

NEW BOOKS, ETC.

NOTES ON LAYING, REPAIRING, OPERATING, AND TESTING SUBMARINE CABLES. U. S. Signal Corps. Prepared under the Direction of Brigadier-General A. W. Greely by Captain Edgar Russel. With Supplementary Chapter on Factory Testing by Lieutenant-Colonel Samuel Reber. Washington: Government Printing Office. 1902. Pp. 70.

LOCOMOTIVES: SIMPLE, COMPOUND, AND ELECTRIC. By H. C. Reagan. 12mo. Pp. xiii, 604. Price \$2.50.

This edition describes and illustrates by means of photographs and detailed drawings the latest improvements in locomotive practice. This includes the latest types of compound and single-expansion locomotives, and treats of many improvements in fire-boxes and boiler construction.

The subjects of liquid fuel and oil-burning engines are carefully considered, as well as piston-valve engines and track-sanding apparatus.

The author also discusses the different methods of operating valve motion for compound locomotive engines, and takes up the questions of metallic-packing and of air-pumps.

The new matter is intended to put the reader in touch with the very latest and highest type of locomotive and its details.

THE ANALYSIS OF STEEL-WORK MATERIALS. By Harry Brearley and Fred. Ibbotson. London, New York, and Bombay: Longmans, Green & Co. 1902. 8vo. Pp. xv, 501.

No author could possibly choose the best from the continually increasing number of ways of analyzing steel works materials and prove his chosen methods at every point. Although this has been the ideal of the authors they frankly admit that they have not accomplished it. Nevertheless they have described no method that has not been personally verified and practised for a considerable time, except in one or two minor cases, dealing with estimations. Furthermore, in writing up the description the authors simultaneously worked through the operation so that no feature might be overlooked which was needful to a complete appreciation of the process. Most of the typical analyses given were obtained in this way. It follows, therefore, that the book is eminently practical.

ASTRONOMY WITHOUT A TELESCOPE. By E. Walter Maunder, F. R. A. S. London: "Knowledge" Office. Pp. xx, 280. Price \$2.50.

In 1900 the author commenced a series of short papers in "Knowledge" upon the zodiacal light and other objects, which, like it, need no optical assistance for their examination. Out of that series of papers the present volume has grown. After an introduction and a section on constellation studies, the author passes to astronomical exercises without a telescope, in which he discusses the sun and the seasons, the morning and evening stars, the march of the planets, and sunspots and moonspots. In his third section the author discusses astronomical observations without a telescope, and treats of meteors, zodiacal light, aurora, the milky way, new stars, the structure of comets, a total solar eclipse, etc.

JENA GLASS AND ITS SCIENTIFIC AND INDUSTRIAL APPLICATIONS. By Dr. H. Hovestadt. Translated and edited by J. D. Everett, M.A., F.R.S., and Alice Everett, M.A. London: Macmillan & Co., Ltd. New York: The Macmillan Company. 1902. 8vo. Pp. xv, 419. Price \$5.

This book is mainly devoted to an account of the physical and chemical properties of the various types of glass which have, up to the present, been produced at the Jena glass-making laboratory and to the indication of their scientific and industrial applications. The experimental and theoretical investigations relating to these glasses are scattered through various journals, or have been published as separate monographs. That they have here been collected, edited and presented in book form, is a task for which Dr. Hovestadt deserves thanks. The work of the translators cannot be too highly commended.

One of the functions of the Smithsonian Institution, at Washington, is the diffusion of knowledge in popular language.

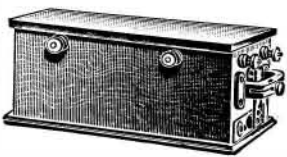
The popular volume before us contains fifty articles, many of them illustrated, nearly all prepared by masters of the respective subjects, telling in clear and interesting language of the latest progress in all the principal branches of knowledge.

"Bodies Smaller than Atoms" is the title of an interesting paper, and as we read "The Laws of Nature," "The Greatest Flying Creature," and "The Fire Walk Ceremony at Tahiti," we are reminded of the wide range of subjects included in the Report. Wireless telegraphy, transatlantic telephoning, and the telephonograph are discussed by experts in electrical progress. Attention ought also to be called to papers on utilization of the sun's energy, the Bogosloff volcanoes of Alaska, forest destruction, irrigation, the Children's Room at the Smithsonian, the submarine boat, a new African animal, pictures by prehistoric cave-dwellers in France, automobile races, the terrible lizards that once lived in America, and Mr. Thompson Seton's paper on the National Zoological Park at Washington.

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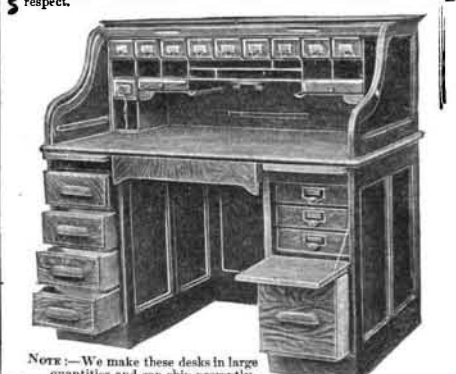


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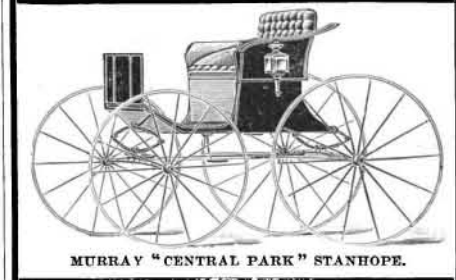
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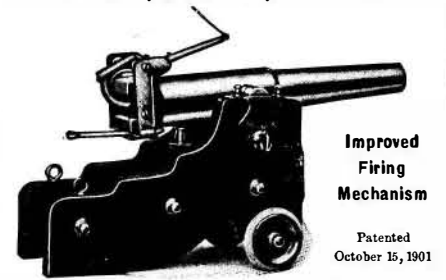
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RECENTLY PATENTED INVENTIONS.

Agricultural Implements. ELEVATOR FOR CORN OR GRAIN DUMPS.—J. MABUS and F. L. HAY, Lilly, Ill. This elevator and conveyor for grain dumps has a multiple of shafts connected with the driving mechanism enabling power to be applied, no matter what position the machinery may occupy. The conveyor and elevator may be adjustably connected so that their belts will have guided movement, and means are provided for safely receiving, holding and conducting quantities of material.

Engineering Improvements. HYDRAULIC DREDGE.—J. ANDERSON, Gulfport, Miss. This improvement belongs to that class of dredges which are adapted to float. The inventor in this improvement makes the dredging mechanism proper in the form of attachments to a boat or scow provided interiorly with chambers or tanks for receiving the mud, sand, silt, and water taken up by a suction-pipe.

Tools. FLUE-CUTTER.—E. E. RESOR, Vanwert, Ohio. This inventor has made an improvement in devices for cutting boiler flues or tubes at the inner side of the flue sheets, and in providing a device of this character he makes it possible to quickly cut a flue with very little exertion on the part of the operator, and also prevents the shock incident to hammer-actuated cutters.

HOG-NOSE CUTTER.—C. F. ROUX, Stryker, Ohio. Comprised in this improvement are means for cutting off the nose of a hog or that part with which the hog roots. The invention provides a simple device with the cutting-blade so curved and extended as to cut away all the rooting portion of the nose of the animal. The implement is also intended for use as an ear-marker.

Mechanical Devices. BASKET-MAKING MACHINE.—C. ENGBERG, St. Joseph, Mich. In its general form this machine embodies two work-holding devices, including means for feeding the hoops with a step-by-step motion and a single stapling mechanism, which is mounted to work alternately over the work-holding device, so that one basket may be operated on while another is being adjusted on the other holder. It is especially intended for putting into place the bottom hoops of bushel-baskets.

DRIVING APPARATUS.—J. H. INGGOLDSBY, Council Bluffs, Iowa. For the purposes of this invention the apparatus is provided with means for driving posts, piles, well-tubing and the like. It is mounted on a wheeled body, so that it may be readily removed from place to place, and is mainly adapted for farm and ranch use for driving fence-posts, etc., and for railway companies in fencing in their lines.

COTTON-CLEANER ATTACHMENT FOR GINS.—M. RUTH, New Edinburg, Ark. In ginning cotton the material is subjected to sharp, quick strokes of the saw-teeth, which strike it in rapid succession, and the dust, dirt, and other foreign substances contained in the cotton are thereby loosened and freed from it. The inventor here employs improved means over those used in the air blast method of cleaning and removal. The draft-passage is adapted to any common type of saw-gin.

CAN-HEADER.—L. C. SHARP, Omaha, Neb. By means of this invention round and square cans may be headed, the machine being built so that it may be readily changed to work on different sizes and forms; also its operation is such that ends or heads are simultaneously placed in the can and crimped. By means of novel mechanism the machine is rendered wholly automatic, the can bodies and heads or ends being placed in chutes and fed from the machine.

COPYING-LATHE.—C. SEYMOUR, Defiance, Ohio. Woodworking machinery receives an improvement in this provision of a new copying-lathe for turning gun-stocks, shoe-lasts, and other articles of regular or irregular form. It is arranged to permit convenient adjustment for turning the articles of the same or of a proportionate larger or smaller size than the pattern.

ADDRESSING-MACHINE.—H. L. GAY, Monticello, Ia. Mr. Gay in this invention has brought about the development of a machine that relates particularly to apparatus for severing printed names and addresses from strips of mailing-papers or the like. In the operation the strip of paper is drawn over the adhesive brush and fed through the front of the machine in an intermittent manner. The projected portion bearing a name will be severed by the cutter, and the blade projection will press such severed portion upon a wrapper. The machine may be provided with legs, or securely fastened to a table.

CLUTCH.—E. DYSTERUD, Monterey, Nuevo Leon, Mexico. This clutch is especially designed to be used with alternating current electrical motors, the object being to keep the clutch inactive till the full speed of the motor is attained and then instantly to connect the motor with its load. The inventor attains this end by providing a centrifugally operating clutch and fitting it with centrifugally controlled means for restoring the action of the clutch until a certain speed of rotation is reached.

tation has been reached, whereupon the centrifugally controlled means permit the immediate application of the clutch thus connecting the motor with its load.

**BASKET-MACHINE.**—C. ENGBERG, St. Joseph, Mich. This invention relates to basket-machines, more particularly of the type used in making the so-called "bushel-baskets."

**COPY-HOLDER.**—C. B. TOWERS, Miles City, and W. A. CAMERON, Stacey, Mont. It will be found that by very little skill an operative may use this invention so as to keep track of the language being copied, no matter how irregularly the lines may be spaced and no matter whether the words are crowded in certain lines and scattered in others.

**TIRE-SET.**—J. B. KIMBELL, Alpharetta, Ga. Means for shrinking or compressing tires when cold upon vehicle-wheels, so as to cause them to tightly fit the wheels, are provided in this apparatus. In use the wheel is put on the table, and spacer-blocks are disposed so that the pressure of the blocks will communicate to the tire. The nuts are then tightened by means of any suitable device.

**Medical.**

**HYPODERMIC-SYRINGE CASE.**—T. A. CHAPPELL, Bronwood, Ga. This contrivance holds a syringe and containers for tablets or the like for charging the syringe, the holder and the containers being related to each other so that one receives a charge from the other without removal, thus preventing any loss.

**Railway Improvements.**

**GRAIN-DOOR.**—M. C. ROWCLIFF, Osceola, Wis. The invention provides a sectional door which may be adapted to be placed in a railway "box-car" when the car is loaded with grain, so as to keep the grain from leaking through the crevices in the main door of the car.

**Miscellaneous.**

**FENCE-POST.**—W. B. WHERRY and J. B. HILL, Overton, Texas. The object which these inventors have in view is the construction of the base which is adapted to be buried in the ground, the base serving to hold the post against vertical displacement in the ground, as well as to overcome any tendency to leaning.

**SHOE-STRETCHING DEVICE.**—J. KARLSON, New York, N. Y. This is a convenient appliance for boots and shoes to hold the soles straight on their lower surfaces and stretch the uppers, so as to prevent transverse wrinkles forming in the shoe-leather that render the foot-gear unsightly and also injure by causing breaks in the material.

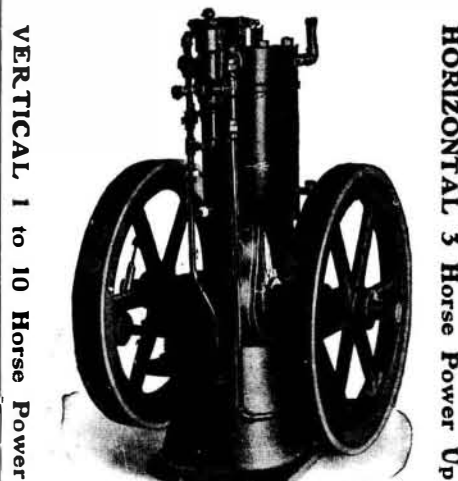
**WAIST AND SUPPORTER.**—SOPHIE VISCHER, New York, N. Y. This contrivance provides a waist and supporter for the bust, abdomen, and skirts, to supplant the corset, and is arranged to be supported from the shoulder-bones and hip-bones, to leave the lungs, stomach, and other organs free of pressure, to prevent disfigurement, to strengthen the back, and to offer means of supporting skirts, hose-supporters, etc.

**EYE-GLASSES.**—E. L. LEMBEKE, New York, N. Y. The appearance of eye-glasses is heightened by this improvement, the screws for fastening the spring and the nose-clamps to the posts are locked against accidental unscrewing and the screws are protected from moisture and cannot come in contact with the skin and bruise it.

**WINDOW-SASH ATTACHMENT.**—P. MAYORTE, Escanaba, Mich. This device facilitates the raising of window-sashes without using counterbalancing-weights and automatically locks the sash in any position.

**TILE FLOORING.**—C. P. LAWSHE, Trenton, N. J. This flooring comprises a tile of any form or material and a bed for the tile of flexible, resilient material, this material lying under the tile with webs between the tiles and the tiles being secured to the webbing by cement or other means.

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**D. L. HOLDEN, REAL ESTATE TRUST BLDG., PHILA., PA. SOLE MANUFACTURER REGEALD ICE MACHINES** SEE FIRST PAGE SCIENTIFIC AMERICAN SEPT. 2, 1899

cured in place by passing fastening devices through holes made in certain of the ties. This flooring is noiseless and elastic.

**BUCKLE.**—J. P. HUNT, Maitland, Mo. The employment of this buckle secures together portions of harness for draft-animals, mainly to such as are used for adjusting the length of traces. It is readily adjusted to lengthen or shorten a tug-strap, which dispenses with holes in the strap, as when buckles having tongues are used. It is applicable to straps of various widths and thicknesses.

**CHAIR ATTACHMENT.**—J. F. BLOCH, New York, N. Y. In the completion of this improvement, the inventor has furnished simple means for producing a current of air by a rocking motion of the chair and conducting it to cool the occupant. The spray of air is practically continuous.

**FOLDING BED.**—C. P. BROWN, Springlake, Mich. The invention relates particularly to improvements in metal folding beds. A bed of this character may be easily raised or lowered and has means to prevent its accidental folding and also for holding the bed at any desired angle, as occasion may require.

**GARMENT-HANGER.**—A. L. ROSS, New York, N. Y. This contrivance is a hanger for trousers and skirts which is simple and durable in construction, cheap to manufacture, easily fastened in place on the inside of a closet-shelf or like support, and arranged to permit adjustments for trousers of different waist sizes and to allow of supporting them by the buttons located outside or inside of the waistband.

**SCREEN FOR PAPER-PULP.**—S. H. TRIBBETTS, Groveton, N. H. In devising this improvement the inventor furnishes a fastening device for securing the end plates of each section of a continuous screen used for cleaning pulp, its object being to prevent the possibility of dirt, or any extraneous matter from working under the sides or edges of the end plates.

**BOOK-SUPPORT FOR CHAIRS.**—T. DONOHUE, Memphis, Tenn. The means adapted for supporting the table of the chair attachment consists of a bar fixed to the table and having its ends resting upon the chair arms. A brace extends down from the under side of the table adjusted to rest upon the upper side of the chair bottom, the brace being formed of two parts secured together and capable of lengthwise adjustment.

**COMBINED SIDESTICK AND QUOIN.**—W. S. RHODES and W. J. TRUMP, Lincoln, Neb. This article consists of a sidestick having its inner side supplied with reversed inclines, the inner ends of which are provided with projecting lugs whose free ends have longitudinal slots formed between the upper and the lower edges of the lugs. An adjusting shaft projects at its ends through the slots and is provided at its middle with a collar fitting and working between the lugs, and the quoins have inclined faces operating along those of the sidesticks and engaged by the screw shaft ends.

**COMBINED TABLE AND DESK.**—F. H. DUKESMITH, Charlestown, W. Va. Combined in this one article is a table and desk capable of various uses and adjustments. When closed it will present no unusual appearance and still be a receptacle for papers, pens, ink, shaving utensils, game apparatus, a file for letters, as well as a support for a center lamp or other objects.

**EDUCATIONAL APPARATUS.**—L. S. PRATT, Galesburg, Ill. The object of this invention is to provide an improved apparatus for use of pupils in school and at home. One of the chief features of the invention is a rectangular frame adapted to be permanently secured to a wall and to receive and temporarily hold boards, maps, or panels designed to be used in the course of instruction.

**PROCESS OF MAKING WOOD PLATES.**—F. A. MANUEL, Richford, Vt. Practical experience has shown that the veneer from green stock cannot be first cut into round or disk-like shape and thereafter subjected to heat and pressure in a press for the manufacture of pressed circular-plates, because the veneer splits and cracks by shrinking until the plates are worthless. This improvement provides means to overcome these objections and to enable the manufacture of good commercial veneer articles to be carried on economically and quickly.

**NON-REFILLABLE BOTTLE.**—H. HAFFTEN, Woodside, N. Y. Initially this bottle can be as readily filled and emptied as any, but after it is once sealed all passages leading from the mouth to the body are closed by fixed and movable barriers, which prevent the introduction of liquid to the body of the bottle or the insertion of devices to displace the movable barriers from their closing positions.

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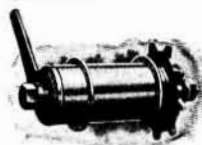
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### Engineering Notes.

After standing securely for upward of 120 years, the cast-iron bridge which The Coalbrookdale Company erected over the Severn in the years 1777-1779 has failed by the sudden breaking of the girders. The structure is believed to be the first metallic bridge ever erected, and it possesses the further distinction of having given its name to the picturesquely situated riparian township of Ironbridge in Shropshire. The span of the arch is 100 feet, the width, exclusive of parapets, 26 feet, and the height from base-line to center, 40 feet, while the weight of iron in the bridge is about 380 tons. No details are at present available as to the cause of fracture, but it is surmised that "fatigue," due to long-continued vibration, may have some connection with the collapse. Cast iron for bridge building is no longer in favor, rolled iron or steel being the material generally used, but for all that, there are few wrought-iron or steel structures now being erected that are likely to remain intact for such a prolonged period as did the famous cast-iron bridge over the Severn.

The "Corrosion of Copper Pipes by Sea Water," was a subject discussed by Prof. Lett before the Chemical Section of the British Association. Speaking generally, Prof. Lett said that corrosion might arise, first, from the nature of the water. The London docks were notoriously bad, and that might be due to hydrogen sulphide, of which appreciable quantities had been found in the water there. Second, from the mechanical structure of the copper; there were always pores or cavities in the copper, and cuprous sulphide and other impurities were irregularly disseminated through it, favoring irregular corrosion. Third, from the chemical composition; the "Sappho" had, for instance, lost 10 per cent of her copper shell within a year at Portsmouth, probably on account of impurities, chiefly arsenic, zinc, and lead. He had found arsenic in his specimen—in traces only, indeed. But the arsenic alloy would be very stable, and, separating in the cooling mass in irregular distribution, would set up electrolytic currents afterward, to the detriment of the copper. This he had investigated experimentally.

Brick and concrete have been used in combination in a novel manner in the construction of a storm sewer system recently completed at Truro, Nova Scotia. The scheme was adopted as a measure of economy and its cost showed a great saving over similar sized sewers constructed of brick alone. The work was regarded as one of exceeding interest to engineers. The system laid consisted of 27, 30, and 37-inch conduits and in the larger size the brick work represented only about 130 deg., forming the crown of the arch, and in the smaller pipes the percentage of brick used was even less. The trench was dug slightly larger than the desired diameter of the conduit, the alignment and grade having been given in the usual way, and a collapsible form devised for this method was carefully put in place, supported at intervals by pieces of plank. Several of the forms were laid in the trench, end to end, at one time, and these were then bolted together in such a way that one continuous form was made somewhat less than 100 feet in length. The concrete was then placed into the trench, filling up the space around and somewhat over the forms. After being allowed to set for twenty-four hours, the forms were separated from each other and upon being collapsed, were easily taken out through the opening at the top of the conduit. The bricks were used in finishing out this opening and forming the crown of the sewer.

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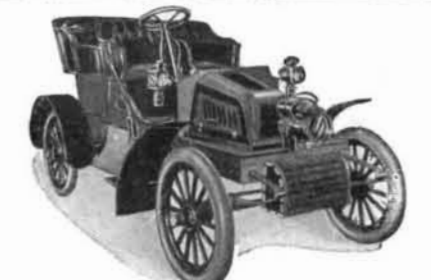
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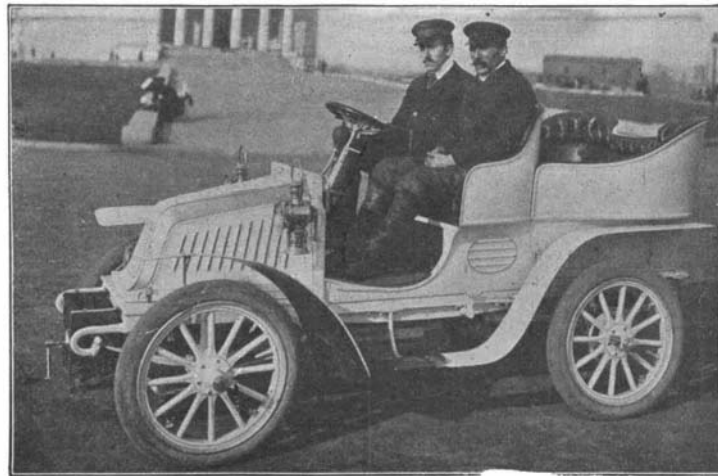
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Science Notes.

Frankel and Wegrinz confirm the statement of Hermbstaet that the aroma of tobacco is due to a volatile basic substance distinct from nicotine and from the alkaloids isolated from tobacco by Pictet and Rotschy. This was named nicotianine by Hermbstaet. It has been isolated from the milky aqueous distillate of tobacco leaves as the picrate of the base; this salt occurs in brilliant, silky, yellow needles, melting at 214 deg. C., which are sparingly soluble in water and in alcohol. According to Frankel and Wegrinz the aroma of tobacco is due to this base.

C. Hartwich and W. Uhlmann have investigated the formation of oil in the olive fruit. They find that it is present at a very early stage in the development, and increases in quantity until a maximum is reached in the month of January. The oil is not secreted in special oil cells, but occurs as drops in the protoplasm. It has been stated that the oil is derived from mannite, but this sugar has not been found to be present in the olive. It contains, however, a large quantity of glucose, which decreases in amount as the oil is formed. Glucose, therefore, and not mannite is considered to be the source of the olein.

Some interesting archaeological discoveries have been made in the course of some excavations upon the site of St. Augustine's Abbey at Canterbury, England. A portion of the crypt extending westward from the three apsidal chapels has been uncovered. The south wall is in a state of remarkable preservation above the spring of the arches, and has the remains of some fourteenth-century windows. On the inner side of the ambulatory are the foundations and rubble of five massive pillars, additional to and in continuance of those discovered last year. Near one of these pillars was found the leaden coffin and coffin plate of Abbot Ulrich I. (985-1006 A. D.), and further westward the body of another abbot, wrapped in silk vestments, much decayed. Pieces of copper gilt clasps were also discovered. A considerable part of the flooring, with colored and patterned tiles, is still existing, and there have been unearthed enormous quantities of worked ashlar, carved marble fragments, gilded pinnacles, and figureheads.

Mount Ararat, on which eight mountaineers recently had a narrow escape from death, attracted the attention of explorers at an early date. Sir John Mandeville estimated that it was seven miles high. Tournfort, the French botanist, attempted the ascent early in the eighteenth century, failed, and described the mountain as "one of the most dismal and disagreeable sights on the face of the earth." A little later a Persian Shah offered a large reward to any one who succeeded in climbing to the summit. Ultimately, the first ascent was accomplished by a climber who gave his name to the Parrot Spitze of Monte Rosa. The second ascent was made by one Spassky Aftonomof, in 1834, and the third by Herr Abich, in 1845. The first English ascent was made by Mr. Bryce in 1876, and since that date ascents have been tolerably frequent.

It has been observed that in the case of certain Rubiaceae, notably Pavetta indica and other species, nodules or hard-warts often arise on the leaves. Inside there is no apparent cause for the hardness, since the cells are of the nature of spongy parenchyma. Dr. Zimmermann has examined these swellings and finds that the hypertrophy is due to bacteria, which swarm and fill up the intercellular spaces. How the bacteria get into the leaf has not been established. But Dr. Zimmermann observed that there is a sinking in of the epidermis in the center of each callosity, which represents the remains of a stoma that was functional in an early stage of the leaf. He therefore put forward the hypothesis that the bacteria enter directly into the leaf through the stomata.

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Automobile News. Although there are no radical changes in electric automobiles or storage batteries this year, various new models have been brought out by the manufacturers. In runabouts, there are the 1,000-pound machine of the E. V. Company, with battery and motor suspended beneath the body, thus furnishing an empty box behind for carrying articles; and the wheel-steering runabout of the National Motor Vehicle Company, built somewhat in imitation of the gasoline runabouts, with a bonnet-like box in front.

New models of larger electric automobiles are the E. V. Company's inside-operated coupé, intended for the use of physicians in stormy weather; the hansom with underslung battery; and the electric truck, of the same company. All kinds of electric private carriages, trucks, and delivery wagons are built by the Vehicle Equipment Company, of Brooklyn. The company has a large station in New York especially for storing and caring for its electric vehicles. This type of automobile is holding its own, and seems destined to do, in a large measure, the work now performed by horses.

The latest practice in steam automobiles—a practice inaugurated by the Stanley Brothers, the original inventors of the light steam machine in America—is the hanging of the engine horizontally on the running gear so that it drives the differential on the rear axle through a spur gear and pinion. This arrangement is similar to that employed on most electric carriages, and it has the advantage of simplicity, while doing away with the chain drive. The Geneva Company have adopted it, while the White Company, also, are using a direct drive, but through a longitudinal, universally-jointed shaft and bevel gears, the motor being in front, under a bonnet.

The Locomobile, Prescott, and Toledo steam machines are still of the standard runabout type, with a tubular running gear, and preferably wood or steel wheels. The first-named has wheel-steering and a sloping box front, besides many improvements, such as the engine inclosed and running in oil on roller bearings, a ratchet device that permits of easily tightening the packing of the valve stems and piston rods, and the automatic turning on of the main cylinder oiler when the throttle is opened. The Prescott still retains the box front with let-down seat, the front seat being lower than the rear one, and its footboard being provided with a dash. Hub brakes are fitted to the rear wheels of this car, the rear axle of which has roller bearings. The reverse is obtained by a pedal. The engine is encased and runs in oil. Three water pumps and two air pumps are fitted to the machine. Two of the water pumps are auxiliary steam and hand-operated ones, as are the air pumps also. Thus it will be seen that emergencies are well provided for. The Toledo car has a bonnet in front, concealing the water tank, which, together with an inclined box on the rear and a condenser in front, gives it the general appearance of a gasoline machine. The smoke pipe projects from each side panel of the seat. The link throw of the engine can be varied by a side lever. The engine can be reversed by moving the throttle lever backward. The exhaust steam passes first through an oil separator and is then condensed, a vacuum pump driven from the engine cross-head circulating the condensed water.

The gasoline automobiles for 1903 are more numerous than ever before. One of the latest models of a thoroughly well constructed closed car is the Limousine, recently brought out by the Packard Company. In this car the usual single-cylinder horizontal motor is abandoned for a 25 horse power four-cylinder vertical one, placed under a bonnet in front. A ball governor that controls the lift of the inlet valves and varies the time of the spark is used, but can be thrown out of action when desired. The regular sliding transmission gear, operated on the

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selective system, is used, and this is connected to the rear axle by a longitudinal shaft, with bevel gear drive. A pump feeds oil under pressure to the engine cylinders and bearings, and grease to the bearings of the transmission.

The Stevens-Duryea gasoline car is a powerful runabout equipped with an 8 horse power opposed-cylinder motor and three-speed gear. The transmission is of the individual clutch type, with gears always in mesh. The motor has a flywheel of large diameter, and it is started by a crank from the seat. A throttle button on the end of the gear-changing lever acts on the inlet valves, while a single carbureter supplies both cylinders.

A medium weight machine that has met with considerable success during the past year is the Autocar 10 horse power tonneau. The same double opposed-cylinder motor that was used on the original Autocar runabout is found on the tonneau machine; but the motor has been improved in construction and is now placed transversely on the chassis, under a bonnet in front. A three-speed sliding-gear transmission, with direct, bevel-gear drive at the rear axle, is employed. The new car is fitted with wheel steering, and has many of the refinements found on all first-class machines.

One of the neatest light machines placed on the market this season is the Covert 650-pound runabout. This little car is built strong enough for touring purposes on ordinary American roads. A reachless running gear is employed, a 5 horse power motor with air-cooled cylinder and water-cooled head being mounted on the chassis in front under a bonnet. A two-speed sliding gear is inclosed in part of the differential casing. The flywheel clutch is thrown out and the brake applied by the progressive movement of a single pedal. An emergency brake on the differential is also provided.

The rapid increase of automobiles in this country has caused the establishment of numerous storage and repair stations. One of the largest and best equipped stations of this kind is the one run by Banker Brothers, in Philadelphia. It is one of three conducted by this firm in New York, Pittsburg, and the Quaker City respectively. A three-story brick building is used for the purpose. The ground floor has ladies' and gentlemen's waiting rooms, with separate entrances; a room for the chauffeurs; an office and salesroom; and a dynamo and engine room; besides the regular storage room for vehicles, in which is a washstand and three pits with stairs leading into them, from which the vehicles can be examined from beneath. Scales for weighing the cars are also provided. On the second floor there is a well-lighted repair shop with a complete equipment of bench and machine tools. A stock room adjoining it contains spare parts of many American-made machines and a few foreign-built ones. A large storage room for electric carriages, fitted with fifteen charging rheostats and a battery repair room, is also situated on the second floor. The third floor is used for storage purposes merely, and will accommodate 150 machines. An electric elevator capable of lifting two tons connects the three floors. This, as well as the machine tools, is run by electricity generated on the premises by a 26 horse power gas engine. A separate 9 horse power engine is used at night, when the building is brilliantly illuminated with incandescent and arc lights.



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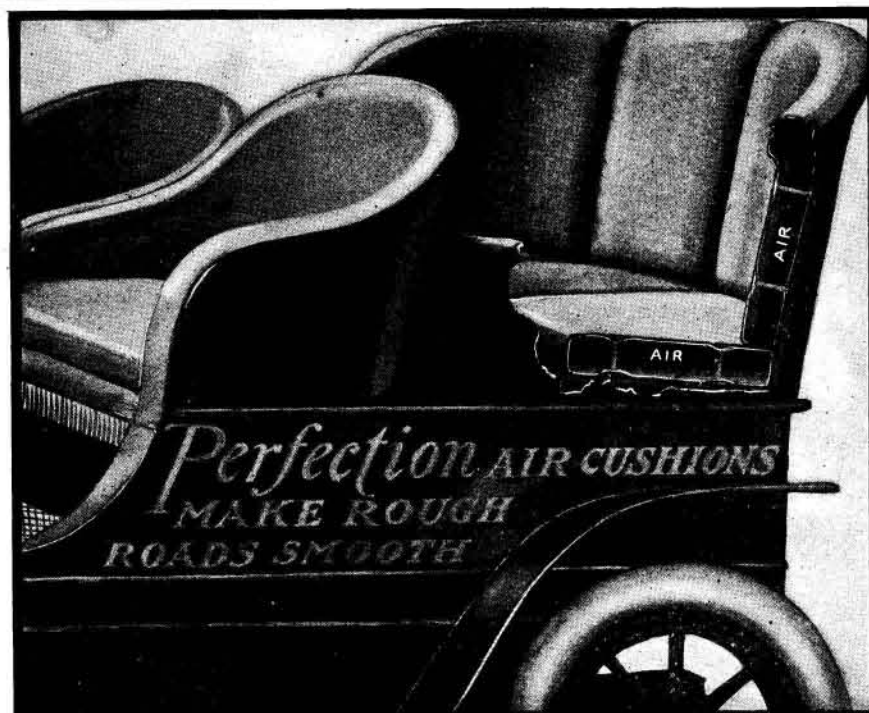
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