexico, as well as along the Mexican coast situated on the other side of the Gulf of California. This flora, upon the whole, does not characterize Lower California solely, but is typical of this entire American region.

In order to protect themselves against a nearly constant evaporation, the plants of this country have had to take on strange forms, in diminishing the evaporating surfaces, which are usually the leaves. So the latter are rare or ephemeral. At all points where water is wanting, we meet only with dry and stony hills clothed with gnarled trees or leafless shrubs. Cactaceous plants alone relieve the dreary aspect of the country by their green color. But, when an abundant rain supervenes, nature, dead in appearance, is seen in a short time (two or three days only) to assume a new aspect. The vivifying element, so ardently awaited, gives these plants a holiday attire. A magnificent herbaceous vegetation soon covers the desolate and superheated earth, which was not even benefited by dew, which the stored-up heat checked. However, this fine state of things is of short duration. It may last several weeks, unless the action of the wind and the heat of the sun come to change the scene at short notice. Here is the whole explanation of the strange vegetation of Lower California. If, supposably, the humidity were prolonged, and the rains more frequent, we should find a tropical flora here in all its forms.

The fertility of the soil of this country is therefore unquestionable when water reaches it. We know, from evidence, that the missionaries in times gone by undertook farming here, which is still prosperous, although it is in inexperienced hands. These pioneer husbandmen impounded the rain water in the valleys by means of dams, so as to preserve it as long as possible for the benefit of their agricultural enterprises.

Although the foliaceous trees of these regions shed their leaves as soon as the dry season returns, the lax and soft tissues of their trunk, as well as the bark and pith, hold enough water in reserve to permit them to endure the persistent heat without perishing. The Fouquieraceæ (coach whip cactuses), represented by three or four species only, are, with the Cactaceæ, examples of this phenomenon.

That portion of the peninsula that faces the Pacific is more favored than the side that skirts the Gulf of California. The sea breezes coming from the west moisten the atmosphere of this coast without reaching the eastern one, and so the species of plants that are stunted at the east are much better developed upon the western coast. It is here that we meet with the torote and the lomboy—trees of medium size whose leaves and flowers disappear shortly after expanding. Yet their branches are often covered with a foliation slightly recalling the large sized lichens that cover the surface of the trees of our forests. These are Bromeliads of the genus Tillandsia, of which we shall speak again further along, and which live as epiphytes, pressed against each other and not meeting with the necessary conditions of humidity upon the opposite side of the mountain.

The torote belongs to the genus Bursera, some of the species of which are exploited in Mexico for the essential oil that is extracted from the trunk and branches of the tree. The name of linaloe has been given to these particular species ever since the conquest of America. The structure of their wood is very peculiar. Ligneous fibers are rare in it, and the element that prevails is ligneous parenchyma, that is to say, a tissue with a thin wall and not possessing the elongated form of fibers; and then come medullary rays of the same consistence, so that when it is desired to split this wood it resists and, owing to its elasticity, expels the wedges that one endeavors to drive into it. There is still another peculiarity to be pointed out. The essential oil of linaloe that is obtained through distillation does not exist in wood that is in a healthy state. In order that it may appear in the cells of the parenchyma, the wood must be in a state of necrosis, that is to say, dead. When a smallish branch has been broken (and the natives do not deprive themselves of the pleasure of mutilating these trees), the alteration that ensues extends from one place to another and the essential oil is seen by the brownish color that appears to gradually fill the cells of the wood. It is then that through distillation is obtained the essential oil of linaloe that is used in perfumery.

An endeavor was once made to utilize the bark of the torote, which contains a large proportion of tannin (from 10 to 12 per cent), but the exploitation of it was abandoned on account of the cost of transporting the bark.

The lomboy is less interesting. It is an arborescent Euphorbiad of the genus Jatropha, with soft wood, and which sheds its leaves during the dry season, like the preceding. Nevertheless, its bark contains a red juice which makes an indelible stain, and which, perhaps, from a chemical view point, possesses properties of some value.

To return to the Bromeliads, of which it has been a question above, we should add that they are probably the only known examples of plants of their order that are used as forage. The species observed by one of us is the Tillandsia recurvata, vulgarly called tojin, which covers the branches of the above named trees, and which is eaten with avidity by animals, for want of other and more succulent plants, during droughts.

There is, however, another kind of forage that will surprise the reader quite as much to learn about, although it has its analogue in Algeria and in the regions in which grows the Barbary fig tree, that the dromedaries do not disdain. Under the name of visuaga are designated throughout Mexico the large cactals belonging to the genus Echinocactus, and which, with age, reach 6 and sometimes 10 feet in height, as stated by Dr. Weber. These plants have prominent longitudinal ribs and are provided with hook-shaped spines. The diameter of their trunk may reach 25 or 30 inches. When forage gives out, the inhabitants, by means of a special instrument called a machete, remove all the spines from the visuaga by excoriating, from top to bottom, the summit of the ribs that bear them. Then they cut the fleshy mass of these visuagas into slices in order to feed them to horses and cattle, which are very fond of them. Finally, the spines of these Echinocacti are used as fish hooks.

There are other cactals that are at least as curious and useful as the visuagas. Such are the pitahayas, a name applied to various species of the genus Cereus.

These plants are true fruit trees. In fact, many of them bear saccharine or acidulous fruits that are eaten raw or preserved, or that are dried like prunes, and the equivalents of which are the Barbary figs that are sold in the south. The pitahaya dulce, p. agria, p. barbona, etc., are of the number.

Finally, there are others still that bear the name of cardon (Fig. 2). These form trees that, when old, reach a height of 50 or 60 feet and a diameter of 25 or 30 inches at the base. Their candelabra form allows them to be distinguished at great distances. One of these species is referred to Cereus giganteus or to C. Pringlei, which is closely related to it.

It will be understood that such plants need a stiffening tissue. In the center of the trunk and branches there is a very thick pith which becomes destroyed with age, so that the plant forms a genuine tube, having the ligneous cylinder as sides. The wood of which it is formed, although not very strong, is quite homogeneous, and its cylindrical arrangement assures its solidity, so that cardons are used as building material and as fuel.

Many other species of the order Cactaceæ, but of small size and varied form, are found here. But these have merely a scientific interest.

The yuccas are the only trees that hold their leaves, and, as they are monocotyledons having more or less resemblance to palm trees, they are named in the United States and Mexico desert palms (and also Spanish bayonets, Adam's needles, etc.) These plants and the cardons are about the only arborescent ones met with in the Mohave desert of Sonora and in all the analogous districts of Lower California having sterile portions. These yuccas are called heredatyl cimarron. They are more numerous and better developed upon the Pacific slope, and the specimen shown in Fig. 3 is certainly the largest example that is known. An endeavor has been made to utilize these plants by employing their leaves, which are rich in filaments, for the manufacture of paper pulp. In certain parts of Mexico, their root stock is used as soap, on account of the large proportion of saponine that it contains. In