Science Notes.

According to M. Casimir de Candolle (Arch. Sci. Phys. et. Nat.), grains of wheat which have been immersed in mercury for four years are still capable of germination, and have been found to produce normal plants.

The ideal specific gravity of petroleum spirit for motor carriage purposes is 0·680 at a temperature of 60° F. A depression of 30° F. causes an additional 15° to the specific gravity, and a corresponding rise necessitates a similar reduction from 0·680.

Six thousand barrels of whiskey are to be shipped from a bonded warehouse at Baltimore, they having reached the limit of their free storage without duty, having been in bond within a few months of eight years, for which time, by provision of the law, this commodity may be stored without being subjected to the internal revenue tax of $1.10 per gallon. It will be shipped across the ocean and stored in warehouses in England and Germany, and will be nearly all shipped back if the demand arises. The ocean voyage increases its excellence, and its market value, and it may return within a year to supply the heavy demand and give a return that pays, over the cost that it represents to produce the article.

The observatory on Ben Nevis, being the highest peak of the British Isles, 4,407 feet above the sea level, presents, as regards its observations, some peculiarities not found in those taken at ordinary altitudes. Observations have been made during clear weather on the one hand, and during foggy weather on the other hand. This has been done for thirteen years. The results are briefly as follows: In continuous clear weather it practically never rains on the mountain at all. In continuous foggy weather on the other hand, the average daily rainfall is almost exactly one inch. There is a large and continuous excess of barometric pressure in clear weather over that in foggy weather. The observatory at Ben Nevis, furnishes a record of the meteorology of the clouds. The fog which characterizes the climate of the mountain is nothing but cloud under another name, and in this respect the observatory is unique.

The effects of the great dynamite explosions at Avigliana (near Turin), on January 16, are described by Dr. M. Baratta in a privately printed pamphlet, says Nature. About 400 kilogrammes of nitro-glycerine and 12,000 kilogrammes of dynamite and gun-cotton were blown up. The first and stronger explosion, though it lasted little more than a second, presented three maxima of intensity, due probably to the successive explosions of magazines a hundred meters from that in which the nitro-glycerine was stored. Owing to the situation of the manufactory, the zone of greatest damage was very small; that in which windows were almost totally destroyed extended to a distance of 5½ kilometers; doors and windows were made to rattle as far as Crescentino (60 kilometers distant); and the sound of the explosion was heard at Pavia (140 kilometers), Varzi (145 kilometers) and Lugano (160 kilometers).

B. Lidforss has made some interesting observations on the attractive force exercised by the secretion of the stigma on the pollen-tube, chiefly on Narcissus tazetta. No distinct influence on the growth of the pollen-tubes was exhibited by artificially prepared organic acids—formic, acetic, lactic, succinic, tartaric, malic, or citric—nor by amides, glucosides, or tannins; but the almost immediate effect of introducing into the medium a few grains of diastase was to cause a deflection of all the pollen-tubes toward the grains. The constituent of the diastase which produced this effect appeared to be the proteid. The classes of substances which attract pollen-tubes are chiefly two, carbo-hydrates and proteids, the most important food-materials of plants. This indicates that the movements of the apex of the pollen-tube are simply a search for food-material. Similar results were obtained with other plants.—Ber. Deutsch. Bot. Gesell.

The recent excavations at the Argive Heræum in Greece have been most important. The sanctuary lies on the northeastern site of the Argive plain, between the ancient cities of Mycenæ and Tiryns and opposite the city of Argos. It was discovered in 1831, and some tentative excavations were made in 1836 and continued in 1854, but the whole was finally excavated in 1892-1895 by the American Archæological Institute, and the school of Athens under the direction of Dr. Chas. Waldstein, now Slade Prof. of Fine Art at Cambridge. The whole of the great temple was laid bare and the excavations also revealed traces on the upper slope of an earlier temple built before the Homeric age and burnt in 423 B. C., the whole pavement having been found together with traces of civilization leading back to a period of 2,000 years or more B. C. Of the second temple there was found only the base, but also sufficient remains of columns to enable a complete architectural restoration to be made; while higher up, says The British Architect, the polygonal pavement of the upper temple was discovered together with portions of the wall, so that the outline of its plan may be determined and even a fair restoration of the structure carried out.

The Typewriter and the Eye.

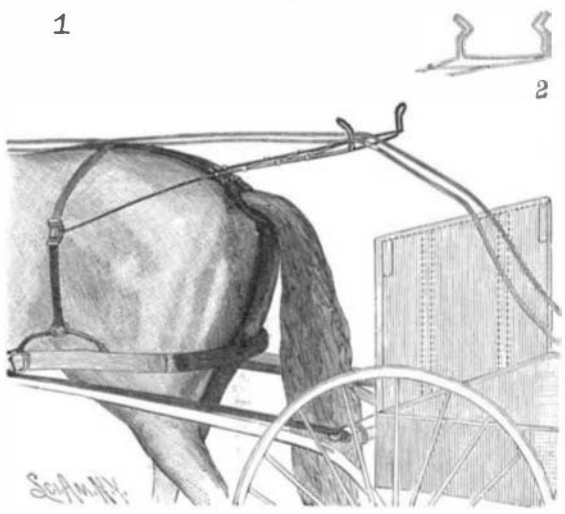
There is the general opinion among oculists that the eye is much relieved by the general introduction of typewritten matter. A recent medical work upon diseases of the eye gives a great many proofs in substantiation of this opinion. The characters are so large on the keys that there is no appreciable strain upon the vision, and when dexterity is attained the eyes can scarcely be said to be used at all. A vast strain is taken off the eye by writing with the typewriter instead of the pen, but the advantages of reading the type writing matter are even more important from a medical point of view, and the strain upon the hands is also slight. It is said that a person can work for eight consecutive hours, with slight interruptions, without the hands being conscious of fatigue. In using the typewriter the additional labor of focusing the eyes calls the muscles into undue use and the result is that many defects of vision which would not probably be discovered under normal conditions are brought to the front.

A REIN SUPPORT AND GUARD FOR HORSE HARNESS.

The accompanying engraving represents a simple device, patented by John T. West, of Bowling Green, Ky., for supporting the reins of a horse at such a height from the crupper that they cannot become entangled with the harness, or with the tail of the horse.

The device comprises essentially a spring-wire frame provided with guide-fingers at its rear end for the reins, and with divergent arms at its forward end for attachment to the crupper and hip-straps. Fastening pins, carried by the frame at each side, are designed to engage sockets in the back-strap or crupper.

The rein-guard, the inventor assures us, can be removed and replaced in a few seconds. The rear end



A REIN SUPPORT AND GUARD FOR HORSE HARNESS.

of the wire-frame projects just over the tail of the horse and supports the reins in such a position that they cannot sink. Carelessly as the driver may hold the reins, they will always be supported in proper position by the guard, without any possibility of their becoming ing entangled with the tail of the horse. The guard weighs but eight ounces.

Japanese Swords.

Mr. Gilbertson gives some interesting details as to the process of manufacture of the celebrated Japanese sabers. The blades of these sabers are formed of a metal prepared from magnetic iron ores and ferruginous sand. The steel is produced in the form of thin laminæ, and the workman commences by fixing one of these to the end of an iron rod which serves as a handle. To this are soldered other sheets until the mass has a length of 6 to 8 inches, a width of 2 inches and a thickness of ¼ to ⅜ inch. This bar, brought to a white heat, is doubled upon itself and hammered until it has taken its original dimensions. This process is repeated fifteen times. Four similar bars are then soldered together, doubled upon themselves, resoldered and heated, this operation being repeated five times. By this process the superposed layers of metal becomes so thin that a saber is estimated to contain at least one million sheets of metal. Sometimes alternate layers of iron and steel are soldered together, and thus the blade presents a veined appearance. When the blade is finished the surface is scraped and the end formed to receive the handle; it is then ground to shape. To finish the blade, it is covered with a mixture of clay, fine sand and powdered charcoal. Formerly the clay was taken from Mount Inari, and the workmen first went through a form of invocation to the tutelary divinity, to ask permission to take the necessary material. When the layer is nearly dry, an ornamental design is traced by short strokes which penetrates to the surface of the metal. It is then heated over a fire arranged for the purpose, and when the proper temperature is reached, which can only be determined by long experience, the blade is plunged into a bath of water or oil. The saber is then sharpened, and for those of the best quality this operation is said to require fifty days' work.

Engineering Notes.

The British War Office has purchased some small steel shields to cover the vital parts about the heart. It is said they weigh about 7 pounds and turn bullets at 700 yards. It seems curious that on the very threshold of the twentieth century that we again resort to armor. The principle, however, is an excellent one, and a helmet with a vizor and a heart guard would be a great protection in the present conditions of war fare.

The colored people of Omaha have petitioned the City Council to get possession of the armorclad car used by President Lincoln during the war time, and to restore it to such a condition as to prevent further deterioration and make it available as a relic. The car is owned by the Union Pacific Railroad and is kept in the yards at Omaha. It was built at Alexandria, Va., in 1864, says The Railroad Review, and was made bullet-proof by means of boiler plates placed on the sides of the car.

A railroad school for candidates for men in training for appointments in the regular permanent railroad service in the operating department of the Prussian State railroads has recently been opened at Berlin, and six hours of instruction is given each week for a regular course. Twenty-seven different subjects are embraced, and much attention is given to railway accounts as a larger part of the students are candidates for the grade of railway clerks. All of the students must have had a certain prescribed education, and many of them are graduates of technical schools.

An inclined railway plane has been built up the face of the Palisades at Weehawken, N. J., for the transportation of trucks. The distance is only 290 feet and the incline is a very steep one. The road will be operated by three 2-inch steel cables, one acting as a safety rope in case of accident. There are also safety tracks attached to the machinery in the power house by which the cars will be attached to the cables; as one ascends, the other descends. Each car will carry four trucks and horses, and is capable of lifting 20 tons. It is somewhat similar to the incline in Hoboken, but is much steeper.

The Association of Engineering Societies consists of eleven societies including the San Francisco, Montana, Minneapolis, St. Paul, Detroit, St. Louis, Louisiana, Cincinnati, Cleveland, Buffalo and Boston. The engineering societies are bonded into an association for their mutual good and for the publication of The Journal of the Association of Engineering Societies. The aggregate membership of the societies composing the association is now very large and has virtually made good the loss caused by the withdrawal of the Western Society of Engineers. The assessment per member has steadily declined from $4.92 in 1894, to $1 in 1899.

In 1870, from July 24 to August 4, a period of eleven days, Germany was able to convey in 1,520 railroad trains 19,299 officers, 556,000 soldiers, 161,881 horses and 16,883 cannon and baggage wagons to the seat of war. So great has been the progress made by Germany during the intervening thirty years, that she could at the present time transport the same number of men and the same quantity of war material to the scene of action from two to four days, which shows the enormous strategetical importance of the railway. A great French military authority considers that by means of seven double-track railway lines, 1,440,000 men could be transported to the frontiers of Germany in twenty-four hours, and in 207 trains on each of the seven lines. This would be a total of 1,449 trains. Germany is not far behind France in this ability to mobilize troops, and 1,440 trains bearing 1,440,000 men can be dispatched from Berlin within twenty-four hours to any district of the empire, so that the two great neighboring powers could mobilize great armies and begin war simultaneously with its declaration.

Some interesting railway statistics for last year, published a Japanese vernacular contemporary, show that the number of special trains run numbered 18,089, representing a decrease of 9,288 as compared with the preceding year. Most of these special trains were for the transportation of material used in the construction of new lines, and 205 special military trains were run in connection with the grand military maneuvers held in the provinces of Settau, Kawachi, and Izumi. The number of trains derailed during the year amounted to 122, and the number of the carriages derailed 250. Collisions numbered, 39; interruptions of traffic, 1,331; obstacles laid on the lines, 45; mistakes of pointsmen, 87; and irregular use of the staff, 65. The people killed by trains numbered 261, and those injured 180, showing an increase of 12 in the killed and of 58 in the injured. Most of the people killed, however, committed suicide; the passengers affected by railway accidents being 18 injured and 13 killed. Twenty-four passengers were injured through their own carelessness. Nine railway employés were injured in accidents, and 22 were killed and 56 injured by self-negligence. The number of passengers carried reached 32,000,000 and the goods carried 8,800,000 tons. The traffic receipts amounted to 10,189,738 yen.