

**Recent Progress in Microscopy.**

At the second annual reception of the New York Microscopical Society, February 7, the retiring president, Mr. J. D. Hyatt, gave a brief account of the present condition, prospects, and recent progress of microscopy. After referring to the success of the Continental makers of objectives years ago in attaining a certain mediocrity in the manufacture of lenses, Mr. Hyatt said that of late they have been altogether distanced in optical science by English and American opticians. The principal feature of advance during the past year was the celebrated Zeiss oil-immersion objective.

The formula for the Zeiss lens was worked out by Prof. Abbe, of the University of Jena, whose brilliant discovery, in the hands of the expert optician whose name it bears (Karl Zeiss), has startled the microscopical world with results not hitherto obtained, even with Powell & Laland's famous one-fiftieth. According to reliable accounts, said Mr. Hyatt, the performances of this lens are marvelous. It is claimed that the *Amphipleura pellucida* is a coarse test of its remarkable resolving powers, and that it copes without difficulty not only with such tests as Nobe's nineteenth band (113 000 striæ to the inch), but also with 125,000 striæ to the inch, mounted in balsam, in the ordinary manner. This result is obtained mainly by the interposition of a film of oil of cedar wood or some other medium of high refracting index, between the front and the thin covering glass, beneath which the object lies. The film thus interposed is made a factor in the formula upon which the lens is constructed, the great loss of light occasioned by media of low refracting power being thus obviated, and the utmost obliquity of the ray turned to practical advantage. The oil also acts as an elastic front, permits ample space for focusing, and thus renders the collar adjustment unnecessary. Again, the front combination is made active, up to 6° beyond the equator of the sphere, a surface exceeding the hemisphere by about one-twentieth of the sphere's diameter being thus applied as a clear lens. This last feature is rather a curiosity than a novelty, Tolles and others having made use of hyperhemispherical lenses in the construction of high-power objectives.

The greatest success in micrometer manufacture of recent years was accredited to Prof. Rogers, of Cambridge, who, by means of a complicated instrument constructed by himself, has been enabled to lay off lines upon a glass slide at distances apart of one one-hundredth and one one-thousandth of an inch with such accuracy that the deviation is less than one one-millionth of an inch.

**SCIENTIFIC TOYS.**

The toy shown in Fig. 1 was invented by Mr. J. Pfeiffer, and is amusing and at the same time instructive, as it shows all the principal phenomena of statical electricity. It consists of a plate of vulcanite, about one third of an inch

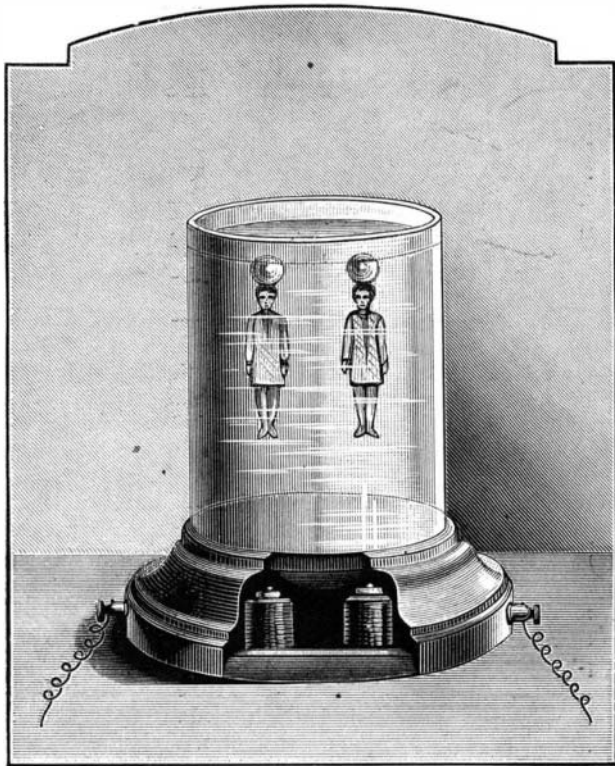


Fig. 2.—ELECTRIC BOTTLE IMPS.

thick, and about half the size of a page of the SCIENTIFIC AMERICAN. One or more small pieces of tin foil about the size of a playing card are pasted on one side of this plate. The vulcanite electrophorus produces electricity with remarkable facility. It is placed on a table, and the surfaces are successively rubbed with the palm of the hand. If the plate is raised from the table and the tin foil is approached by the other hand, a spark from one third to four fifths of an inch long is produced. A number of figures of elder pith complete the toy, and show the phenomena of electrical attraction and repulsion in the most comical manner. The plate being excited, the small elder pith figures are placed on the tin foil, and the plate is lifted from the

table. One of the figures will raise its arms, the hair of another will stand out like the bristles of a porcupine, and the third, which is to be lighter than the rest, will perform very laughable movements, and will seem to play with the two pith balls.

Fig. 2 shows electric bottle imps, made by Mr. De Combettes. A cylindrical glass vessel is filled with water, and mounted on a hollow base containing an electro-magnet provided with battery connections. One or two small figures, surmounted by a hollow glass bulb, and having a small piece of wire attached to the feet, are placed in this vessel. The air in the hollow glass bulb will draw them up to the surface of the water, as shown in one of the accompanying

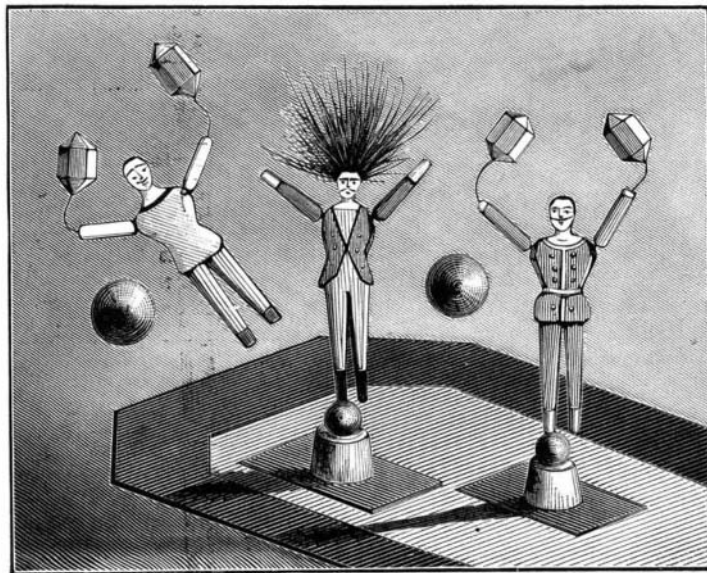


Fig. 1.—ELECTROPHORUS WITH ELDER PITH FIGURES.

engravings, but as soon as the current is passed through the electro-magnet, the figures will be drawn down to the bottom of the vessel. As soon as the current is interrupted the figures will rise rapidly.

The magic fishes, shown in Fig. 3, resemble the device just described. The electro-magnet is replaced by a small electro-motor which rotates from right to left or from left to right, and causes a corresponding movement of the fishes in the vessel.

**RECENT INVENTIONS.**

Mr. Hosea Willard, of Vergennes, Vt., has invented a novel scale beam, the object of which is to facilitate the weighing of articles on the same scale by different systems of weighing—as, for instance, by the ordinary avoirdupois system and metric system, by avoirdupois and troy weights, net and gross weights, etc.

Mr. Michael H. Hagerty, of Brooklyn, N. Y., has patented a glass stopper for milk bottles and other similar articles with a metal eye for the reception of the bail by which the stopper is fastened to the bottle. The stopper has a central depression in which is a metal eye, the shank of which is moulded into the glass stopper in the center of the depression.

Mr. Andrew D. Martin, of Abbeville, La., has patented an improved saddle blanket, which is light, cheap, and durable. The blanket is woven on a hand or machine loom, with strands twisted out of black Spanish moss. The warp is of sufficient length for a number of blankets, and the weft is interwoven with it, and the blankets are cut off at the desired length when completed. A strand of cloth is woven in between the weft at the ends of each blanket, and one or more strands of cloth or some similar material, are woven into the middle of the blanket. The edges of the blanket are trimmed with a binding of cloth, leather, or oil-cloth.

Mr. William H. Allen, of New York city, has invented an improved machine for weighing grain and other substances as they flow from a spout, discharging them in uniform quantities into a hopper or other receiver, and registering the weight of the substance discharged.

An improvement in washing machines, patented by Mr. George W. Dorris, of Elgin, Texas, consists in combining a lower cylinder having longitudinal spiral grooves with an upper cylinder having longitudinal straight grooves and holes.

An improved apparatus for refining camphor has been patented by Mr. William V. McKenzie, of Rahway, N. J. The method of using this apparatus consists in placing the crude camphor upon the diaphragm in a suitable covered vessel, and introducing steam of proper temperature from a boiler into the chamber below the diaphragm to cause the camphor to evaporate or sublime. The moisture or a portion of it contained in the crude material passes off as steam through an aperture in the cover, while the camphor sublimes or evaporates and collects upon the under side of the cover in a solid cake that may readily be removed by slightly heating the cover. The impurities of the camphor remain behind on the diaphragm.

A safe, easily-operated, and strong device for fastening the ends of the traces to the single-tree, has been patented by Mr. Millard M. Bowlus, of Bowlusville, O. The device consists of a flat metal spring attached to the back edge of

the single-tree, and provided with a notch which receives the edge of the end of the trace, and, together with an adjacent notch in the single-tree, holds the end of said trace on the single-tree.

Mr. Dennis Harrington, of New York city, has patented a device for transporting or moving live stock on foot through the streets of a city. It consists of a pen without a floor, mounted on wheels, and arranged to be drawn forward by animals. By this arrangement stock can be moved through the streets of a city with perfect safety to the inhabitants, as it is impossible for the animals to escape from the moving pen.

Messrs. Samuel Mart, of Sutton-at-Hone, County of Kent, and Charles W. Bradley, of York Street, County of Surrey, England, have patented apparatus for heating or cooling water and other liquids wherein the water is circulated in tubes within a heating or cooling space and drawn through a pipe as desired for use. In heating water the inventors make use of gas burners to which the gas is turned on when required by a cock, which also supplies gas to a pilot burner that burns continuously to maintain the heat and keep up a circulation. The gas cock is combined with the water supply pipe in such a manner that a single handle is made use of for regulating the gas supply, the supply of water to the boilers, and the delivery of the hot water. The hot water is delivered by a rising pipe above the heater, into which the hot water is forced by the pressure when the water inlet to the heater is opened. In cooling water, ice is substituted for the burners.

An animal poke, patented by Mr. James T. Camp, of La Fayette, O., consists of a bow to place over the animal's neck, in which are pivoted the ends of two bars, one above the other. The pivoted ends of the bars are provided with cams, so arranged that by pressure on the lower bar the poke is spread open. The free end of the lower bar, when it is drawn down, throws the free end of the upper bar up against the head of the animal.

Mr. George W. Ebright, of Waynesville, O., has patented a new, simple, and amusing toy, consisting of a box containing a slide provided with a rubber or other suitable spring. To this slide a goat or other animal is fastened, which, when the spring is pulled, butts against the figure of a boy on the front part of the box.

Mr. Washington Irving Marsh, of Northville, Mich., has patented a device for preventing the ends of the whiffletree from catching upon or striking against any objects. It consists of a plate of wood or metal attached to the trace of a harness just in front of the cock-eye, and extending rearward past the hook and end of the whiffletree.

Messrs. James W. Gault and William A. Forman, of Murphysville, Ky., have patented an improved elevator for hoisting tobacco plants and leaves and suspending them upon the rails in drying or curing barns. This device can easily be worked by one person, and by it the tobacco sticks can easily be hung six inches apart, or closer, if desirable, thus economizing all the hanging room in a curing barn.

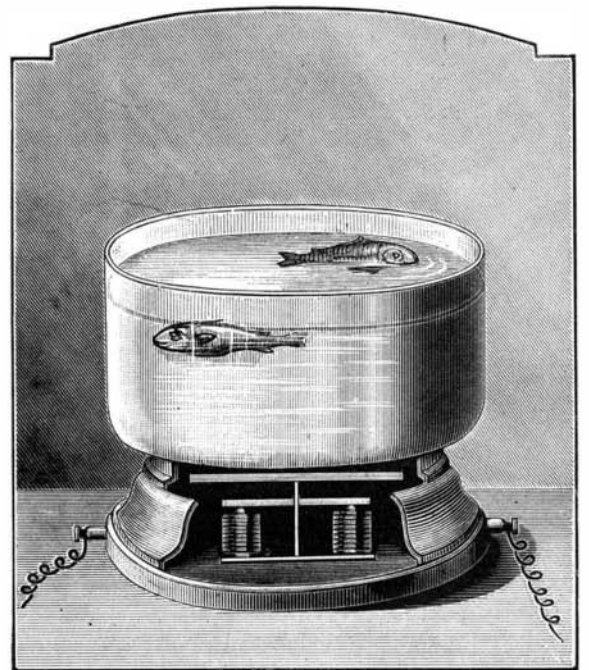


Fig. 3.—MAGIC FISHES.

Mr. John H. Yates, of Sharon, Wis., has invented an improved nasal inhaler, which is simple, convenient, and so arranged that the air can circulate very freely through it before being inhaled. The invention is an improvement on the inhaler for which letters patent No. 167,209 were granted to Mr. Yates and Mr. Charles R. Treat, dated August 31, 1875.

Mr. John Toler, of Newark, N. J. has patented an improved furniture caster. The object of the invention is to provide a solid bearing in a two part caster socket for the conical head of the caster spindle, and to secure the spindle in said two part socket without the use of screws or rivets.

A simple and effective bag tie that cannot accidentally become unfastened, has been patented by Mr. Moses Y. Hall, of Vinal Haven, Me.

Mr. Johnson H. Beard, of Providence, Ky., has patented a portable fireplace that is self-supporting when it is set up, and does not require external support to give it stability.

Mr. Henry Shulenbarger, of Smithville, O., has patented an animal trap that will catch the animal before it has an opportunity to eat the bait, and will also set itself automatically after being sprung.

Mr. Michael Limpert, of Pittsburg, Pa., has patented an improved heating attachment for cars and other vehicles, so constructed as to heat the floor of the vehicle and at the same time introduce a supply of warm fresh air.

Mr. Alfred N. Loveiace, of Knoxville, Tenn., has patented a trap for the flies, moths, and other insects that are destructive to bees and to vegetation, and that produce the larvae destructive to tobacco, cotton, etc.

Mr. Ezra W. Savage, of Ashtabula, O., has patented an improved sap spout, by which the sap bucket may be held to a tree without injury to the bucket. It consists of a latch pivoted to the front end of the spout and a hook formed on the under side, so that by the combination of the two a sap bucket may be firmly held.

Mr. Morris F. Bell, of Fulton, Mo., has patented an improved adjustable rocking chair. The seat and back of the chair are continuous, and composed of thin transverse strips of wood or other suitable material, riveted on two or more longitudinal flexible bands of metal. One end of these bands is secured to the head piece, while the other is fastened to the front piece of the seat. Thus both back and seat are made flexible and capable of conforming to the shape of the occupant.

A self-closing bottle stopper, patented by Mr. James J. Allison, of Nelson, Ill. consists of a wire doubled to form a median loop or eye, and provided with elastic arms passing through stopper and having hook ends bent toward each other.

Mr. Louis B. Denison, of Delaware, O., has patented a tripod head for leveling instruments. In this device there are two sets of leveling screws, and the motions produced by them are independent of each other, so that when the instrument is leveled over one set it remains so while being leveled over the other set. By this independence of motions the binding of the leveling screws, that is so common with ordinary tripod heads, is entirely obviated; and as the binding of the screws is a source of a great deal of trouble to the operator in many ways, both because of the consequent breaking of the screws and because of the straining of parts of the tripod head, the entire removal of such troubles by the use of this device will recommend it to all who use leveling instruments.

Mr. James N. Winn, of Darien, Ga., has patented car couplings which are so constructed that they may be moved up and down to adapt them to couple with cars higher or lower than those to which they are attached.

Mr. John Kirkland, of Menomonee, Wis., has invented an improved spark arrester of the class in which plates, disks, or other devices are placed within the smoke stack for the purpose of detaining the sparks and cinders until they are consumed or extinguished.

An improved cloth cutting knife for cutting several thicknesses at the same time, has been patented by Mr. Nathan Rubenstein, of Chicago, Ill. The invention consists in a knife, the cutting edge of which is inclined downward toward the center of the blade and is then inclined upward to the lower end of the blade in a wave line, thus forming a shoulder at about the middle of the cutting edge.

Mr. John M. Axtmann, of New York city, has patented a new and improved attachment for transoms, by means of which they can be conveniently opened and held in the desired position. It consists in a curved lever pivoted to a bracket secured to the door frame, and having one end pivoted to a pitman rod provided with a handle or knob, and the other end provided with a stud which passes into a slot in an angle plate securely attached to the hinged or pivoted transom.

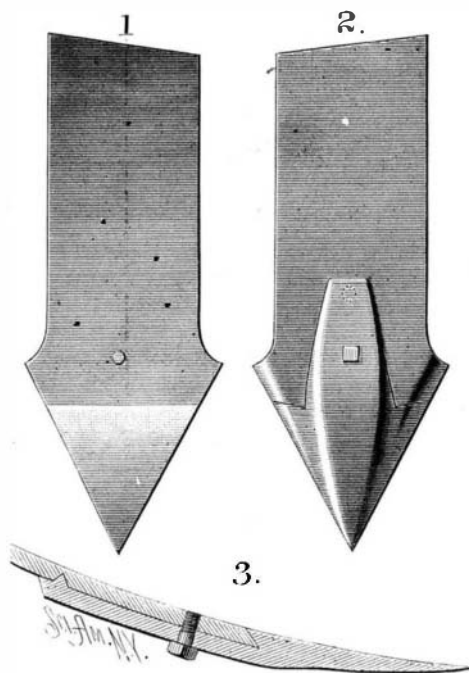
#### The Industrial Population of France.

According to the *Annuaire Statistique* recently published by the French Minister of Agriculture and Commerce, the total population of France, a little under 37,000,000 in round numbers, is divided into 12,000,000 inhabitants of towns and 25,000,000 inhabitants of the country. On eliminating from the general total 860,590 individuals (who are soldiers, sailors, students in schools, infirm and diseased, prisoners, or monks not giving instruction), the total of a little over 36,000,000 of persons participating fully in social life comprises, with regard to means of existence and professions, 210,200 persons without known professions; 71,300 vagabonds and mendicants; 2,151,900 stockholders (including 195,000 pensioners of the Government); 1,531,400 persons exercising liberal professions or living by them; 2,037,200 persons engaged in trade, transport, and navigation, or living on their products; 9,274,500 persons engaged in various industries, or living by them (6,000,000 in small industries, 3,000,000 in mining and manufactures); 18,968,600 persons practicing agriculture, or living by it (of whom 10,500,000 are proprietors of their land, nearly 6,000,000 are tenant farmers, 2,500,000 are agricultural specialists, comprising vine growers). On entering into detail of each of the great branches of the national production, it is found that 4,000,000 of proprietors or agricultural tenants (of whom 400,000

are women) employ: as clerks, 82,000 men and 54,000 women; as workpeople, 590,000 men and 378,000 women; as day laborers, 922,000 men and 704,000 women; as domestics, 661,000 men and 663,000 women; and, on the other hand, that the families maintained by the landed property or agricultural work consist of 3,800,000 persons of masculine sex, and 7,200,000 of feminine; 1,125,000 industrial patrons (of whom 226,000 are women) have for clerks 143,000 men and 50,000 women; 1,555,000 workmen and 1,000,000 workwomen; 305,000 male day laborers and 244,000 female; 78,000 male domestics and 143,000 female. The families living by industrial operations embrace nearly 1,600,000 persons of masculine sex and 3,000,000 of feminine; 784,000 employers in trade and carriage (of whom 221,000 are women) have 247,000 male employes and 71,000 female; 198,000 workmen and 56,000 workwomen; 140,000 male day laborers and 80,000 female; 65,000 male domestics and 188,000 cooks or nursery maids. They support families amounting to 661,000 boys and 1,346,000 girls.

#### IMPROVED SHOVEL PLOW POINT.

The profits of the agriculturist depend largely on the perfection and adaptability of his implements, and it is not only necessary that the implements be perfect as they are purchased, but they should be so designed that worn parts may be readily adjusted or replaced so that only a small portion of the original expenditure will be required to make the tool "as good as new."



BEEBE'S SHOVEL PLOW POINT.

The invention represented by the accompanying engraving is intended to render a very important class of agricultural tools more useful and more durable than those of the usual construction. Fig. 1 is a face view of the share, having the point attached; Fig. 2 is a back view, and Fig. 3 is a longitudinal section showing the joint between the share and point. The point, as will be observed by referring to Fig. 3, is hooked over the beveled end of the share and is held firmly in place by a single bolt and by a short dowel pin. The point may be readily removed and replaced when worn or broken, at a cost that is slight when compared with that of the entire shovel, and when the point needs sharpening it may be removed and sharpened without injuring the temper of the share.

It is stated that in the long run this share with its point is much cheaper than the ordinary kind, and is capable of doing better work. It may be adapted to local peculiarities of soil and to different kinds of work.

Mr. H. C. Beebe, of Canton, Fulton county, Ill., is the inventor of this useful improvement.

#### Wheat Heaters.

Perhaps no device has come into such wide use among our millers, in so short a time, as our steam wheat heaters. A very short time ago the heating of wheat by steam was almost or altogether unknown, while now hundreds of mills are using them, and scores are sold every week. An unsophisticated person, on entering a mill and finding the wheat heated to a very moderate degree, but little above blood heat, in fact, might have serious doubts as to whether any advantage was gained by the procedure; but the experienced miller's observation has taught him that the benefit derived from heating wheat by steam is of a very substantial character.

Hard, dry wheats have always been difficult to mill properly and still obtain a good yield. In grinding such wheats, if the outer covering is dry and brittle, it cannot well avoid being abraded more or less, and the tiny particles of bran rubbed off in the grinding are so thoroughly mixed with flour that a separation is impossible, seeing that the comminuted particles of bran are of about the same size as the flour particles, and will pass through the same numbers of bolting cloth. It was this observed fact that led millers to adopt some means of toughening the bran before grinding, and the first and simplest means seemed to

be to wet it. This practice is still largely followed by European millers, but there are very serious objections to it, not the least of which is, that wetting the wheat spoils the keeping properties of the flour. Some genius noted the fact that dry, hard wheats could be ground and bolted more easily in hot weather than in cold, and reasoned that the only reason could be that the wheat was warmer. Of course this would seem paradoxical, for on first sight it would appear that the original trouble with the wheat was, that it was too dry, and that any more heat would make it still drier, and therefore more unsuitable for milling. A little reflection will show, however, that additional heat, while drying out the interior of the berry, draws the moisture to the surface or bran, and therefore attains the purpose of wetting the wheat while avoiding the disadvantage of the latter; for by drawing the moisture to the bran, the "keeping" properties of the interior portion of the berry are enhanced.

The advantage of using wheat heaters is manifold. One great object gained is, that the wheat is ground and bolted at about the same temperature the year round, and trouble and annoyance with the bolts is largely or completely avoided. The toughening of the grain coating renders broad bran possible, and therefore the flour will have fewer specks. Most millers agree that there is an appreciable saving of power in grinding wheat that has been previously passed through a heater, and another advantage which very many have noticed is, that when heated, hard and soft wheats blend more easily in grinding. All these things are certainly sufficient to entitle the wheat heater to a permanent place among our mill machinery, and account for the large numbers of them that have been sold in the past two years.—*American Miller.*

#### Sun Spots.

The sun is becoming an object of great interest to observers, as the minimum sun spot period is drawing to a close. During the greater part of the winter spots have been visible on the sun's face. An observation made yesterday revealed three widely separated spots or groups, forming an immense triangle. Two of these spots were quite large, and surrounded with broad penumbrae. These spots were very black. The presence of spots on the sun can be easily ascertained without danger to the eye, by those possessing telescopes of even moderate power. Let a broad, round, pasteboard screen, with a hole in the center for the eye piece to pass through, be attached to the telescope. In the shadow of this screen, and about two feet or eighteen inches from the eye piece, place a white paper screen. The screen can be supported by a very simple contrivance, so it shall be nearly at right angle to the telescope tube as directed to the sun; or a paper may be pinned to the side of a building, if no great accuracy is desired. An eye piece magnifying from twenty to a hundred diameters is best for the purpose. Throw the sun's image on the screen so the edge shall appear sharp as it crosses the field of the telescope. The dark spots which move across the screen with the sun's image can be readily detected and carefully focused, so their full outlines will appear, provided the magnifying power is sufficient. This is a safe way of observing sun spots, and it requires but little preparation. A better way would be to throw the image upon a white surface at the bottom of a funnel. But this funnel must be attached to the telescope, or so mounted as to move with it, in following the sun. An equatorial mounting is the best for the purpose. The eye piece should be mounted in brass, as rubber or other light material is liable to take fire. By the use of a low power eye piece the telescope may be readily placed upon the sun. This accomplished, a higher power may be applied.—*Rochester Democrat.*

#### Theory of Life.

The late Professor Faraday adopted the theory that the natural age of man is 100 years. The duration of life he believed to be measured by the time of growth. In the camel the union takes place at eight, in the horse at five, in the lion at four, in the dog at two, in the rabbit at one. The natural termination is five removes from these several points.

Man being twenty years in growing lives five times twenty years—that is, 100; the camel is eight years in growing, and lives forty years; and so with other animals. The man who does not die of sickness lives everywhere from 80 to 100 years. The professor divides life into equal halves—growth and decline—and these into infancy, youth, virility, and age. Infancy extends to the twentieth year, youth to the fiftieth, because it is in this period the tissues become firm, virility from fifty to seventy-five, during which the organism remains complete, and at seventy-five old age commences to last a longer or shorter time as the diminution of reserved forces is hastened or retarded.

#### Winter Cotton in Georgia.

The turn out of the cotton crop of this region is simply astonishing. Many farmers are now gathering several hundred pounds a day. It seems as if every boll will open. The mild weather of the winter has been a godsend on this account, for it has given every farmer many more bales than he thought it possible for him to get at the beginning of the season. We heard one man say he had lost three bales by plowing up a field too soon to sow in wheat. It is a novel sight to see cotton picking going on the last of January. The cotton is stained and classes low, but it pays better than the good grades did last year.—*Oglethorpe (Ga.) Echo.*