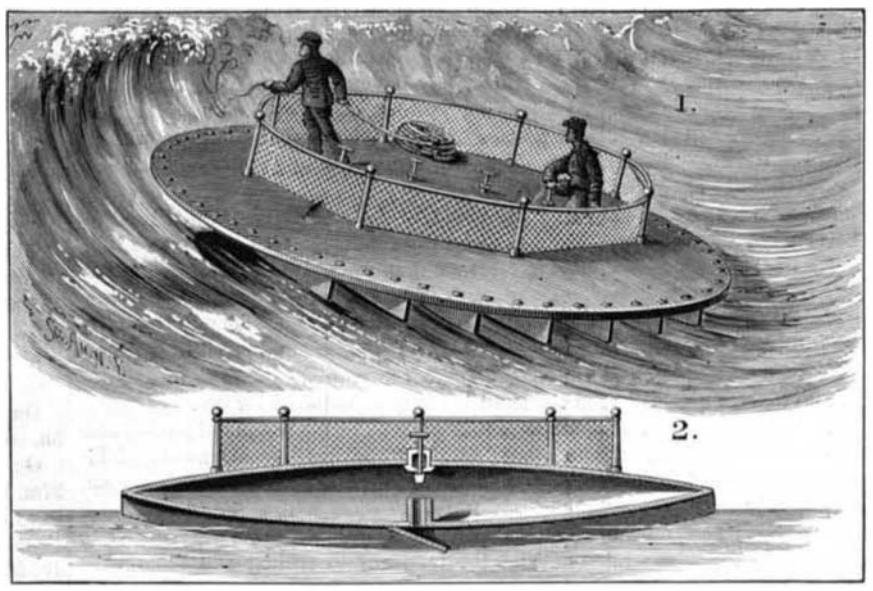
A NEW SURF BOAT.

The accompanying engraving represents a novel surf boat recently patented by Mr. Richard H. Tucker, of Wiscasset, Me. The boat is circular in form, with convex upper and lower surfaces, and its entire interior forms a reservoir for holding compressed air to be used in the propulsion of the boat. The propelling device is very simple. It consists in air nozzles projecting toward the stern, one being placed in each between the keels, of which there are several. The air nozzles are provided with valves which are operated from the deck. The boat is steered by closing the air valves on one side or the other as may be required.

This boat is not designed for long distances, but it is claimed that it has propelling power sufficient for ordinary requirements. It certainly contains no machinery which can become impaired either by use or rest, and it possesses sufficient buoyancy and is of the proper form to maintain its proper position in the water.



TUCKER'S SURF BOAT.

Reaping 20 Square Miles of Wheat.

The poetry of the harvest field will have to be rewritten. A correspondent of the Chicago *Tribune*, writing from the Dalrymple farm, furnishes the rough materials for one canto.

"Just think," he says, "of a sea of wheat containing twenty square miles—13,000 acres—rich, ripe, golden; the winds rippling over it. As far as the eye can see there is the same golden sunset hue. Far away on the horizon you behold an army sweeping along in grand procession. Riding on to meet it you see a major general on horseback—the superintendent; two brigadiers on horseback—repairers. No swords flash in the sunlight, but their weapons are monkey wrenches and hammers. No brass band, no drum beat or shrill note of the fife, but the army moves on—a solid phalanx of twenty-four self-binding reapers—to the music of its own machinery. At one sweep in a twinkling, a swath of one hundred and ninety-two feet has been cut and bound—the reaper tossing the bundles almost disdainfully into the air—each binder doing the work of six men. In all there are 115 self-binding reapers at work. During the harvest about 400 men are employed, and during thrashing 600—their wages being $2 a day with board."

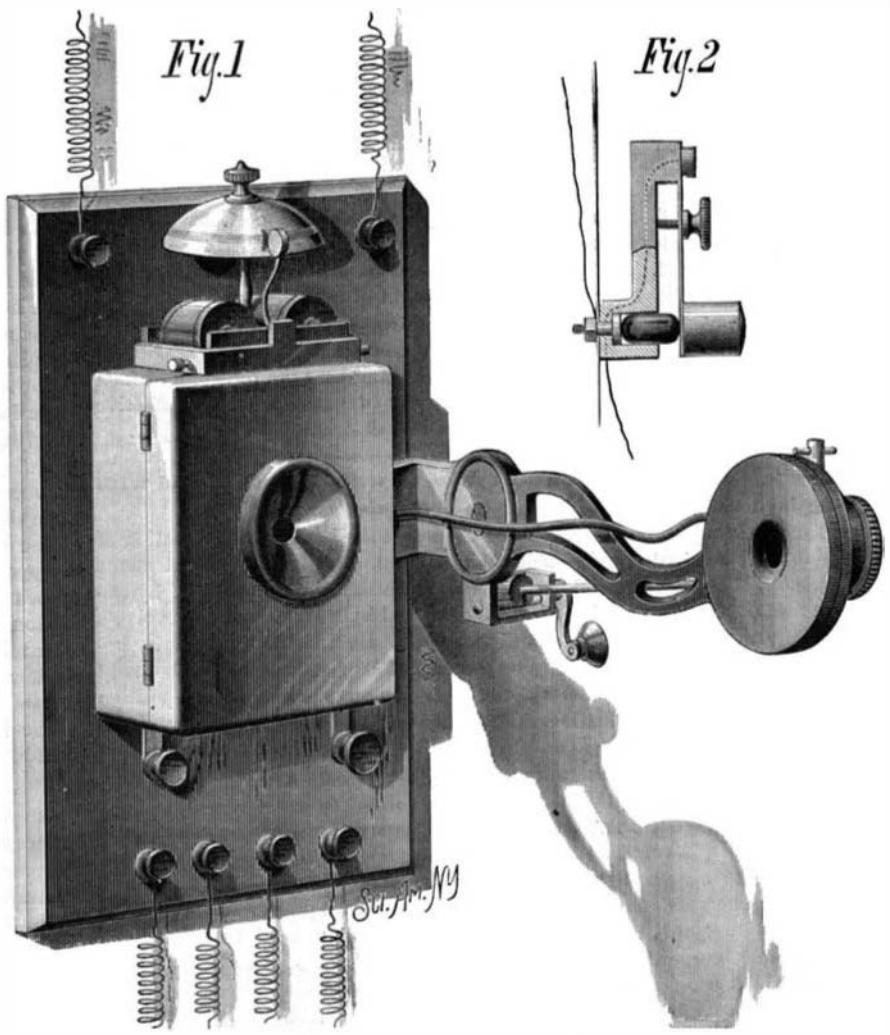
EDISON'S LATEST TELEPHONE.

Some weeks since we described Professor Edison's electro-chemical telephone as it first appeared in practical shape; since then it has passed through a succession of changes until it has finally assumed the compact and convenient form shown in the accompanying engraving. The form, however, is not the only change. In the first electro-chemical telephone, it will be remembered, the chalk cylinder was supplied with moisture by a movable roller which dipped in the exciting fluid and supplied it with moisture. This movable roller is now dispensed with, and the chalk cylinder is inclosed in a vulcanite box, seen at the end of the movable arm. The cylinder, when once moistened, remains in that condition for an indefinite period, as the box is practically airtight.

The small shaft that runs parallel with the iron arm extends through the side of the box and carries the chalk cylinder. Upon the opposite end there is a small pinion moved by a worm, the crank of which is turned by the finger. The diaphragm of the receiving instrument is covered by the front of the box, excepting a small central portion which is quite sufficient for the exit of the sound.

The arm which supports the receiving instrument is jointed so that it may be raised vertically out of the way when the telephone is not in use.

The transmitter is contained in the stationary rectangular box; its mouthpiece projects slightly, and the diaphragm, which is of mica, is supported by a metal frame and springs inside the box cover. This transmitter is quite different from the carbon transmitters now so largely in use in this country, and it will be new to many of our readers; but it is one of Prof. Edison's earliest and best telephones or microphones. It is exceedingly simple and does not require frequent adjustment, while it is equally as sensitive as existing forms of transmitter. The details of its construction will be understood by Fig. 2. A vulcanite arm is secured to the center of the mica diaphragm by means of a small bolt, which is connected with one pole of the battery by a piece of metallic foil or very thin copper wire. The head of this bolt is platinum-faced, and sunk deeply in the vulcanite arm, the same cavity containing also a piece of carbon pencil, such as is used for electric candles. The carbon fits the cavity loosely and is rounded at both ends. Its outer end is pressed by a platinum-faced spring secured to the outer end of the vulcanite arm. The spring carries at its free end, exactly opposite the piece of carbon, a brass weight, and the pressure of the spring upon the carbon is regulated by the small set screw. A wire or piece of copper foil, connecting with the spring, completes an electrical circuit, which includes the primary of an induction coil contained by the rectangular box. The secondary wire of the induction coil is connected with the telephonic line, and a tertiary coil which envelops the secondary is connected with the rubber and chalk cylinder of the receiving instrument. Below the transmitter box are two keys, the right hand one being used for signaling, the left hand one for completing the tertiary circuit when a message is received.



EDISON'S NEW TELEPHONE.

The cylinder of the receiving instrument is made of precipitated chalk solidified by great pressure. The fluid now used to saturate the chalk is a dilute solution of hydrogen disodic phosphate. Professor Edison has found by a long series of experiments that the solution employed must be that of an alkali or the phosphate of an alkali, and the hydrogen disodic phosphate is found to be superior to all others.

The operation of this telephone will be understood by those who are familiar with the first electro-chemical telephone. The vibration of the diaphragm of the transmitting instrument varies the contact between the carbon and the two electrodes, so that a varying current is sent through the primary of the induction coil; this of course produces a secondary current of varying intensity in the secondary wire of the induction coil, which being in circuit with the secondary wire of the induction coil of a distant instrument produces a current in the tertiary wire wound around the secondary coil. The tertiary current passes through the chalk cylinder and the platinum faced rubber, and as the chalk cylinder revolves the friction of the rubber is varied according to the variation of the primary, secondary, and tertiary currents. The platinum faced rubber is connected with the diaphragm, and the friction of the rubber is sufficient, when no current passes, to pull the diaphragm forward as the cylinder is turned; but when the slightest current is sent through the primary coil, the induced tertiary current transforms the frictional surface of the chalk into a frictionless surface and the diaphragm springs back. All this to describe a single vibration of the diaphragm, thousands of which are required for the utterance of a single sentence. It is not essential that the current should be broken to produce the effect in the receiver. It is probable that an absolute break never occurs in the ordinary use of the telephone.

An ordinary call bell is adopted in this system as a means of giving an alarm.

This telephone is unrivaled for loudness of speech, and an electro-magnet is not required in its construction.

MISCELLANEOUS INVENTIONS.

An improved hose coupling has been patented by Mr. Frederick Stewart, of St. Louis, Mo. The object of this invention is to construct hose couplings so that the water passage will be unobstructed and of the full inner diameter of the hose; also, to render the joint of the coupling water tight without using packing rings.

An improvement in electric lamps has been patented by Mr. Norborne B. Gantt, of Louisville, Ky. This invention relates to the construction of the supports for the carbon holders, by which, as the carbon burns away, the carbon holders are automatically adjusted to maintain the electric arc at one point.

An improved shuttle spindle has been patented by Mr. Henry A. Boyington, of Manchester, N. H. The invention consists in shuttle spindles made in two semi-cylindrical parts, placed one above the other, with their flat sides toward each other, having semi-conical heads formed upon their forward ends, having inclined projections or cams formed upon the middle parts of their adjacent sides, and pivoted at their rear ends to the shuttle by two pins, so arranged that the upper pin may be in the rear of the lower one.

Mr. Thomas H. Hicks, of London, Ontario, Canada, has patented an improvement in the class of cylindrical drums or blowers used with carbureters, and which are provided with gudgeons, and rotate in water or other liquid, so that the latter alternately seals and opens the induction and exit orifices for the air or gas passed through the blower or drum. The force of the current of gas flowing to the burners is the motive power which turns the blower or drum on its axis, and the inventor utilizes this force for inducting atmospheric air into a portion of the rotating drum which exactly corresponds in construction to that part of the drum through which the gas passes.

Mr. Orlando Cleaveland, of Middlesex, N. Y., has invented an improved ironing table, which is readily adjustable in height, and may be used for various other purposes than for ironing—for example, as a work, or lunch, or a lamp table.

An improved gate and door closing device has been patented by Mr. William H. Williams, of Mineola, N. Y. This improvement relates to gate and door hangings wherein the gate is closed by a weight. It consists in a novel means by which the weight is shifted to change its purchase and obtain the greatest effect when the gate or door is closed.

Mr. David E. Wilson, of Darlington, Md., has invented an improvement in cattle fasteners, which consists, mainly, of a crank rod or eccentrically pivoted bar, which is arranged close to the inner side of a series of mangers, so that when turned up or revolved a part revolution it will clamp against the manger the ends of the chains or halters which are pendent from the necks or heads of the cattle, and thus secure them. When turned down, it will release all the neck chains or halters at the same time.

An improvement in harness has been patented by Mr. Charles R. Stanhope, of Ashtabula, Ohio. The object of the invention is to furnish an improved means for connecting the belly band or girth and the martingale of a harness, the use of which will allow them to be disconnected without unbuckling the belly band or girth to prevent the horse from being chafed by the martingale interposed between the belly band or girth and his body.

THERE is deposited in the San Francisco Mint a collection of ancient and modern coins valued at $100,000. Among them is a silver shekel of King David's time. This is the oldest coin extant. Another is the Roman penny, with the twins and their foster-mother, the wolf, date 700 B. C.

Poisonous Fishes.

The question of poisoning by eating certain kinds of fishes is one not well understood, and there are several reasons why this is so. Grave and even fatal accidents of this nature have usually occurred in the less civilized portions of the globe; and the phenomenon itself is very complex. There are a large number of suspected species; and in some of these certain individuals alone seem to be possessed of the toxic property, and even in these the danger resulting from using them as food disappears at certain seasons of the year. Finally, ichthyology is such a difficult study that few physicians are well enough acquainted with the subject to accurately determine the genera or species of the poisonous fishes that they meet with in their travels. We translate and condense the following notes on this subject from the *Annales d'Hygiène Publique:*

In the medical report published by the Inspector General of Chinese Customs, residing at Pekin, we find, among the maladies that afflict Europeans living in Japan, that of fish poisoning. The editor of the report, Dr. Stuart Eldridge, states that the salmon is doubtless the most common toxic fish of Japan. From the spring onward this fish is out of season, and if eaten after that period of the year occasions the same accidents as follow the eating of tainted meat. In Japan, the same dangers follow the eating of the *katsuo* (bonita) and the *maguro*, although the sickness they occasion is rarely fatal. A few strange symptoms have been observed, however, such as severe congestion of the brain and face, and nervous derangements difficult of explanation on the theory of the decomposition of the animal matter. In one case the cerebral disturbances were very serious. Several theories have been proposed to explain this remarkable property of the fishes. Some writers believe that it is a morbid element which is developed in the animals at certain seasons. But no such fatal element has as yet been discovered. Others think the idiosyncrasies of the patient have something to do with it. This explanation cannot be accepted; for if there is any idiosyncrasy about it, it exists in the fish and not in the consumer, since it has been proved that certain fishes—the *Lethrinus nambo*, for instance—can be eaten with impunity until it attains a certain size, say a length of 5 to 5½ inches, after which it becomes poisonous. The age of the fish, then, would seem to have something to do with its toxic qualities.

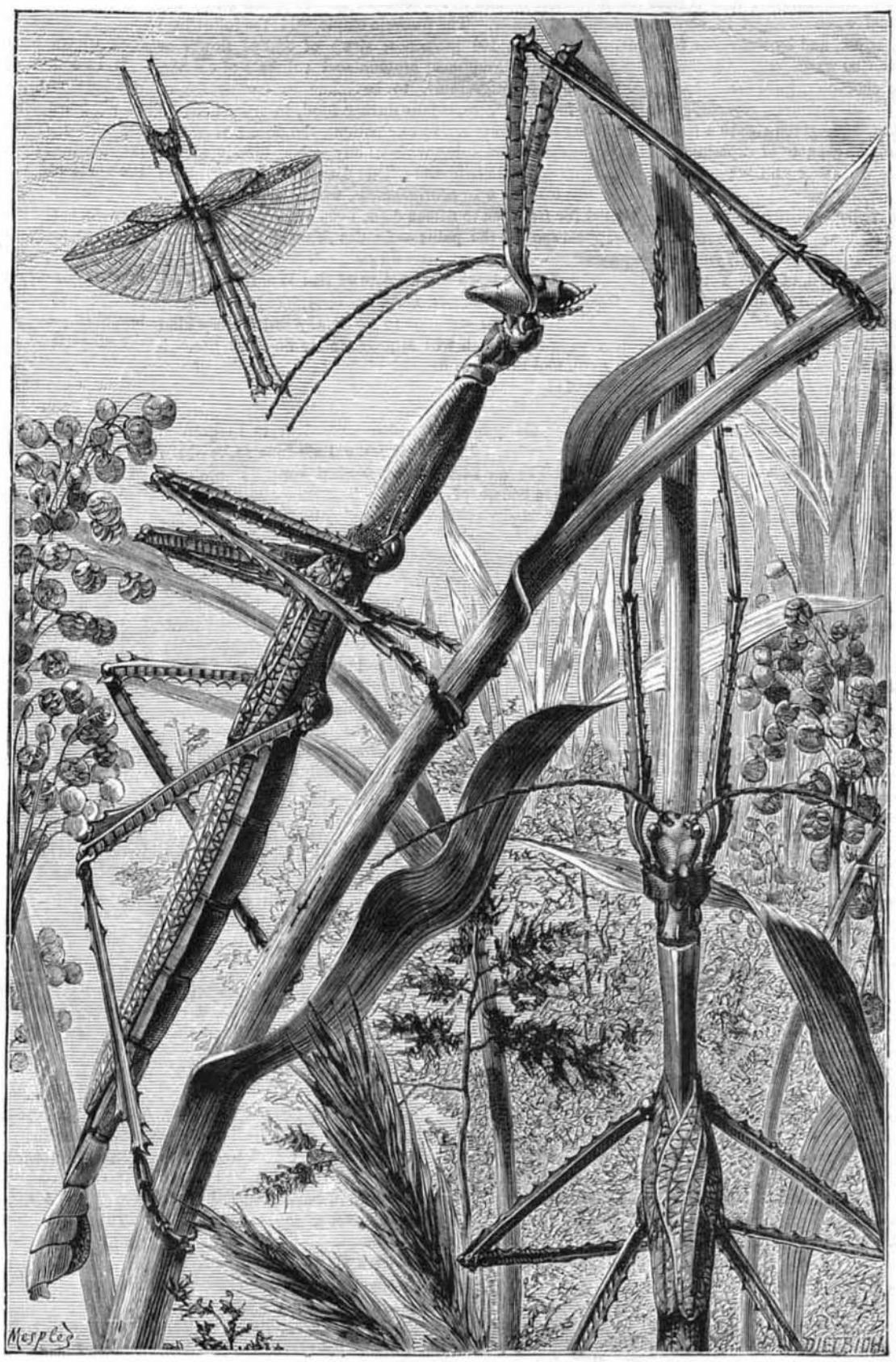
Fishes of very diverse genera have been the occasion of grave and even fatal accidents, and they are found in all parts of the globe, but more especially in the torrid zone. Pappenheim gives a list of more than forty poisonous species. Among these we find mackerels, perches, herrings, sea pikes, and a large number of species belonging to the order *Plectognathes*. The latter order contains five genera that are poisonous. The most common genus of the order in Japan is the *tetrodon* or swell fish, the species of which are all known by the general name of *fugu*, and are considered the most dangerous of the poisonous fishes, so much so, in fact, that their sale at certain seasons is forbidden by law. Dr. Goërtz, of Yokohama, in a memoir read before the German Asiatic Society of Japan, has given a description of the symptoms observed in these cases of poisoning by the *fugu*. One of these was rapidly fatal, the other two were more alarming, but recovered under prompt treatment. At the beginning of the attack there were violent headache and nausea, quickly followed by great muscular weakness; the pulse, the respiration, and temperature all fell at the same instant, thus denoting the very energetic action of the poison upon the nervous centers with special effect upon the pneumogastric. Dr. Houghton, of Savannah (*Lancet*, 1876, page 939), mentions thirteen cases of poisoning by the *Tetrodon hystrix*—one of the Japanese *fugus*—in which the results were identical with those reported by Dr. Goërtz. It is somewhat remarkable that in the three cases given by the latter, and in the thirteen of Dr. Houghton, the subjects are stated to have eaten the eggs of the fish.

Congers, pikes, and barbels have long been recognized in Europe as poisonous at certain seasons, and the eggs of the barbel as especially so.

In Japan the liver of the *fugu*, immediately after the spawning season, is considered the most dangerous part of the fish. A few cases of death caused by eating the liver of the fish have also been reported from the Cape of Good Hope, the poison having proved fatal in some instances in less than seventeen minutes.

GIANT INSECTS.

The insect shown in the accompanying engraving is of such extraordinary dimensions as to justify the name of "giant among insects." It belongs to the family of *Phasmedæ* (specters), which are distinguished from grasshoppers and crickets by their long slender hind legs, which are adapted for walking and not for leaping.



GIANT INSECT OF NEW GUINEA.—(*Kerocrana Papuana.*)

Many of the phasmedæ are wingless, and when wings exist (in the males) their structure is very peculiar. The wing covers are quite small and useless for protecting the wings, which are broad and ample. The wings are plicated longitudinally in a multitude of folds, the folds being narrower toward the base and increasing regularly toward the edge, so that the wings close like a fan. The wings lie along the body of the insect, and in consequence of their many folds do not break the outline of the stick-shaped body. The outermost fold of the wing is stiff and strong, and when the wing is closed it protects the delicate folds of the wing in the same manner as a fan stick protects a fan.

Some of these insects are as thick as a man's thumb, and fifteen inches long. The color of the insect is greenish-brown, and may be readily mistaken for the twigs of the shrubs on which it feeds.

The engraving, which we have taken from *La Nature*, is incorrect in one particular, the legs of the insect being somewhat shorter than is natural.

Railway Speeds.

The daily express mail train from London to Holyhead makes the distance, 268 miles, in 4½ hours, being at the speed of a little over 59 miles an hour, stoppages included. The distance between New York and Washington is 228 miles, and the fastest train makes it in 6 hours and 20 minutes, or 36 miles an hour, stops included. But most of the trains occupy from 8 to 9 hours.

In this wide country, where railway engineering exhibits such great triumphs, it would seem as if we ought to be able to run trains between our important cities as fast as the Britishers do. If we had a Holyhead express between New York and Washington, the time of transit would be reduced nearly one half, to wit, to 3 hours 40 minutes. This would enable passengers to leave New York in the morning, have an entire official day for business before the departments in Washington, or attend a session of Congress, and still be home again in time for the evening tea.

Ailantus Wood.

Persons who know the ailantus only as a shade tree, with its nauseous blossoms and uncouth growth, will be glad to learn that it possesses invaluable qualities of strength, durability, beauty of finish and color for carpentry and cabinet work, freedom from warping and shrinkage, ease of being worked without injury to tools and with little or no waste. It is a rapid growing tree, as all know, upon poor soils as well as good ones, in exposed situations on the sea coast, and in the interior. It seasons readily, and when dry is free from the unpleasant odor which characterizes the wood when green. It has a higher value as fuel than most of the wood in general use. Experiments made in the French dockyard at Toulon showed that the ailantus broke with a weight of 72,186 lb. where the elm yielded to a weight of 54,707 lb., and the oak to a weight of 43,434 lb. The small second growth is said to make very durable grape stakes, to which it seems well adapted. A set of furniture, made of this wood, has been in use in Providence, R. I., for about twenty years. It takes a high polish, and may be cut so as to present a satin luster which is very pleasing. It is regarded by some cabinet-makers as equal to mahogany and superior to black walnut in the matter of shrinking. For the treads of stairs, for floors of offices, mills, and other buildings, where a hard, strong wood is required, it is regarded by many as superior to most of the woods thus employed. Its warm color makes it an effective finish when used with both lighter and darker woods, and as wainscoting is again becoming fashionable, the ease of producing this wood where other woods are not readily obtainable, will recommend this style of interior finish. The tree grows more rapidly when young than when it has attained considerable age.

Chloral in Whooping Cough.

Dr. C. H. Smith reports that in two hundred cases of this disease treated with chloral, he has in every case noticed a marked alleviation of the symptoms and shortening of the period of the disease. Only one case lasted seven weeks, and the majority of the cases were well in from two to six weeks. No other remedy was given.—*N. Y. Medical Journal.*