

## ORGANOGRAPHY, OR VEGETABLE ANATOMY.

Muscles are the chief instruments of voluntary motion in men and animals, and popular comprehension has hardly recognized, as yet, the fact of plant organization being an exact analogue to that of human beings. This has been generally supposed to be merely a speculation or theory among the learned or imaginative, and plants considered as rooted or fixed to one place, while the question of movement has been overlooked simply because plants do not rove about. It cannot be denied that the power to move may be exercised in different modes and directions, while the instruments may be essentially identical. In the human body movement is perpetual, and by no means limited to the act of walking. Life itself is movement, and the contrary, in figurative speech, is always understood to be an equivalent for death.

The flux and reflux of currents in the growth and development of plant life are continual, and readily admitted by the most superficial observer; but the instruments or organs by which spontaneous movements are made are not ordinarily admitted as even existing. Muscular contraction is to be found in those fibers of the footstalks of leaves, which act in closing their upper surfaces together, or bending them downward; within the claws of petals, and divisions of the calyx, when exerted for the purpose of opening or closing the corollas or calyxes of the florescence. They act also as resistants to external irritation or internal sensations of discomfort in the plant individual, making efforts to prevent or remove sensations which annoy, or to encourage those which are necessary and agreeable. They act under the stimulus of light, turning the upper side of the leaf to the point most favorable for receiving that stimulus. The Abbé Tessier ("Hist. de l'Académie Royal, ann. 1783") exposed a variety of plants, in a cavern, to different quantities of light, and demonstrated satisfactorily that the contraction or elongation of muscular action in plants, or, in other words, their elasticity, was sensibly affected by the presence or absence of light.

Instances of muscular dilatation and contraction abound, and to the observant eye are very evident. To quote from an Italian writer: "If the top of the floret (chondrilla) be touched (which has five stamens surrounding one pistil), all the filaments which support the cylindrical anther will contract themselves, and, by raising or depressing the anther, the whole pollen will be collected on the stigma; and if one filament be touched after it is separated from the floret, it will be found to contract like the muscular fibers of animal bodies."

Plants are known to change the direction of their roots or trunks, as, for instance, where a plant has been inverted intentionally, or placed root uppermost, the root makes an effort to curve downward, and the stem upward, until it regains its natural and proper direction. Acted upon by the air, sun, and light, the muscles direct the upward course of the stems; and acted upon by the moist warm vapors in the ground, they also determine the direction of the roots. While in some species the muscles are robust and powerful, in others they are extremely delicate and minute, but none the less fitted to be instruments for fulfilling the will of the individual plant, the same as the muscles of a man obey the mandates of his active brain.

A plant named *Upata* or *Sanar* is found in Senegal, with roots which rise vertically a foot above the surface of the earth. With the aid of their muscular fibers plants are enabled to forsake a poor soil and reach a better one. They frequently succeed in reaching to newly formed ditches and canals, where they can obtain a more abundant supply of moisture. Roots and branches are known to surmount almost insuperable obstacles in order to gain their end, that is, to supply their necessities. A branch has been known to leave its normal direction parallel to the soil, and to overtop an obstruction, with the evident purpose of attaining a more favorable exposure to the sun, air, and light. Roots penetrate into hard soils, through stone walls, and even into rocks by bursting them. By means of muscular elasticity numerous flowers leave their perpendicular direction, and, with the purpose of exposing their faces to the sun, follow his diurnal course by looking towards the east in the morning, the south at noon, and the west at evening. Moisture and dryness are both necessary conditions for the action of muscular fiber. The existence of these fibers was incontrovertibly established by the observations of La Hiré, Hales, and Bonnet.

Change of direction is conspicuous in the altered aspect of plants at night, and under excess of moisture, particularly evident in compound or pinnated leaves. The winged leaves of the leguminous tribe, acted upon by the heat of the sun, rise vertically and form a right angle with the common footstalk, the lobes or lesser leaves clinging together by their upper surface. Simple leaves, as in Indian mallow (*Urena*), when exposed to the sun, become concave. Winged leaves, in a close, moist, and cloudy atmosphere, may be found

extended along the common footstalk; and after the sun sets, they hang vertically downward, closed together by the lower surface, like the leaves of a book. If there is an odd lobe at the extremity, it folds upon itself until it reaches the first pair of leaves in its neighborhood. The simple leaves of bastard and feverfew are good examples. Intrefoil, lucerne, and lotus they unite by their extremities, and form a cavity of protection from the chill of the night season. According to M. Duhamel, this muscular motion is, in sensitive



VENUS'S FLY TRAP.

plants, evinced in the two forms of natural and artificial; warm vapors causing the one, and external agencies, such as touching or shaking, causing the other. The muscular motion of the sensitive plants is laid open to our inspection, and is an instance of extreme contractile force. At the lightest touch of the hand they move, close their leaves, and bend their branches, until a sympathetic agitation extends throughout a whole savanna; a sight which charmed and astonished the Spaniards who penetrated the American Isthmus in 1548, who gave them the expressive appellation of *dormideras*.

The sensitive plant of Senegal, called by the negroes *guerikar*, or "good day," has been frequently described. When it is touched, or even bowed to, it inclines

its stem and turns its leaves as though in polite response to a salutation. The *Dionaea muscipula* (Venus's fly trap) is another familiar instance, to be found in marshy soils in North America. The leaves are massed in rosettes around the floral stem, and spread out upon the soil. These have at their extremities a sort of reddish appendage, hollowed into two large lobes, attached to the main leaf by the mid vein only. The edges of these foliated lobes are garnished with hairs, and their surface bristles with little points, constantly covered with a viscous liquor which attracts insects, particularly flies, which are dissolved by matter secreted in the plant, or, as we might with propriety suggest, digested, and affording nutrition to the plant. As the fly struggles, the leaves contract, and the insect is either suffocated or bled to death upon the bristling points of the leaf.

The true sensitive plants of South America are described by M. de Martius in his "Travels in Brazil," as closing their leaves by an agitated muscular movement when even a horse galloped over distant ground, and equally startled by the approaching step of a man. The animation of an extended group of these sensitives in that tropical climate must carry with it to the mind of the beholder a curious sensation of awakened conviction in regard to the intensity of animation, which is less prominent, though, as we believe, no less actual in the vegetable lives of colder climates. The burning sun and luxuriant growths of Brazil, for instance, reveal a movement and an expression, which, seen for the first time, convey a freshness of conception which equals an added power of vision, and is not readily forgotten, but ever after colors all conceptions in regard to vegetable beings, as organized harmoniously, with complete organs for the execution of equally complete functions.

R. C. K.

## MEXICAN FLORA.

Our engraving shows some of the prominent types of the flora of the hotter and drier portions of Mexico. At the left is an agave, a genus of the order *Amaryllidaceae*, or American aloes, the common species of which is known in Mexico as *mescal*. From its sap, obtained by incisions in the stem, a fermented liquor, called *pulque*, is made, which, when distilled, forms the *vino mescal*, or common cactus brandy. It is a popular error that the plants or trees belonging to this genus require a century to arrive at maturity, when the flower is put forth, to remain dormant, so far as efflorescence is concerned, for another full century. In hot climates, otherwise favorable to development, maturity is reached sometimes in ten years; but in colder countries a much longer period is required, thus affording some justification for the popular belief.

Several varieties of cactus are also shown in the engraving. In the foreground are specimens of the *C. opuntia*, or prickly pear, and of the *C. melocactus*, the great melon thistle or "Turk's cap," as it is sometimes called, one of the most remarkable members of the family. The large cactus in the background is the *C. cochinitifer*, which forms the chief nourishment of the cochineal insect.

## New Inventions.

Mr. N. Overfield, of Rockaway Beach, N. Y., has contrived a Portable Bathing House made of canvas stretched on a frame so constructed as to be readily taken down and adjusted in compact form for removal or storage. The arrangement for ventilation is efficient.

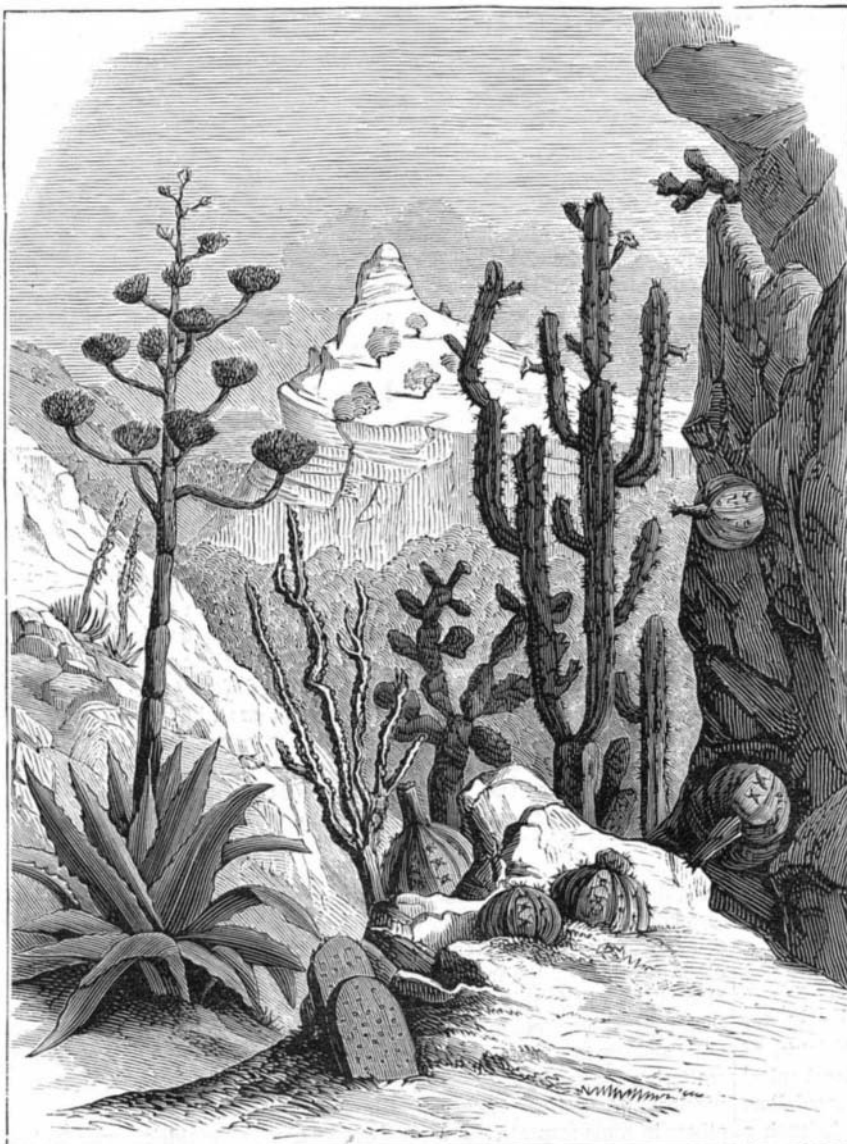
Mr. H. D. Cress, of Cromwell, Ind., has invented a simple Draught Equalizer, consisting of a draught bar, to the ends of which the outer traces are hooked, the inner traces connecting with a chain which passes over a pulley carried by a plate secured to the middle of the draught bar. The whole is securely braced.

Mr. A. Dittrich, of St. Luke's, England, has patented a spring-acted Umbrella Tip Cup, capable of being readily applied to the umbrella stick, and without requiring detachment of any portion of the frame.

An improved Heating Stove, invented by Mr. F. J. Gould, of Sidney, Ohio, is of the double magazine, base-burning type, and is intended for burning soft coal. In the old styles of double magazine stoves the gas generated in the inner magazine had no other escape but the top of the stove, so as to vitiate the air; this is prevented by an arrangement of draught holes of the outer magazine. Other advantages are claimed.

Mr. G. W. Gomber, of Hazleton, Pa., has patented an improved Bottle Stopper, which is operated on the same general plan as the De Quillfeldt stopper, but made compound, with a different hanging of the eccentric lever, and with new details intended to give increased durability.

A convenient Clasp for Pocket Books, patented by Mr. Louis Prahar, of New York city, is so constructed that it may be put together after being plated, without danger of marring the plating, and which, it is claimed, cannot be detached accidentally.



AGAVE, CACTUS, AND MELOCACTUS.

Mr. N. Fox, of Savannah, Ga., has patented an improved Bottle Stopper, especially for effervescent liquids, which permits the bottle to be closed before removal from the filling machine. The principal parts are a collar, secured to the bottle neck, a cap which screws down upon the collar, operating a ball valve, and a suitable nozzle.

Mr. G. W. Everett, of New York city, has patented a Skirt Holder for drygoods stores, etc., which may be conveniently folded into a narrow space for being packed in a trunk or otherwise stored away.

An improved Clothes Pin, patented by Messrs. H. L. Clark and A. B. Smith, of Chester, N. Y., is formed by the combination, with a straight-shanked hook having a thumbpiece and stop, of a spiral spring and follower, the latter having two fingers which engage with the hook.

An improved Child's Carriage, invented by Mr. C. Gillis, of Brooklyn, N. Y., has a flexible body, like a hammock, and the frame is so arranged as to fold into a small compass for carrying upstairs, or may be readily taken to pieces for transportation.

A new Harness Pad, recently patented, is claimed to rest easily upon the horse's back and not press upon the spine. The tree is a flat bar of wrought iron having end loops for receiving the trace-supporting traps, and having ears on each edge for receiving the pad-fastening screws; and the pads are wooden blocks covered with several thicknesses of cloth or felt and leather. The inventor is Mr. L. W. Vandenburg, of Honesdale, Pa.

Mr. Henry Holcomb, of Painesville, Ohio, has invented an improved Hot Air Furnace, which is provided with automatic means for regulating the admission of cold air into the fire chamber, and which embodies a number of novel details.

An amusing Mechanical Toy, recently patented, may be said to convey a moral. It is called "the careless engineer," and illustrates by a harmless clockwork explosion the danger attending an engineer's carelessness. It may also be set so as to run without accident, showing the safety which results from proper care. This is the idea of Mr. Stacy Potts, of Philadelphia, Pa.

An improved Knife Scourer, patented by Mr. N. A. Wierman, of Bendersville, Pa., is claimed to be made much more durable than is usual by making the scouring rubbers detachable, so as to present a fresh face from time to time, and by applying the pressure at the middle of the rubbers, at the point where the most wear occurs, so as to hold them to their work even when considerably worn.

A new Fire Escape, patented by Messrs. John Swank and Arnold Jehnke, of Denver, Colo., is of the class in which the downward motion of the person is checked by means of a friction clutch attached to the drum carrying the rope by which the descent is made. It has, in addition to a spring acted clutch, a further safeguard in the shape of a brake operated by a nut, to be used in case the clutch proves insufficient.

An improved Rocking Chair of the class having a stationary base and spring connected rocking seat, which has lately become so popular, has been invented by Mr. M. Schrenkeisen, of New York city. The interposition of rubber blocks prevents jar as the chair reaches the end of its forward or backward movement, and there are other improvements.

Mr. E. T. Rogers, of New York city, has invented a Filter intended for the feed water of steam engine boilers and similar uses. It has a vertical breakwater plate and one or more vertical screens at the inlet end, and similar vertical screens at the outlet end, with a central charcoal chamber, and under it a sediment receptacle.

Mr. John Conrath, of Salamanca, N. Y., has patented an apparatus for Drying and Stretching Curtains, arranged to keep the curtain under tension by its own weight while drying, and capable of being compactly folded when not in use.

A Lock for Stovepipe Joints, designed to keep the lengths from coming apart and the line of pipe from sagging, has been patented by Mr. J. W. Woolsey, of Henderson, Minn. A metallic strip riveted to one length passes through a slit in a corresponding strip attached to the other length, and is bent upon itself, forming a secure tie.

Messrs. N. N. Sprecher and I. B. Keller, of Reading, Pa., have patented an improvement in Shirt Scales, which is claimed to provide a convenient and reliable rule for graduating slopes required between different diameters of neck measurement in all sizes and proportions.

Mr. F. J. Grotevent, of Reading, Pa., has patented a convenient Mailing Package for transporting small quantities of powdered substances as samples. It is a box having a hinged lid at each end, and contained by a paper wrapper and a cloth wrapper, both of which are wrapped permanently around the box, folded over upon the lids at the ends of the box, and held in place by cord, which may be easily unfastened.

An improved Dumping Wagon, the invention of Mr. J. H. Nelson, of Wayne, Wis., has a box made in four sections, either of which may be emptied independently. By this construction the load may be discharged in four separate heaps.

#### Manufacture of Chloride of Lime.

A new process for the expeditious manufacture of dry chloride of lime has been invented by Mr. E. Maletta, of Paris, which consists in the employment of mechanical means for stirring, agitating, or mixing the powdered lime and the chloride of lime as fast as it is formed, in such a manner as to expose all the molecules of these substances in succession to the continuous action of the gaseous chlorine,

which is introduced under favorable conditions for combining with the lime, and is rapidly absorbed by the latter. In order to insure regularity, it has been found necessary to couple at least two apparatus together, so as to admit of the chlorine being directed into either, as required. The process is very rapid, and is carried out with great facility, and without any waste of chlorine. The progress of the operation may be constantly watched by persons near the apparatus, which emits no injurious odors. The apparatus is cheap in construction, and occupies but small space. The manufacture may be regulated at will, as examples of absolute homogeneity (as may be ascertained by testing) may be taken at any time during the operation. As the chloride of lime manufactured in this manner is homogeneous in every part it is not liable to become decomposed, as is the case with chlorides manufactured in layers, more or less deep, and in a state of rest, and a source of considerable loss is thereby avoided in the manufacture of this product, which is liable to deterioration from the influence of climate and other influences resulting from its composition.

#### Natural History Notes.

*Leaf Veins of Poison Hemlock.*—Some interesting remarks on the leaf of the poison hemlock (*Conium maculatum*) formed the substance of a paper recently read before the Linnean Society by Mr. J. Gorham. From his observations it was shown that in a piece of the leaf, one third of an inch long by one fifth wide, the veinlets were arranged exactly in the same way as the venation of the entire leaf. This was also found to occur in the other umbelliferous plants that were examined, so that it was possible to detect and recognize each from the merest fragment. This is something like describing an animal from a bone. These facts open a new field to the student of botany, besides promising to be of valuable service in medico-legal investigation. The relation of the venation of leaves to the branches of a tree may yield more interesting facts on investigation.

*Habits of the Fur Bearing Seal.*—At a recent meeting of the Linnean Society there were exhibited mounted specimens of the fur bearing seal of the Pacific, male, female, and young. Mention was made of the "rookeries" of these animals, containing over three million seals in a compact area. Like old Turks, a male dominates over a harem of a dozen or fifteen females, which he guards with jealous care, for two months or more never stirring from the spot, and meantime fights terrific battles for its maintenance. A neutral zone exists to the rear of the breeding grounds, where the enforced bachelors and adolescent young of both sexes repair. These come and go continuously, passing to and fro through free lanes of passage. Others of these creatures delight in dashing among the breakers on the surf, or frolic and play in droves on the sand and grassy dunes adjoining the more rocky ground of the "rookery." In preparing the skins of these seals for commerce, the under side is shaved in such a manner that the roots of the long, coarse hairs are cut loose and the hairs set free, so that nothing is retained but their fine fur.

*A Rare Bird at Central Park.*—There is at present on exhibition at the Central Park menagerie, for a short time only, while in transit for Europe, a very rare specimen of a bird belonging to the family *Megapodiidae* (so named because of their large feet). This is the first specimen ever brought alive to this country, and will be the first living example ever seen in Europe, should it arrive there safely. It is a native of one of the East Indies—Nina-Fou or Proby Island, which is situated about half way between the Feejee and Samoan Islands. The bird is of a uniform blackish-brown color, cheeks and upper part of neck vermilion red, slightly feathered with small black plumes, bill bright yellow, tarsi and toes pale yellow, claws black; length from bill to end of tail about 14 inches. There are about twenty species belonging to this family of megapods. They are found chiefly in the tropics, and inhabit dense forests and swamps, generally in the vicinity of the sea beach. These birds are remarkable for the extraordinary contrivances resorted to by them to obtain the artificial heat necessary to hatch their eggs. For this purpose some of them form mounds, and are hence called "mound builders." These mounds, which sometimes reach fourteen feet in height, with a circumference of 150 feet, are composed partly of vegetable matter, which the birds bring by small quantities at a time in their large feet. In the middle of these mounds, at various depths (from 18 inches to several feet) the females deposit their eggs, some in the form of a circle, while others of a different species place them irregularly. When the eggs are all deposited, the center is entirely covered in, and the mound raised several feet in the form of a cone. The heat produced by the fermentation of the vegetable matter is then retained within the mass, and brings the eggs to maturity. The birds are usually engaged in laying their eggs during a period of from two to three months. The Celebean megapod has a different method of hatching its eggs: it places them in a hole which it has dug out of a rotten stump; then, covering them up with vegetable matter, leaves them. Again, other members of the family burrow obliquely into the sand along the seashore to a depth of three or four feet, deposit their eggs at the bottom, then cover up the mouth of the hole, and try to conceal their foot-marks leading thereto by scattering the sand about. The habits of the Central Park species (*Megapodius pritchardii*) differ from those of the others in some respects. It scoops out its nest in the side of a little lake in the center of the island, between one and two feet in depth, laying about forty eggs in the months of Sep-

tember and October. The exact period of incubation is unknown. The most remarkable thing about these birds is that, after all the trouble and care taken for the preservation of their eggs, they should be so utterly indifferent to the fate of their young, leaving them to scratch their way out of whatever position the eggs were placed in, and to take care of themselves afterwards.

*The American Oyster.*—It is a well known fact that the edible oyster (*Ostrea edulis*) attains its full growth and proper flavor only in the waters of the American coast; and that its representative in Great Britain, owing perhaps to some trouble in its "environments," has dwindled down to a minute coppery-flavored bivalve, which affords to the evolutionist a melancholy example of "reversion," and to the American gastronome an object of aversion. It is no wonder, then, that when one of our American oysters is seen for the first time by an inhabitant of the British Isles, it should call forth expressions of great surprise. An English gentleman who has been indulging in some of our exported "Blue Points," writes to the "Notes and Queries" column of a recent number of *Land and Water*, asking for information in regard to these "delicious mollusks." He says:

"As an old correspondent, I want to know, in common with many of your readers, who have asked me the question, what are Blue Point oysters? Now, perhaps my friend Mr. Buckland, who has done so much for and written so well on these delicious mollusks, will enlighten us. Tempted by the advertisement in *Land and Water*, I sent to the offices of the New Direct Supply and Trading Association, Cannon street, for a bag of fifty for only 4s., including a knife. I found them excellent, notwithstanding the extraordinary shape of some of the shells, which I send with this. One of them you will see is like the Irishman's gun, which, being bent, he said was made to shoot around the corners; but the contents of this were very fine, large, and plump, as indeed all were, more or less; the contents of the smallest shells were frequently larger than those contained in the more pretentious. I wish to direct your attention to the large black spot in the middle of the flat shells of all of them; they are now slightly fading, but when first opened were quite black. I should like to know if this color has anything to do with the flavor, for I found the blue points so good that I have had three, and am now going to order another basket. They are reported to come from America. When Mr. Buckland returns from his official tour in Cornwall, perhaps he will tell us something about them, or Major Iles Home, the obliging manager of the Stores, will enlighten us, saying how long the season lasts for eating them."

*An Imprisoned Owl.*—The Lancaster (Pa.) *Examiner* says: "The owner of a large farm, not far from Lancaster, had an opportunity a few days ago of witnessing how an interloper is punished by the martin species of birds. A pair of martins had taken possession of a small box, and were building their nest. One day, while they were absent, a screech owl took possession of the box, and when the martins came home at night would not allow them to enter. The smaller birds were nonplussed for a while, and in a short time flew away, seemingly giving up the fight. But if the owl was of this opinion he was sadly mistaken, for in a short time the little ones returned, bringing with them a whole army of their companions, who immediately set to work, and procuring mud, plastered the entrance to the box shut. They then all flew away. In a few days the box was examined and the owl was found dead."

*Solid-hoofed Pigs.*—Dr. Coues states that a breed of solid-hoofed pigs has apparently been established in Texas. The terminal phalanges of the toes are united to form a single broad phalanx; above this, however, the other two phalanges remain perfectly distinct. The hoof is perfectly solid, and on its sole there is a broad angular elevation of horny substance, which is curiously like the frog of the horse's hoof. The breed is so firmly established that no tendency to revert to the original and normal form is observable. It is further stated that, in the cross of a solid-hoofed boar with a sow of the ordinary type, a majority of the litter have the peculiarity of the male parent.

#### African Explorations.

The United States Consul at St. Paul de Loando reports to the Department of State that the German exploring expedition sent out under the leadership of Herr Otto Schmitt by the Geographical Society of Berlin, and which recently left Loando for the purpose of making accurate surveys east of Quango and south of the Congo, had safely reached Melange, about 200 miles south of Loando, where heavy rains had delayed them. When these rains are over, the expedition will again resume its march. Much valuable work had already been accomplished, and a number of maps of actual surveys had been made, of which copies will be sent to our government.

In this connection it may be stated that the United States Commercial Agent at Gaboon informs the Department of State that more missionaries are following in the path of Stanley's discoveries, two having recently spent a few days at Gaboon *en route* for the Congo, who had been sent out by philanthropic merchants at London and Liverpool, to ascend the south bank of the river to a point above the first rapids, where they are to establish an industrial Christian mission. This and similar enterprises, the agent thinks, will pave the way for the extension of commerce and steam navigation upon the vast interior rivers of Ethiopia and the development of her valuable resources.