A STANDARD OF WEALTH IN RUSSIAN ARMENIA.

BY E. O. HOVEY.

In arid and semi-desert regions the question of fuel is one that taxes the resources and ingenuity of the inhabitants. The people who live in Russian Armenia have solved the question in a way that forms a very striking feature in the views of all the villages of the plateau. After the grain has been thrashed, the remaining straw is piled up in great stacks on the low, flat roofs of the houses and stables, where it will be convenient for use as bedding for the stock. Much of the straw, however, is mixed with the fresh manure as

WALLS OF STRAW-MANURE FUEL.

that is taken from the stables from day to day. The mixing is usually done in round beds made by raising a low ridge of earth, using an implement like a hoe for the work. Then square or round cakes of the mixture are made with the hands and plastered up on a wall to dry. When dry, these cakes are piled up in conical or pyramidal heaps, which are frequently ten or even fifteen feet in height. These piles seem to be hollow, so as to permit a free circulation of air to insure thorough drying. The illustrations show the curious forms in which these piles are made. In many cases there is a small opening at the bottom of the stack to allow of its being used as a kennel or chicken house or something else of that sort. These dried cakes of dung mixed with straw are almost the sole dependence of the country people for fuel, and, as a consequence, in the semi-desert, the man who possesses a large quantity of this material is considered wealthy and his daughters are desirable matches.

Features of the New Battleships.

Secretary Long has just published a circular which defines the characteristics of the three seagoing coast line battleships authorized by the new Naval Appropriation law. It is proposed that the new ships shall have a load water line of 368 feet; the breadth at water line will be 72 feet; and the mean draught at the normal displacement 23½ feet; the normal displacement is to be 11,500 tons and the total coal capacity 1,200 tons. The hull is to be of steel, with a double bottom, and is to be subdivided by watertight compartments. The hull at the water line is to be protected by an armor belt of a maximum thickness of not less than 16½ inches and a mean depth of 7 feet 6 inches. This belt is to extend at least from the stem to the after barbette and to maintain the maximum thickness through the engine and boiler spaces. From the boiler space forward it may be tapered to a uniform thickness of 4 inches. The transverse armor just forward of the boiler space and at the after end of the belt will not be less than 12 inches in thickness. Throughout the length of the vessel a protective deck is to extend. Where this deck is worked flat the total thickness will not be less than 2¾ inches, and where worked with inclined sides the slope will be 3 inches in thickness forward and 5 inches in thickness aft. A cellulose belt is to be fitted along the sides for the whole length of the ship. The barbettes for the 13-inch guns will have armor 15 inches thick, except in the rear, where it will be reduced to 10 inches. The turret armor is to be 14 inches throughout. The ship's sides, from the armor belt to the main deck, will be protected by not less than 5½ inches of steel armor from barbette to barbette. Coal is to be carried back of a portion of this 5½-inch casing armor.

In a suitable position will be a conning tower of not less than 10 inches in thickness, having an armored communication tube 7 inches in thickness. Four 13-inch guns will be mounted in two heavy barbette turrets on the midship line, one forward and one aft. There will be ten 6-inch rapid-fire guns in broadside on the main deck, four on the upper deck within the superstructure, and a secondary battery of twenty-four rapid-fire and machine guns. The 6-inch guns on the upper deck will be protected by 5½-inch armor. There will be two submerged torpedo tubes. The torpedo compartment will be fitted up for the storage of eight 17-foot torpedoes and appliances and means for operating and handling the same.

The vessels will be driven by twin screws. The engines will be of the vertical triple-expansion four-cylinder type, two in number, one on each shaft, and they will be placed in separate watertight compartments. The eight boilers are to be cylindrical and single ended. They are to be placed in four separate watertight compartments, and will work at a pressure of 210 pounds. If on trial the average speed shall equal or exceed the speed at sea of 16 knots an hour for four consecutive hours, the vessel will be accepted as far as the speed is concerned. If the speed falls below 16 knots and exceeds 15 knots an hour, the vessel will be accepted at a reduced price, the reduction being at the rate of $25,000 per quarter knot, if the deficiency of the speed lies between 16 knots and 15½ knots, and at the rate of $50,000 per quarter knot between 15½ knots and 15 knots. If the speed falls below 15 knots an hour, the vessel will be rejected or accepted at a reduced price. No sail will be carried, but two military masts are to be fitted with fighting tops.

The New Naval Academy.

The complete rehabilitation of the Naval Academy at Annapolis being assured by the Congressional appropriation of $1,000,000 to start operations—the estimated expenditure being $6,000,000—work is to be begun on the dredging and the sea walls. The first structures to be undertaken are the armory and the boat house and the power house. At the present time, when the navy arm of the service is first in the public eye, the future of the American navy will probably be a matter of solicitude for some years to come. With the requirements of modern sea defense comes the necessity for a splendidly equipped school for those who are to be responsible for the management of our fleets. The old naval school, which was opened in 1845, is a motley assemblage of buildings, which are now inadequate and out of date, so that they tend to militate against the success of the modern courses of instruction.

Plans to alter and reconstruct these buildings were considered, but they were abandoned as stumbling blocks in attaining the end aimed at—a practically new academy. A commission was appointed, which reported against tinkering with the old buildings and in favor of new ones. The architect, Ernest Flagg, of New York, prepared the approved plan for the rebuilding of the Academy.

The present Academy occupies three pieces of ground more or less separated from each other, lying to the north of Annapolis and on the Severn River. The original plot was an irregular triangle containing numerous buildings, almost all of which are old and dilapidated. They were built at different times, and placed haphazard with little regard to the convenient working of the institution, and the most beautiful part of the property is occupied by the gas house and sheds, which serve to cut off a fine view of the bay.

MONUMENTS OF ARMENIAN FUEL.

The only interesting building on the grounds, except perhaps the old fort, is the library, formerly the residence of the Governors of Maryland; this is to be preserved.

The new plan contemplates the gradual demolition of all the old buildings, except the two last mentioned. When the plan is fully carried out, the buildings will be disposed in three groups, located respectively at the east, west and south of the campus, leaving the fourth side open to the river. The first of these groups contains the cadets' quarters, the armory and the boat house. The cadets' quarters will afford accommodation for 500 cadets, all of the rooms having views of either the Severn River, the bay or the campus. The armory is to be connected with the cadets' quarters by a colonnade. It consists of a main drill hall and gallery for models, and it will also contain various recitation rooms, etc. The boat house corresponds in size and general appearance to the armory, and occupies a corresponding position, and faces the large basin, which opens into the Severn River, and will be connected with the cadets' quarters by a colonnade. It will likewise accommodate 12 cutters, 12 sailing launches, 12 steam launches, 4 small torpedo boats and 2 large ones. It will also contain recitation rooms, model rooms, etc.

The campus, with its shaded walks, occupies the central portion of the architectural scheme. The chapel will be located in the center, and to the rear

MOUND OF ARMENIAN FUEL.

will be the officers' house. Fine walks will lead from the chapel to an exedra containing a band stand, and in front of this is the basin in which is to be moored the fleet of cutters, practice boats and torpedo craft. The third group of buildings lies on the other side of the campus, and faces the cadets' quarters. The group consists of the academic building, power house, steam engineering building and the physics and chemistry building. The academic building will be second in size and importance of those proposed, and will contain the administration offices, class rooms and the library. The other appointments will be most modern and appropriate. The Naval Academy, with the splendid record of the past, opens a second half century of existence with a deep-seated pride and with the knowledge of the affection in which the heart of this great nation holds the navy, and the new buildings are a propitious augury for a magnificent future for this service.

An Interesting Discovery.

Prof. Ramsay and Mr. Travers have recently made some interesting discoveries on the constituents of the atmosphere. Since the discovery of argon, it has been a question whether it was really an element This was very difficult to settle, owing to the impossibility of employing any ordinary chemical test, but Prof. Ramsay and Mr. Travers announced to the Royal Society of London, on June 16, the results of experiments which may be summarized as follows: They prepared a large quantity of argon from atmospheric nitrogen, separating the latter gas by means of magnesium, and having liquefied it by cooling it with liquid air, they then fractionally distilled the product. The first portion, says The New York Sun's cablegram, consisted of less than 100 cubic centimeters, distilled off from the liquid obtained by condensing 18 liters of argon, was found to have a density of about 13 instead of 20, which is that of argon, and its spectrum differed from that of known gases. The yellow line was less refrangible than those characteristic of helium and crypton, being especially prominent.

On continuing the distillation, after nearly the whole of the liquid argon had been evaporated, a solid was obtained which only slowly volatilized. The gas into which this solid was converted was found to be practically of the same density as argon, but its spectrum was altogether different and peculiar, consisting for the most part of bands, not lines.

It is proposed to call the lighter element neon, and that derived from the solid metargon.

The further development of the investigation is awaited with interest. The success of the experiments hitherto is regarded as a striking proof of the value of the new engine of research which liquid air affords.

ELECTRO magnets capable of picking up a load not exceeding five tons are used by an Illinois steel company to transfer steel beams or plates from one part of the shop to another.

Science Notes.

Prof. S. P. Langley, of the Smithsonian Institution, states that the bolometer (or actinic balance) is capable of indicating a "change of temperature in its strips of, at any rate, much less than one ten-millionth of 1° Centigrade." The apparatus is about 400 times as sensitive as when first described in 1881.

Those of our readers who are interested in astronomy will be glad to know that they can obtain the lantern slides and prints from the astronomical photographs made at the Yerkes Observatory, at a moderate expense by addressing G. W. Ritchey, optician, at Williams Bay, Wis. He is prepared to supply lantern slides, transparencies and paper prints from any of the negatives in the collection of the observatory A complete list of the subjects will be sent on application.

Herr W. Zaleski discusses the controverted question whether albuminoid substances can be formed in the plant in the dark. From a series of experiments on sunflower leaves he has come to the conclusion that the nitrates taken up into the leaves are there decomposed and transformed into other nitrogenous compounds. This transformation is connected with the access of sugar, which renders possible the passage of nitrates into other compounds, probably of the nature of amides. These processes can take place in the dark. —Ber. deutsch. bot. Gesell., vol. xv., 536.

Prof. A. Hansgirg proposes the following classification of pollen grains, dependent on their power of resisting moisture and on their protection against unfavorable atmospheric influences: (A) Plants whose pollen is resistent to moisture and germinates in pure water: (a) species in which the sexual organs are more or less protected against rain, etc.; (b) species in which the sexual organs are only slightly or not at all protected against atmospheric precipitations. (B) Plants whose pollen is not resistent to moisture, and does not germinate, or only very imperfectly, in pure water: (a) species in which the sexual organs are completely or partially protected against rain; (b) species in which the sexual organs are only slightly or not at all protected against rain, usually completely exposed. The class to which any particular pollen grain belongs does not depend so much on the affinity of the species as on its special habit.—Sitzber. kön. Böhmisch. Ges. Wiss., 1897.

An interesting illustration of natural engineering is the well-known heavy dike on the Holland coast which was built by the winds themselves. The sand formed between the jetties becoming dry in sunny weather, and the surface blown ashore on the wind blowing in that direction, it was desired to build a strong dike to connect with the sand dunes, and this was accomplished by setting in the sand, in rows about one foot apart, tufts of dune sea grass near by. The tufts thus placed, consisting simply of little handfuls of grass, were put each one into a cavity dug out with the hands, the tufts being set into this and the sand pressed around. The whole surface of the dry, sandy beach above high tide was covered with this plantation, and just back of it, at the highest point of the existing sandy area, one or two rows of reeds were set in the sand, their tops cut off and the stalks left standing about four feet above the sand—the latter drifting along over the surface, catching and in one day almost burying the tufts of grass and standing up one foot along the row of reeds; then another plantation being made, and another, a massive dike was thus built up to the height of the adjoining dike. In high storm tides the waves eat into the top of the slope and pull down the sand, but, by the same process of building, the dike is again restored to its former size.—Invention.

An interesting series of experiments in which a hollow hemisphere of metal was made to collapse by the pressure applied on top of it by another hemisphere or plane is described by Prof. H. Schoentjes, of Ghent, in the current Bulletin de l'Académie royale de Belgique. Prof. Schoentjes gives excellent photographs showing various cases of collapse in segments; triangular, quadrangular, pentagonal and hexagonal forms being all represented. The present paper forms the sequel to one published in 1890, and among the author's conclusions the following are noteworthy: When two similar hemispheres of 10 cm. diameter were crushed together by a hydraulic press with their summits in contact, only one of the hemispheres collapsed; the cavity formed was spherical, and was moulded on the undeformed hemisphere just as if the latter hemisphere were solid. When a hemisphere of 15 cm. diameter was crushed against one of 10 cm., the smaller one penetrated nine times out of ten into the larger one; the cavity was at first spherical, but afterward its margin became polygonal. In one case only—and the author could not succeed in repeating the experiment —both hemispheres were deformed; the larger one first penetrated the smaller, but under a force of 80 kilos. the edge of the cavity began to penetrate the large hemisphere. When a hemisphere was crushed by a plane the normal deformation was found to be hexagonal.

AN IMPROVED TRACE-HOLDER.

The device represented in our illustration is designed to prevent the accidental slipping of a trace from the singletree to which it has been attached. The trace-holder is in general characterized by a spring fastened to the upper or lower side of a singletree and is provided with a hook that embraces the trace and prevents it from slipping off the tree. Our illustration represents part of a singletree with the device attached.

The trace-holder is made of a single piece of spring-wire whose body consists of a coil terminating at one end in two eyes, by means of which it is fixed to the singletree. The other end is formed with a hook having a long beak which extends through a ferrule in the tree

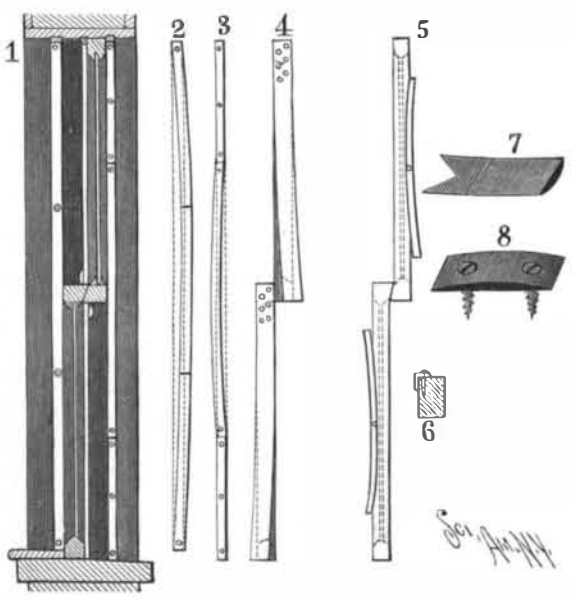
BARTLETT'S TRACE-HOLDER.

to inclose the trace and to prevent its slipping. The wire is doubled on itself to form the hook, and the free end is turned to enter the coiled shank portion. This shank portion has an outward curve and rests against the singletree only at its ends, so as to avoid rattling. In applying the trace, the hook is forced away from the singletree until the slit of the trace may be slipped over the ferrule. The hook is then allowed to spring back, its beak passing through the ferrule and inclosing the trace. The device is the invention of Granville Bartlett, of 360 South Broadway, Lexington, Ky.

A NOVEL SASH-HOLDER.

The sash-holder which we illustrate is the invention of John and Thomas W. Leask, of Gore Bay, Ontario, Canada, and is designed to enable the sashes to be held in any desired position, at the same time preventing rattling. The invention makes use of spring plates flexing edgwise in contradistinction to a flatwise movement, for the purpose of holding the sashes firmly to the frame. Of our illustrations, Fig. 1 is a vertical section of a window frame with the device attached; Fig. 2 is a side elevation of the inner stop and Fig. 3 a side elevation of the outer stop. Figs. 4 and 5 are modifications and Fig. 6 is a cross section of the sash and the spring shown in Fig. 5. Figs. 7 and 8 are detail perspective views of wear plates employed.

The arrangement illustrated in the first three figures consists in applying the spring plates to the sides of the window frame, the sashes sliding in the usual manner. The outer stop differs from the inner stop in employing a spring plate, whose bow is confined to the central



LEASK'S SASH-HOLDER.

portion of the plate, the ends being rigidly fastened. The intermediate portions of the plates constituting the inner stops have slots in which headed pins are inserted, so as to prevent inward bulging of the plates. Fig. 4 shows a modification in which the sashes themselves carry the spring plates. In this case the springs are fastened to the sashes at their inner ends, the outer ends being free. In Fig. 5 another modification is shown, in which the plates are curved throughout their lengths and secured at their centers to the side rails of the sash—a position which may be reversed.

In order to prevent the finish of the sashes from being marred, plates like those shown in Figs. 7 and 8 are employed, which prevent direct contact of the springs with the parting strip of the two sashes.

ACCORDING to Pediatrics, there is a law in France forbidding the giving of solid food of any kind to infants under one year of age without the written consent of a physician. The use of feeding bottles with long rubber tubes is also forbidden by law.

A Curious Safe.

In St. Augustine's Church, Brooklyn, N. Y., the tabernacle of the high altar is protected by probably the most novel safe ever devised. This is undoubtedly the first time in which practical science has been used as an adjunct in religious service. Of course, it was very essential that the beautiful altar itself should not be marred in any way by the safe and that it should be operated in a dignified and fitting manner. Unfortunately, in many churches, the richly jeweled receptacle for the sacrament has proved too often a bait for burglars, and many priests have tried to devise some scheme by which the security and sanctity of the tabernacle would be assured.

In the church to which we have referred the receptacle for the sacrament cost $10,000. The safe consists of circular curving doors which slide together, closing the front toward the church. The safe weighs 1,600 pounds and consists of four pieces, the base, a curving piece of steel at the back that is stationary and the two doors which come together. The leaves of these doors are made of Harveyized steel an inch thick. They meet as they close under the dome and overlap each other tightly by a scarf joint. They turn on roller bearings and they are operated by means of an electric motor. The safe is easily opened by manipulating buttons beside the tabernacle, but these push buttons will have no effect until the motor itself is set in motion in the vault below, the combination lock of the steel vault being known only to the priests of the parish. Electrical protection is also provided which would give notice at once to the nearest police station should the safe be tampered with. Masked in its covering of gold leaf, this steel shell is a superb piece of mechanism and it is one of the most ingenious uses to which the electric motor has ever been put. The same motor is used to drive a blower intended for the purpose of dusting the elaborately carved marble altar. An exhaust fan sucks away the dust.

The Current Supplement.

The current SUPPLEMENT, No. 1173, contains a number of articles of sterling interest. Subjects connected with the war are naturally in evidence. "The Queen Regent and Alfonzo XIII." is accompanied by a portrait of the King and his mother. "The American Regular" is by the English correspondent of The London Times on board the United States transport "Gussie." It gives an Englishman's idea of the regular army. "The Milestones of Human Progress" is a lecture delivered by Prof. Daniel G. Brinton at the Academy of Natural Sciences, Philadelphia, Pa. "Tombs of the First Egyptian Dynasty" is by Dr. Ludwig Borchardt, Director of the German School in Cairo. "An Amateur Chronophotographic Apparatus" describes a simple apparatus. "The Reclaiming of Old Rubber" is a very important paper by Hawthorne Hill and is one of the best contributions to this much neglected division of the literature on rubber. "Patents," by Mr. J. W. See, is continued, and the present installment of this paper deals with the employers' rights, combinations and aggregrations, genera and species, combinations and sub-combinations and mechanical equivalents. "The Development of the Central Station," by Samuel Insull, is concluded in this number.

Coaches on the Community Plan in Genoa.

A curious custom exists in Genoa. Many of the well-to-do people as well as those in moderate circumstances do not own either horses or coaches; they own only an interest in them. Four or five or a half dozen great families club together and buy a coach and horses, then they arrange among themselves the days the different families will use it. Thus one family uses the coach on Mondays, another on Tuesdays and a third on Wednesdays, so that an establishment that would be impossible for one family becomes perfectly practical when the cost is divided among five or six. Each family has a set of doors for the coach with their own coat of arms on the panels, which are changed according to the family which is going to use the coach. The builders of these vehicles seldom think of building a coach without five or six sets of doors, and arrangements are made so that they are very easily changed.

American Contracts in Russia.

Under the date of May 21, 1898, Ambassador Hitchcock writes from St. Petersburg that an order has been sent to the Baldwin Locomotive Works for sixty-five locomotives for the Manchurian railway, making a total of eighty Baldwin engines ordered for this railway within the last nine weeks and a total of 138 engines of this make sold to Russian railways within the last six months. The Imperial government has also awarded the Westinghouse Company a contract amounting to between $2,000,000 and $3,000,000 for the equipment of rolling stock of the Manchurian railway with Westinghouse air brakes. This contract will probably be duplicated in the near future. It appears that the Manchurian railway is entirely up to date in every particular, being equipped with the very best of American rolling stock.