

Science Notes.

The Berliner Tageblatt estimates the deficit on the exhibition to amount to something like \$1,950,000, and this in spite of the fact that, according to the Lokal Anzeiger, the exhibition, before it closed on Nov. 15, was visited by 3,500,000 paying visitors.

According to the recent communication made to the Royal Society of New South Wales by Prof. Liversidge on the composition of sea water, the professor finds that it contains about 0.5 to 0.8 grain of gold per ton, thus confirming the work of Sonstadt, published some years ago.

German explorers in New Guinea, Dr. Lauterbach, Dr. Keruting, and Herr Tappenbeck, discovered in October, at the foot of the Bismarck Mountain, a navigable stream flowing through a fruitful and thickly populated plain, over which they traveled for two hundred miles. This is the first well populated area that has been discovered in the interior of New Guinea.

Prof. W. J. Waggener finds that with an ordinary printing press and woodcuts or similar relief engravings all kinds of pictures and diagrams may be printed upon sheets of transparent gelatin, in the same way that they are now impressed upon paper. The prints thus made are ready for use as lantern slides without any further preparation, and can be produced for a few cents.

In the polar regions, Mr. Moss found that at a temperature of -35° C. (-31° Fah.) a candle would not burn regularly; for the wax would not melt, being cooled at once by the surrounding air. The flame then burned feebly, and sank down into a kind of tubular hollow; and on boring holes into this the flame sank down so as to leave a tubular shell, which was actually not melted by the flame. The continuous current of very cold air induced by the flame was not heated sufficiently to enable it to melt the wax above the flame.

When a soil that is not irrigated is covered with plants, it evaporates, according to Prof. Wollney, a far greater quantity of moisture than when the surface is bare. In the former case the evaporation cannot exceed the quantity received by the soil from the atmosphere before or during the period of growth. Swampy lands and those that are well irrigated, as also free surfaces of water, can, under circumstances favorable to evaporation, sometimes give to the atmosphere a greater quantity of water than corresponds to the precipitation that occurs during the same time.

An important source of vanadium compounds has lately been discovered in South America, says Nature. In the high plateaus of the Andes, at a height of about 16,000 feet, there exists a mine of anthracite containing vanadium. The coal from this mine, which is easily worked, burns easily, leaving about two per cent of ash. This ash contains one-seventh to one-quarter of its weight of vanadium, besides some silver, with traces of zirconium and platinum. The extraction of the vanadium on the large scale has been accomplished by M. K. Helouis, who has applied it to the preparation of aniline black, to the coloring of porcelain, and in metallurgy. The vanadium used by M. Moissan in the preparation of vanadium carbide came from this source.

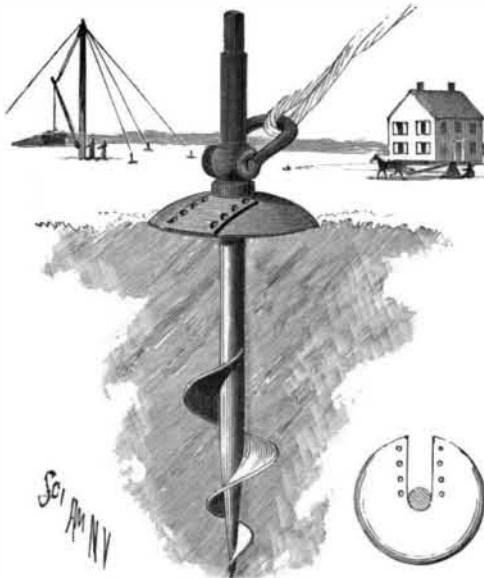
The following table, showing the proportion of light reflected from various substances as compared with that which falls upon their surfaces, is given by Dr. Sumner, and will be found of interest, says Popular Science News:

	Per cent.
White blotting paper.....	82
White cartridge paper.....	80
White tracing cloth.....	35
White tracing paper.....	22
Ordinary foolscap.....	70
Newspapers.....	50 to 70
Yellow wall paper.....	40
Blue paper.....	25
Dark brown paper.....	13
Dark chocolate paper.....	4
Planned deal, clean.....	40 to 50
Planned deal, dirty.....	20
Yellow painted wall, dirty.....	20

By common agreement the wasp is accepted as emblematical of irritability and petty malignity; but even this much abused hymenopterous insect plays a beneficial part in the work of nature, as a note in the Irish Naturalist testifies. A number of wasps were seen by Mr. R. M. Barrington, of Bray, buzzing about his cows. Closer inspection revealed that they were all busy catching flies, and pouncing with the rapidity of hawks after birds on the flies as they tried to settle or rest on some favorite part of the cow. One white cow drew more wasps than any of the others, because the moment a fly alighted it was seen at once against the skin. When a wasp catches a fly it immediately bites off both wings, sometimes a leg or two, and occasionally the head. Mr. Barrington saw some of the wasps when laden with one fly catch another, without letting go the first, and then fly away with both. There was a constant stream of wasps carrying away flies, probably to feed the larvæ in their nests, and returning again to the cows to catch more. In about twenty minutes Mr. Barrington estimated that between 300 and 400 flies were caught on two cows lying close to where he stood. Perhaps this narrative of good deeds accomplished will lead people to think more leniently of the vices of the wasp.

AN EFFICIENT ANCHOR.

For anchoring vessels to the shore of a stream, or for fastening guy lines in raising derricks or in house moving, the simple form of anchor shown in the accompanying illustration has been devised and patented by John J. Ryan, of No. 120 Front Street, Memphis, Tenn. The anchor post has a tapered lower end provided with a screw blade, its upper end receiving a wrench by which the post is turned into the ground, and there being an aperture in the post through which may be passed a bolt to secure a line shackle in position. Movable vertically on the post between the screw blade and a collar just below the shackle is a metal anchor disk, shown also in the small view, the slot in the disk being closed by a riveted plate when the disk has been placed

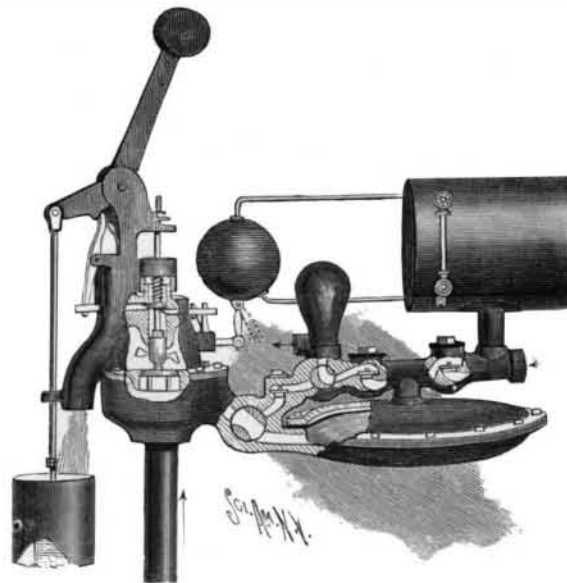


RYAN'S SHORE ANCHOR.

in position on the post. This disk is designed to be especially advantageous in making an anchorage in soft or sandy soils, or in banks over which water is flowing, and also serves as a guide to hold the post straight while screwing it into the ground.

AN IMPROVED HYDRAULIC ENGINE.

The illustration represents an improvement in hydraulic engines whereby the action of a ram or momentum valve is rendered automatic, and the momentum of water is utilized to handle other fluids or gases, as in a pump. The improvement has been patented by Horace D. Payne, of Thompson, Pa. Combined with a ram valve of peculiar construction having a water supply is an incased diaphragm or piston, the space beneath which has connection with the water supply, while the space above is adapted to receive and handle a fluid or gas separate from the water supply. The diaphragm thus has a fluid on each side, or a liquid on one side and a gas on the other side, the pressure being nearly equalized in either case and in-



PAYNE'S HYDRAULIC ENGINE.

sureing durability in the diaphragm. The valve is adapted to be seated in the casing by the water pressure, and a bolt movable transversely in the casing is adapted to engage the valve stem to hold the valve open, a pivoted lever connected with an overflow vessel moving the bolt out of engagement with the valve stem, while a water receiver has connection with a bolt adapted to hold the valve in closed position. A weighted lever pivoted to a bracket on the valve casing is adapted to move a pivoted lever connected to a bolt adapted to hold the valve open, and a vessel connected to the weighted lever is adapted to receive water discharged from the valve casing. As shown in the engraving, the device is arranged as a combined boiler feeder and pump for conducting the water from steam coils or radiators of a heating system situated below the water level of the boiler.

Facts About False Hair.

History (writes Mr. Eric Broad, in *Hearth and Home*) records the fact that in 1662, in this country, long flaxen hair was purchased, from the head, at ten shillings an ounce, while other fine hair fetched from five to seven shillings for the same quantity; and within the present century the heads of whole families in Devonshire were let out by the year at so much per poll, "a periwig maker of Exeter going round at certain periods to cut the locks, afterward oiling the skull of each bereft person." That the use of false hair as an aid to feminine beauty was not unknown to the ancients is well proved. The Greeks, Romans, and Egyptians, long before the dawn of the Christian era, resorted to the wearing of tresses obtained from other persons' heads; they even went so far as to paint bald heads so as to represent them as covered with short hair, also marble caps, so painted, were worn. A valuable merchandise in the blond hair of German women is mentioned in ancient Roman history.

A question that has doubtless often presented itself is: Where did all this hair come from? This question I will endeavor to answer. With the coming of spring, in the midlands and west of France, appeared what may fitly be termed a singular class of nomadic individuals, armed with long, iron-tipped staves, and bearing heavy packs of merchandise upon their backs. At first glance one would have taken them to be ordinary hawkers; yet merchandise was but an accessory to their strange industry. They were the coupeurs, the reapers of a hirsute harvest. Armed with long, keen shears, they went their way seeking the tresses of willing victims dwelling in outlying hamlets and villages of peasant France; and a laborious business it was. From "dewy morn" until the shadows of night gathered thickly, they did their ten or fifteen miles a day—often fruitlessly and with empty stomachs, their only bed the wayside. In Auvergne these seekers after hair were known as chimneurs. The Bretons called them margoulins, which terms have no fit English parallels. These curious journeymen exerted every effort to gain their ends—a good head of hair; the former preferring the local fairs as a workroom, the latter choosing to visit the dwellings of their possible clients. In summer the Brittany margoulin was often seen going through the streets, carrying his long staff, from which hung twists of hair, while he cried in doleful tones the well known "Piau! Piau!" at the sound of which the cottagers, with an itching desire to possess some of his gewgaws, attracted the wanderer's attention. He was only too pleased to dazzle their eyes with his many colored wares, and the bargaining was not slow to begin. While the woman fingered his goods, the margoulin weighed her tresses with his hand—a proceeding at which he was adept through long practice. The bargain ended, the woman yielded her abundant locks in return for a few yards of cotton stuff, or a gay petticoat, to which—thanks to the progress of civilization—the coupeur had to add a small sum of money. Sometimes the transaction was not completed without much discussion on both sides. Very often the coupeur had to return to the charge owing to female indecision; and he was more than happy when sure that a tardy remorse would not rob him of half his coveted trophy.

Until the authorities intervened cutting was conducted in public as an amusement for onlookers, it being considered highly entertaining to hear ten or twelve rival coupeurs eulogizing their wares, each protesting his to be far superior to his fellows. The prohibition of this custom drove the hair harvesters to erect tents, rent for the day unoccupied shops, cellars, stables, or any corner they could find wherein to establish themselves. Sticks were then stuck up, from them being suspended petticoats as a lure, as an indication of what could be had in exchange for tresses; to the petticoats were attached twists of hair as trade marks. The ruse succeeded, peasants halted, casting envious glances at the multi-colored garments; they were handled, and even tried on, thus affording an opportunity to the coupeurs to flatter their fair customers—who did not long rest—and victory rewarded the cute buyers. In Auvergne—where the coupeurs were most numerous—the greatest harvest was reaped on St. John's day. The ingathering extended from April to September, during which month the butchers, bakers, locksmiths, etc., forsook their ordinary avocations for that of the coupeur, returning to their legitimate trades with the coming of the dead season. The hair of different countries was distinguished by certain qualities; for instance, that of Auvergne was the coarsest; the finest and the most flaxen came from Belgium; the blackest and longest from Italy; while that procured in Brittany was the most beautiful, though least well cared for.

It is announced that our neighbors, Foster, Paul & Co., 364 Broadway, manufacturers of kid gloves, are to retire from business on January 1. This firm was established some twenty years ago, adopting a patented fastening for gloves, and to this invention is attributed their great success as manufacturers and the fortune the concern has acquired.

Natural History Notes.

The Fountain Tree.—Mr. Henri Lecomte, who has recently returned from a mission to Congo, gives some curious details concerning a fountain tree that he met with in his travels. This tree, which is very lofty and grows in damp places, is called the "moosanga." It belongs to the order Urticaceae. The trunk is very regular and is provided with large branches that bear finely dissected leaves. It is divided at the base, like that of the mangroves, and enters the earth through a large number of ramifications. When the tree is cut at a height of about five feet, says the *Chronique Industrielle*, a large quantity of water is observed to flow from the section. Mr. Lecomte cut one at a height of five feet from the ground that had a diameter of twenty inches, and then, forming a gutter along the trunk, placed a pail at the base. The next morning the pail, which held nine quarts, had overflowed. The water continues to flow after the trunk has been cut for some time. It doubtless ascends the trunk through capillarity. It seems to be perfectly potable, although rich in chlorides and other salts.

The Roentgen Rays in Botany.—The result of some experiments recently communicated to the German Botanical Society, by Mr. Alfred Schober, seems to show that the X rays exert scarcely any influence upon the phenomena of plant life. Plants exposed to the action of the light of the Hittorf tube showed, however, that this differs from solar light, as far as plants are concerned, in that it does not cause any heliotropic incurvation. It is well to add, nevertheless, that the conclusion is perhaps immature, seeing that the time of exposure of the plants to the rays was quite short (thirty minutes) and not sufficient to justify the assertion made by the experimenter.

Vegetation and Civilization.—Mr. Thomas Kirk, in a memoir recently published by the Philosophical Society of Wellington, New Zealand, gives a certain number of interesting facts relative to the modifications that the indigenous flora has undergone. These modifications are due to the direct or indirect action of man, voluntary or involuntary. Thus, at the present time there are five hundred new species that have been more or less completely acclimated in this country, where they had never existed before. In certain regions such species have obtained such a firm footing that they might readily be thought to be indigenous, if their true history were not known. The indigenous flora has receded before these strangers; and it must not be thought either that it is large plants that are driving the old flora out, for in most cases it is small species which, through numerous and varied mechanisms that it would be interesting to explain in detail, gradually succeed in eliminating plants that at first sight seem to be vigorous and well adapted for a successful struggle for existence.

Census of the Animal Kingdom.—The editors of the *Zoological Record* have recently drawn up a table that indicates approximately the number of the living species of animals. The following are the figures given: Mammals, 2,500; reptiles and batrachians, 4,400; tuniata, 900; brachiopods, 150; crustaceans, 20,000; myriapods, 3,000; echinoderms, 3,000; coelenterata, 2,000; protozoans, 6,100; birds, 12,500; fishes, 12,000; mollusks, 50,000; bryozoans, 1,500; arachnids, 10,000; insects, 230,000; vermes, 6,150; sponges, 1,500. General total, 366,000 distinct species.

Fear in Animals.—A Scandinavian writer cited by the *Zoologist* has recently described a curious method of capturing swans much employed for centuries past in the northwest of Iceland. The swans, after moulting in autumn, leave the interior in order to reach the coast. The inhabitants of the coast and their dogs are prepared, and, when the birds approach, begin to make as much noise as they can by shouting, striking boards with stones, and making as much of a racket as possible. This noise has a powerful effect upon the young swans, which, terrified and distracted, and not knowing which way to turn their heads, allow themselves to fall to the ground, where they are seized without any difficulty. Fear is likewise exploited in South America for the capture of another species of swan by the Gauchos, who, when they perceive a flock, run toward it in keeping themselves leeward to the wind and in concealing themselves. When they get close enough to the flock, they spur up their horses and rush upon the birds with loud shouts. The swans, seized with fear, are unable to take flight, and allow themselves to be seized and slaughtered upon the spot. The paralysis of fear is met with also in other animals, and in a most marked manner. Mr. Cancani has pointed out quite a large number of instances in which animals have given manifest signs of fear or inquietude before earthquake shocks. We need not look for a peculiar form of presentiment in these animals, for they are in all probability influenced by the very slight tremors that precede the heavy shocks. However, as Mr. Cancani remarks, such inquietude of animals is observed only in cases in which the center whence the shock emanates is quite distant, and he supposes that the slight vibrations travel more quickly than the strong ones, but that it requires a distance great enough to allow the differences to be appreciable, in

order that the vibrations may arrive sufficiently in advance of the shocks and affect the animals before the shocks occur.

Animals and Steam.—A writer in a German engineering journal contrasts the behavior of different animals toward steam machinery. That proverbially stupid animal the ox stands composedly on the rails without having any idea of the danger that threatens him; dogs run among the wheels of a departing railway train without suffering any injury, and birds seem to have a peculiar delight in the steam engine. Larks often build their nests and rear their young under the switches of a railway over which heavy trains are constantly rolling, and swallows make their homes in engine houses. A pair of swallows has reared its young for years in a mill where a noisy 300 horse power engine is working day and night, and another pair has built a nest in the paddle box of a steamer that plies between Pesth and Semlin.

The Speed of Birds.—The speed of pigeons and of birds in general has been much discussed in recent times by different zoologists. Many authors are inclined to give too high figures. Thus, according to Spallanzani the speed of the martin is fixed at 290 feet per second, and that of the pigeon (estimated from a flight of four from Paris to Budapest) at 155 feet per second. But these figures appear to be erroneous. An interesting experiment, reported by Ciel et Terre, has just been made at Anvers by Mr. A. Verschuren on the subject of the speed of swallows. Having succeeded in capturing one of these birds, he marked it and gave it in charge of a train that started for Compiègne on the 16th of May with 250 baskets of carrier pigeons belonging to the Federation Colombophile. The swallow was set free on the 17th of May at 7 o'clock in the morning along with the pigeons, and, quick as a flash, took a northerly direction, while the pigeons were still describing numerous spirals in search of their direction. At twenty-three minutes past eight the bird made its appearance in Anvers and hastened to seek its nest. The first pigeons did not enter their cote till half past eleven. The swallow had made the 140 mile trip in one hour and eight minutes, say at a speed of 120 miles an hour or about 190 feet a second. The pigeon attained a speed of but 35 miles an hour or 50 feet a second. Such speed, nearly 200 feet a second, gives us an idea of the rapidity with which swallows are capable of accomplishing their migrations. To reach Belgium from the north of Africa, for example, it would take them scarcely half a day.

The Leech.—The leech, or as it is variously spelled, litchi, lich, or latji, is the most celebrated of the indigenous fruits of China, and is now frequently imported to this country and sold in fruit stores, and is sometimes presented by Chinese laundrymen to their customers. There are several varieties, but the most common is nearly round, about an inch and a half in diameter, with a thin, brittle shell of a red color, covered all over with rough, wartlike protuberances. Others are larger and heart-shaped. When fresh they are filled with a white, almost transparent, sweet, jelly-like pulp surrounding a large shining brown seed. After they have been gathered some time, the pulp shrivels and turns black, and then bears some resemblance to a prune. The Chinese are very fond of these fruits and consume large quantities of them both in a fresh state and when dried and preserved in various ways. The tree that produces them (*Nephelium litchi*) grows to a height of about twenty feet, and is a native of Southern China, although known only in a cultivated state.

The New Mint Building.

The plans for the new United States Mint, to be built in Philadelphia, at Sixteenth and Spring Garden Streets, have been completed and approved, and advertisements for bids for the erection will be promptly issued, says the *American Manufacturer*. The act authorizing the building fixes the cost at \$2,000,000. The site cost \$325,000. The plans purpose a building to cost \$1,650,000. It will occupy the entire square bounded by Spring Garden, Sixteenth, Buttonwood and Seventeenth Streets. The main front is on Spring Garden Street and the side entrance for workmen and wagons on Sixteenth.

The building is arranged in the form of a hollow square with an interior courtyard. The front of the building proper on Spring Garden Street is 316 feet, while the terrace which runs the entire length of the lot is 396 feet. The building has frontages on Sixteenth and Seventeenth Streets of 150 feet. The rear of the building on Buttonwood Street comes directly on the street. The architecture is of the classic style, with some ornamentation of cornice, etc. The interior arrangement is designed in the most careful manner to secure the best possible practical operation of the mint.

THE SCIENTIFIC AMERICAN Patent Agency has just issued its new hand book on patents, which will be sent to any one contemplating the securing of patents free of charge. This little book is up to date and gives valuable information concerning the steps necessary for procuring patents, trade marks, etc.

The Abuse of Free Libraries.

At its recent annual meeting in Cleveland, the American Library Association heard some candid criticism from its president, Mr. John Cotton Dana, librarian of the Public Library of Denver. He feared that his enthusiasm for the free public library was born more of contagion than of conviction. In the public library, he said, you have stored a few thousand volumes, including, of course, the best books of all time—which no one reads—and a generous percentage of fiction of the cheaper sort. To this place come in good proportion the idle and the lazy, and also the people who cannot endure the burden of a thought, and who fancy they are improving their minds, while in fact they are simply letting the cool water of knowledge trickle through the sieve of an idle curiosity. The more persistent visitors are largely men who have either failed in a career, or never had a career, or do not wish a career.

Mr. Dana charged the free public library with relieving the idle, the incompetent, and the indifferent reader from the necessity—would he have books—of going to work to earn them. It checks, he continued, the serious reader in collecting a library of his own adapted to the wants and tastes of himself and his family. It leads parents to regard with indifference the general reading of their children, just as the free public school may lead them to be indifferent to their formal education.

This and much more in the same strain was loudly applauded by Mr. Dana's large and representative audience of librarians. It is evident that the abuses of free public libraries have led to much searching of heart among their chief officers. They are feeling, as the teachers of the public schools also feel, that they cannot take the place of the parent who abdicates from one of the primary responsibilities of parenthood. A child whose father and mother hand over its mental and moral culture to the teacher and the librarian virtually becomes an orphan. Neither public school nor public library can do its duty toward its pupils and readers without the hearty and intelligent co-operation of parents. Mr. Dana's address was clearly intended to traverse the easy optimism and self-gratulatory vein usual in presidential utterances. His criticisms will bear fruit in pointing to the abuses and losses inevitable when the form of gratuity is impressed upon a comfort or a luxury which each should buy for himself. The form of gratuity is a form only; at great and increasing cost a service is proffered which should be rendered, not in the free public library, but in the home; or, if a compromise must be made, then by the free public library watchfully directed from the home.—*Appleton's Popular Science Monthly*.

Dr. Salmon on Tuberculosis.

In the course of an address given in New York City, Dr. D. E. Salmon, chief of the National Bureau of Animal Industry, made the following brief summary upon Tuberculosis, says the *Massachusetts Plowman*. We have learned, said Dr. Salmon, that:

1. Tuberculosis is a germ disease.
2. The germ attacks a great number of animals; e. g., men, cattle, fowls, swine, sheep, cats, dogs, horses, rats, mice, domestic vermin. Even bedbugs have been known to communicate the disease. Each infected animal throws off germs capable of infecting the others.
3. The germ attacks only diseased or abraded tissue.
4. There are cells within the body whose duty it is to fight disease germs.
5. The germ may enter either by inhalation, inoculation or ingestion.
6. Tuberculosis is more prevalent in old than in young cattle.
7. Tuberculosis is not hereditary.
8. The germ can be killed: a, by a temperature of 155 degrees Fahrenheit for thirty minutes; b, by direct sunlight; c, by diffused sunlight.
9. Its virulence depends on the numbers present.
10. In-breeding, poor health, poor ventilation, poor food, lack of sunlight, are important predisposing causes.
11. There is no more, if as much, tuberculosis at the present time than in the past.
12. Tuberculin, in competent hands, is a trustworthy and safe diagnostic agent.
13. Tuberculosis is not a respecter of breeds.
14. That communities have been furnished almost entirely with milk from tuberculous herds, without any appreciable increase in tuberculosis. Others have been furnished milk from healthy herds with no appreciable decrease in tuberculosis.
15. That where fat calves have been inspected, even where a large proportion of their dams and nurses are tuberculous, only in from two to five in 100,000 has the disease been detected.

One conclusion drawn by Dr. Salmon is to the effect that tuberculosis is not hereditary, and he thinks the disease could be bred out of a herd by separating the infected animals and raising the healthy calves according to the Danish method recently described in this paper.