

## A WONDERFUL TREE.

The plant illustrated in the accompanying engraving is perhaps one of the most extraordinary vegetable productions, in many respects, on the face of the globe. Seldom, if ever, has the discovery of a new plant created such an amount of interest in the scientific world as did this. In the year 1860 an Austrian botanist, Dr. Frederic Welwitsch, while making explorations in Southwest Tropical Africa, under the auspices of the Portuguese Government, came upon an elevated sandy plateau about 500 miles south of Cape Negro. Here his attention was at once attracted to a number of curious objects rising from a foot to a foot and a half above the surface of the soil, varying from 2 to 14 feet in circumference, and having a flat, somewhat depressed top of a dingy brown color, and appearing more like large stools or small tables than any living plant. When his amazement at beholding such a scene was over, Dr. Welwitsch's first proceeding, of course, was to secure both a plant and sufficient and proper materials for determining its scientific classification. These materials were subsequently sent to Kew with the request of the discoverer that Dr. Hooker should examine and classify the plant; this the latter did, naming it *Welwitschia mirabilis*. The result of Dr. Hooker's labors was the subject of one of the most interesting papers ever read before the Linnæan Society.

As we have before stated, the *Welwitschia* rises no higher than a foot or so from the surface of the soil, and may, therefore, be called a dwarf tree. The roots branch just below the stock, penetrate several feet into the ground, and fix themselves so firmly in the hard, sandy parched soil that it was found extremely difficult to dig up a plant with the roots entire. The most peculiar part of this plant is the crown, into the edges of which (at the point of junction with the stock) the leaves are inserted. The outline of this crown is of an irregular oval or oblong form, and its surface (and, indeed the whole exterior of the tree) is of a dirty brown color, hard, rugged, and cracked, and has been aptly likened by Dr. Hooker to the crust of an overbaked loaf of bread. It is seldom or never flat, but usually sunken or concave toward the center. From the edges, toward the center, the surface is covered with little pits, the marks or scars of fallen flower stalks. The leaves, like all other parts of the plants, are very extraordinary; each plant possesses two only, corresponding in width to the lobes of the crown, and running out right and left to the enormous length of six feet, and one twentieth of an inch in thickness. These leaves (which are not true leaves, but "seed leaves" or *cotyledons*) are normally entire, although they are seldom seen in that state, as they soon become split to the base into strips. They lie spread out flat on the ground, are of a leathery texture, and of a bright green color, with almost imperceptible parallel veins. They are described as being persistent during the whole life of the plant, which is said to be a hundred years or more.

This fact affords another instance of dissimilarity with other plants; for we know that the first or cotyledonary leaves of most plants drop off as soon as second leaves are produced. The *Welwitschia* is *dioecious*, that is, its male and female flowers are borne on separate plants. The inflorescence is supported on dichotomously branched cymes, which spring from the small pits or scars, before spoken of, upon the crown of the tree, close to the point of insertion of the leaves, and even occasionally below them. The fruit or cone (which is the only part of the plant bearing any general resemblance to the coniferæ, to which it is related) are, when fully grown, about two inches long, with four slightly convex sides, and of a bright red color. The seeds, which are contained one in each scale, are surrounded by a broad, light-colored, transparent wing. It is highly probable that the fertilization of the female flowers is effected by insects, as it appears "that a pollen-feeding group of coleoptera, the *Cetonia*, abound in the regions inhabited by the *Welwitschia*."

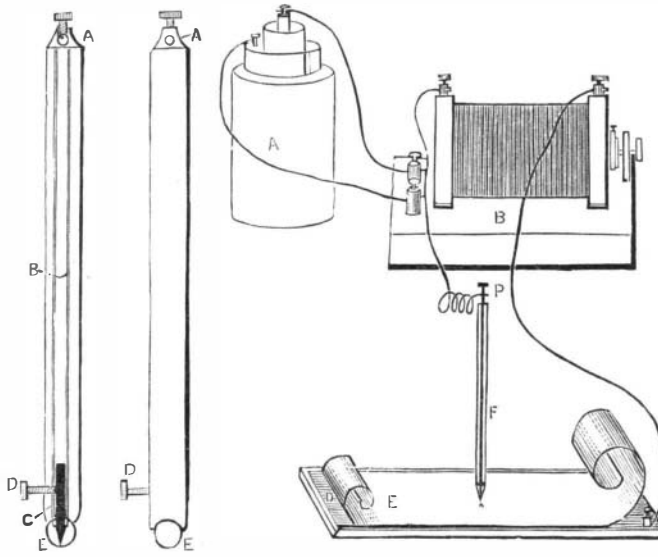
Dr. Hooker, after a careful microscopical examination of this extraordinary plant, placed it in the natural order *Gnetaceæ*, and regards it as having a very close affinity with the genera *Ephedra* and *Gnetum*. Outside of the high scientific interest with which it is invested, this plant has no recognized use. Its leaves, being tough, leathery, and not softly fibrous,

are not adapted for cordage, weaving, or any similar purposes. Its tough trunk is of such an uneven, fibrous grain that the saw seems rather to tear than cut it; and besides, it is so irregular in its growth as to unfit it for any economic use.

No wonder, then, that the plants have been allowed to grow for centuries unmolested by the natives, and, consequently, up to the time of its discovery hidden from the eye of civilized man.

## A SIMPLE ELECTRIC PEN.

We give below a description of a simple electric pen,



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which we extract from an article by Professor Wentworth Lascelles Scott in the *Electrician*.

The little contrivance which is shown in the accompanying engraving could be sold at a good profit for from 25s. to 30s. complete, or can be put together by any one possessing a very moderate amount of electro-mechanical skill at even less cost than the former sum, while the "pen" *per se* is as convenient and as light to hold as an ordinary pencil, and can be actuated by a comparatively very small single cell battery.

The accompanying rough sketch needs but little explanation, and shows fairly well the arrangement devised and actually used by me.

A is a Daniell's cell of medium size, which is all the battery power required; indeed, a very small bichromate or

very well if certain simple improvements be applied thereto. As a rule these tiny "Ruhmkorffs" give a secondary spark of from one eighth to three sixteenths of an inch in length, but would give a much longer one only that the vibrating armature is not sufficiently delicate, while the condenser is often only a delusion and a snare. The former should be more delicately adjusted, a really elastic bit of spring being added if necessary, and the latter should be taken out and replaced by a sound and practical condenser, containing 300 or 350 square inches of tin foil, carefully insulated with paraffin paper. When these alterations are completed, it will be found that the spark is increased in length to some five sixteenths of an inch, or even more. The desk or writing slab consists of a plate of glass or vulcanite of suitable dimensions, upon which has been evenly laid a perfectly smooth, but rather smaller sheet of silver or tin foil, D, the whole being protected from damp by a coat of thin amber varnish; at one corner of the slab is fixed a binding screw, E, in contact with the metallic surface, and connected by a wire with one terminal of the secondary coil.

The writing stylus or "pen," F, consists of an ivory or vulcanite tube, pointed at its lower extremity, and provided at the other end with a small brass terminal; from the latter a stiff wire, furnished with an extremely fine platinum point (p) proceeds in the interior of the tube, and is capable of adjustment by a small set screw. In practice this platinum point should be (when the stylus is turned up) very slightly below the level of the aperture in the ivory. The "pen" being then connected to the free terminal of the secondary, and the little coil set so that the primary sparks appear almost continuous by reason of their very rapid succession, a sheet of paper laid upon the slab, C, will be quickly perforated in a series of minute holes if the point of the stylus be gently drawn over it. Any writing, plan, or outline drawing, may be traced in

this way upon the paper, although in a somewhat slower manner than with an ordinary pen. When removed from the slab the paper is found to be a kind of stencil plate, from which, by laying in succession upon a number of sheets of paper, and applying the ink roller or "dubber," many hundred *fac-simile* copies may easily and quickly be obtained.

If an "electro-stencil" of a large architectural or other plan or of a map be wanted, a slightly modified stylus will facilitate the work. Fig. 2 shows such an instrument drawn to scale (half the original size), Fig. 3 being a section of the same.

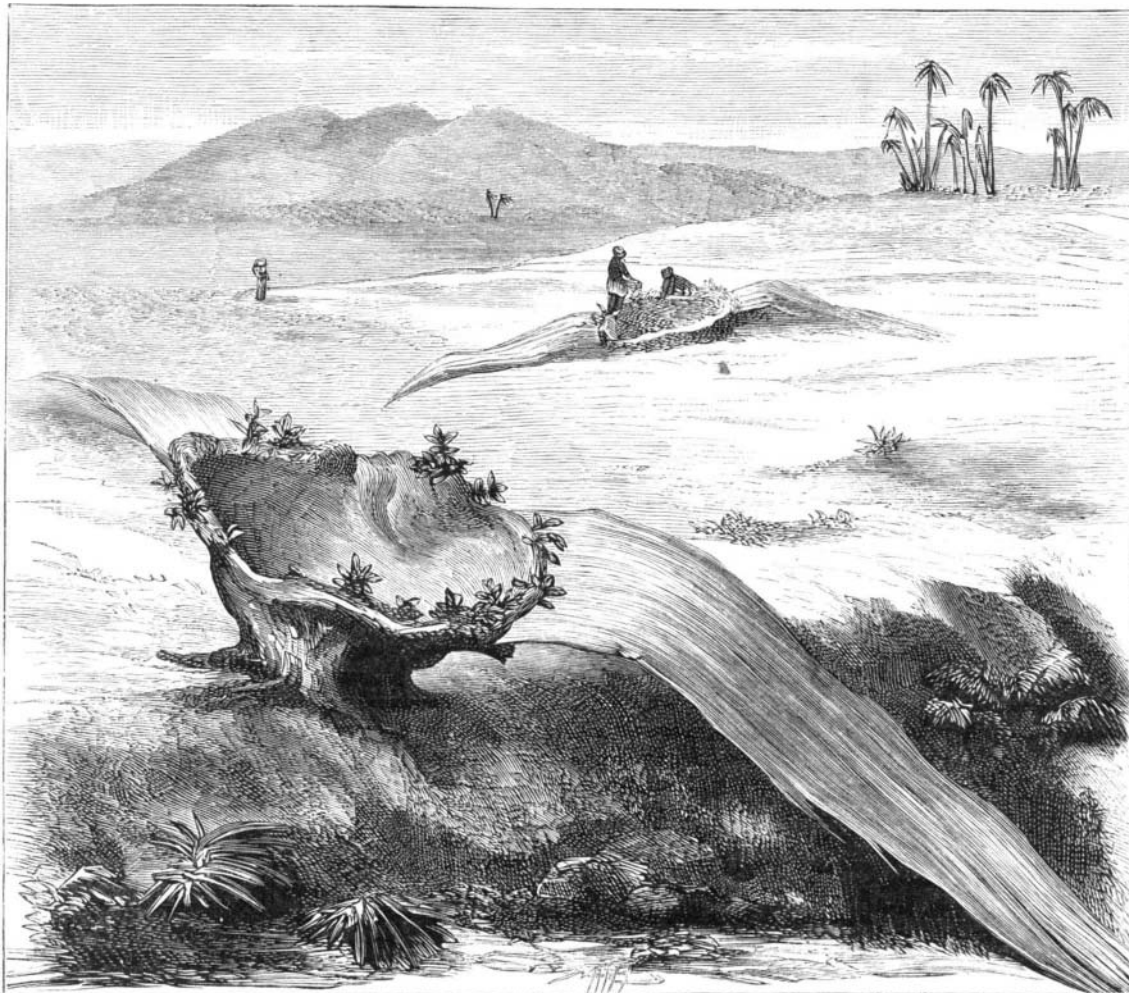
A represents the terminal for the reception of wire from coil. B is a brass tube extending to within an inch of the "writing," or lower end of the stylus, where it receives a pointed platinum wire, C, which can be fixed at any required height by means of the set screw, D. A small ivory wheel, E, enables the stylus to travel easily and evenly over any long continuous lines, either with or without the aid of a ruler.

[Other applications of this simple and easily constructed electric pen will suggest themselves to the intelligent reader, and it may readily be made (if really needed) far more rapid in its action than the costly instrument before alluded to. Its use infringes no patent, as its action depends upon well known principles, which have been applied somewhat in the same way for lecture demonstrations.

The circumstance that a whole generation of students and inventors have missed this simple and useful application of electricity, strikingly illustrates the blindness even of thoughtful men to practical opportunities which lie close at hand, but a little out of the common channels of thought. For many years it has been a well known fact that the spark of an intensity coil is capable of perforating paper; and now no one can see the practical application of that knowledge without wondering why he never thought of it. Who can tell

what myriads of similar opportunities—what multitudes of good things—are within the easy reach of whoever will get his mind out of the ruts of habit?

The world is full of possibilities for whoever can see them. The art of original personal seeing and thinking is what we all lack most.]



THE WELWITSCHIA MIRABILIS.

"Marié-Davy" couple may often be substituted here, where the pen is not required for very hard and continuous use. The battery is connected in the usual way to the primary terminals of a small induction coil, B, and for this purpose one of the little coils generally accompanying the cheap French sets of apparatus for "vacuum tube experiments," answers