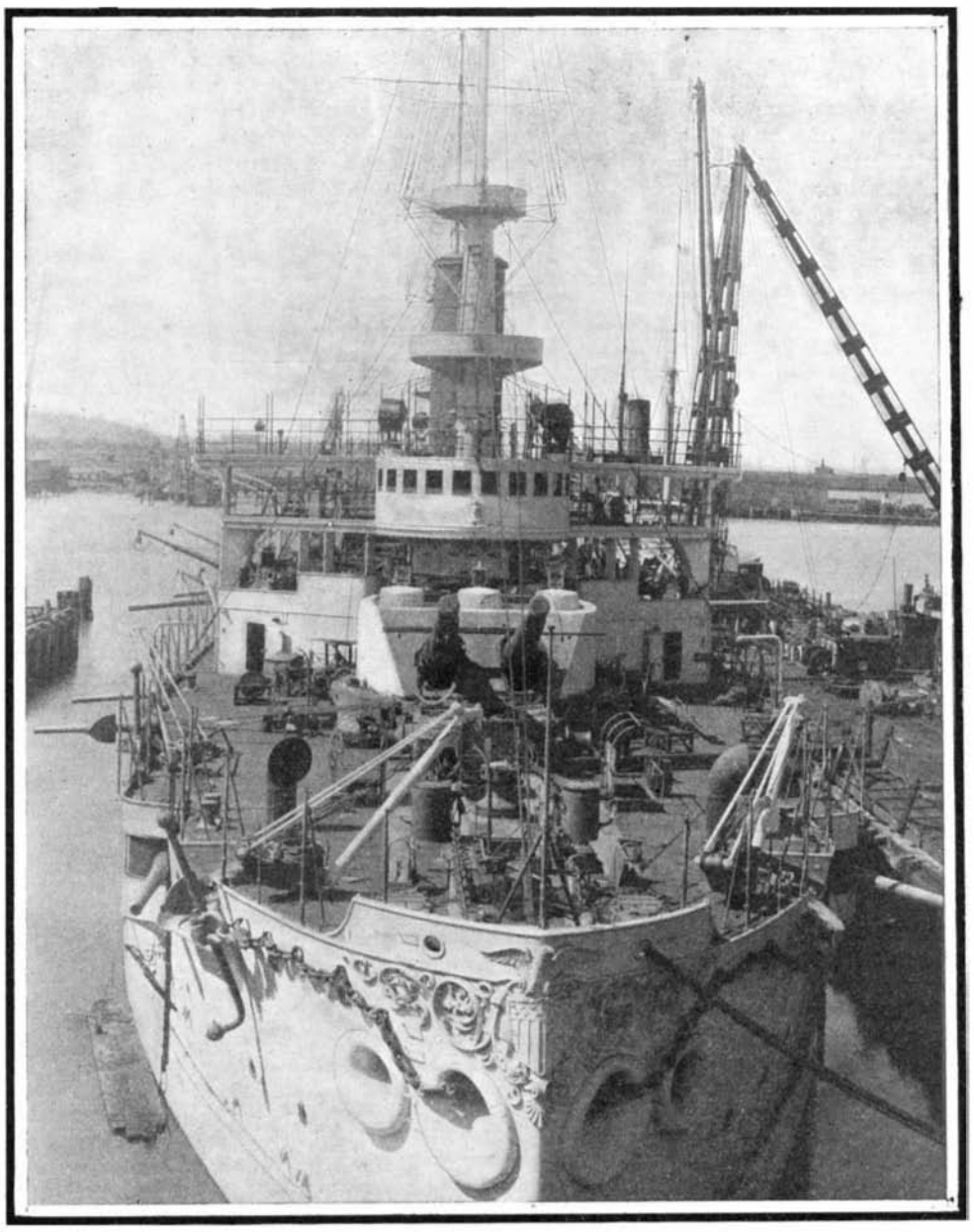
SPEED TRIAL OF THE BATTLESHIP "OHIO."

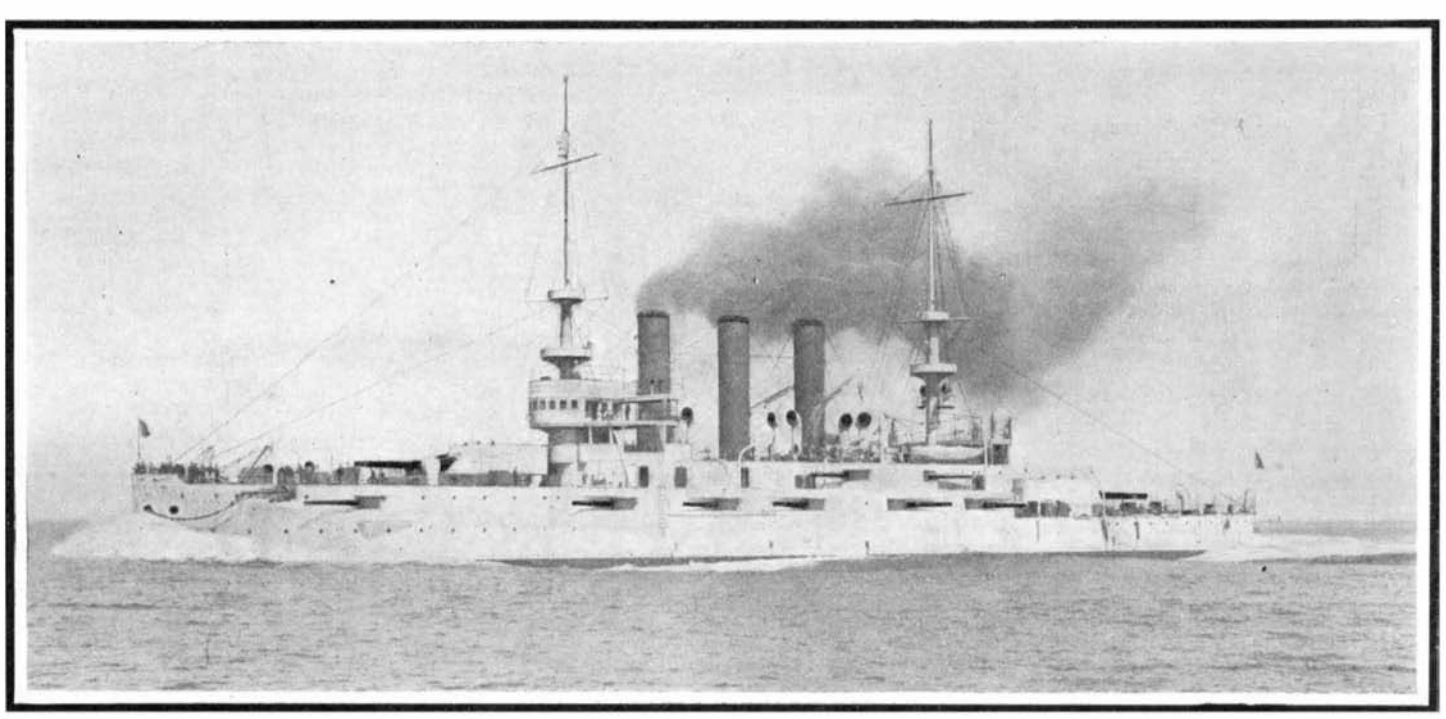
The battleship "Ohio," built by the Union Iron Works of San Francisco, received her speed trial at Santa Barbara, California, on Saturday, the 30th of July. Her actual record fell slightly below the requirements of an 18-knot speed, but it is thought probable that when allowances have been made for the tide it will be found that she made fully 18 knots and maybe a trifle more. The course lay from the Santa Barbara Lighthouse to a stake-boat 36 miles up the coast, and return. On the first leg of the course the "Ohio" fully met requirements, rounding the stake-boat with half a minute in her favor, but on the return both wind and tide were against her, and she lost a minute and a half. The trial was attended by Rear Admiral Whiting, who was the government's representative on board, and the builders were represented by Capt. Forsythe. The "Ohio" will probably be given another trial soon, when she is expected to make a better showing.

The battleship "Ohio" is one of the three powerful battleships of the "Maine" class, authorized by Congress on May 4, 1898. Although she was the first of her class to be launched (in May, 1901), she fell behind her sister ships the "Maine" and the "Missouri," which are both in commission, the former since December, 1902. The contract date of completion of the "Ohio" was originally set for June 5, 1901, so that she is over three years behind her contract.

The addition of the "Ohio" to our navy will greatly strengthen our position in the Pacific, for she belongs to the most powerful class of battleships we possess. It will be recalled that it was at first proposed to build these vessels on plans very similar to the "Alabama" class of battleships, which have a speed of about 16 knots per hour, or at least two knots below the average speed of foreign battleships. Owing to the storm of protest aroused by this proposition, it was decided to increase the speed of these vessels to 18 knots. Increased speed required the addition of twenty feet amidships to allow for the increased motive power necessary. This also made room for two more 6-inch guns in the broadside battery, and a larger coal capacity. The "Ohio" has a length of 388 feet, and a beam of 72 feet 3 inches, with a draft of 25 feet 6 inches. Her displacement when fully equipped for service and carrying her normal supply of 1,000 tons of coal will be 12,500 tons, and her full load displacement will be 13,941 tons. The normal displacement of the "Maine" is 12,300 tons, and of the "Missouri" 12,240 tons. The "Ohio," like the "Missouri," is equipped with Thornycroft boilers and twin-screw vertical triple-expansion engines. The "Maine," it will be recalled, is fitted with Niclausse boilers. The main armament of the "Ohio" consists of four 12-inch guns and sixteen 6-inch guns, and she is equipped with two submerged torpedo tubes. The armor of the "Ohio" consists of a water-line belt of Krupp steel, 11 inches thick at the top and 7½ inches at the bottom. The turrets containing the 12-inch guns have a thickness of 12 inches, and the 6-inch guns are protected by 8-inch armor. The protective deck is covered with 3-inch plate forward and 4-inch plate aft. All the joiner work above the protective deck is of fireproofed wood, and, whenever possible, light metal is used for gangways, bridges, and the like, so as to make the vessel thoroughly fireproof. The "Ohio" will have a complement of 699 officers and men.



DECK OF THE "OHIO."



THE "OHIO" MAKING SEVENTEEN AND THREE-QUARTER KNOTS.

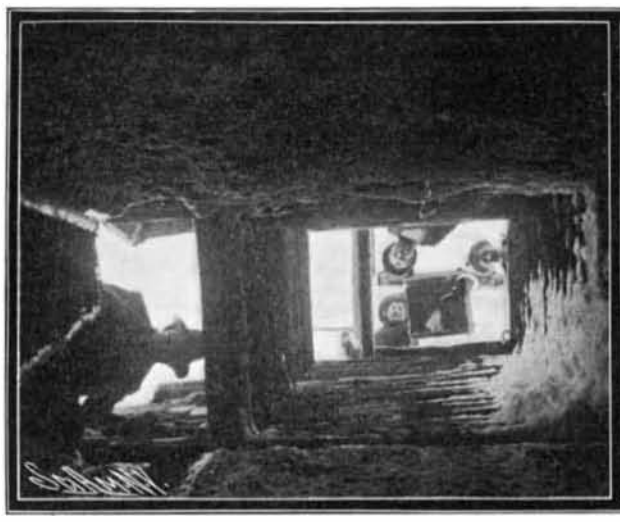
STRANGE SIGHTS IN THE FAR NORTH.

BY ARTHUR INKERSLEY.

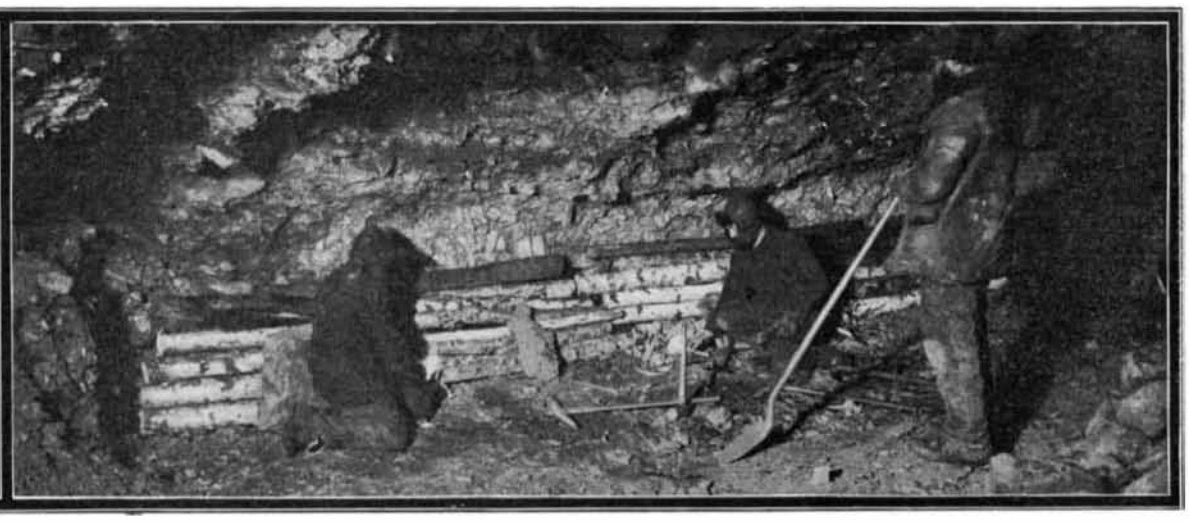
The long winter, the short summer, and the extreme cold are the conditions which are responsible for most of the strange things to be seen in the Klondike. In temperate or hot countries the process of extracting gold from a placer deposit is extremely simple—if the gold is there. A pick, a shovel, and a pan or rocker are all the implements the gold-digger needs on an Australian, South African, or Californian gold field, and, if the nuggets are large enough to be taken out by hand, the first two will suffice. But in the gold-bearing region of Alaska and the Northwest Territories, the extraction of alluvial gold is by no means so easy a process. Most of the placer deposits in that ice-bound region are in a frozen condition, and it is this fact that makes the extraction of the yellow metal there, as in Siberia, so laborious. After the miner has dug down to the depth of only one foot in many places, and in others to a depth of two feet below the surface, he strikes ground that is frozen solid and that remains so both summer and winter. Heat must be applied to soften the frozen ground before the digger can work it. "Burning down" through the frozen ground has been practiced for a long time in the gold fields of Siberia, where similar conditions exist. The process is conducted as follows: Over the prospect shaft, which generally measures three or four feet by six feet, a wood fire is made, the heat of which melts the soil to a depth of a few inches, or sometimes of a foot or more. The softened earth is shoveled out, another fire is built, and the operation is repeated until the gold-bearing stratum is removed. The fact that the material dug out of the pit must be hoisted to the surface by a buckct and windlass renders the process of sinking a shaft so slow and tedious that it taxes to the very utmost the patience and endurance of the most industrious miner. The better half of a season may be spent in "burning down" two or three prospect holes. The work is done chiefly during the winter, and the vertical prospect shafts are often united by lateral burning and picking. Not only is the work of tunneling through the frozen ground hard and tiresome, but the eager gold-seeker runs the risk of perishing, like a rat in a hole, from asphyxiation by the noxious gases generated in the process of burning. Many attempts have been made to devise a better method than wood-burning, the most successful of them being to thaw the ground by steam.

The first prospect in what seems to be a likely location is made with the gold-pan. If "colors" appear at first in small quantity and increase as bed-rock is approached, the prospector generally decides to take up the location. If a pan of the gravel when washed shows a few cents of gold, the claim is likely to turn out a valuable one. To use a gold pan properly requires some skill, the slow, rotary movement which produces the best results being very tiring to the wrist; while the rough motion adopted by some miners, either through inexperience or from a desire to make the work less fatiguing, causes the loss of some of the gold, which escapes in the washing.

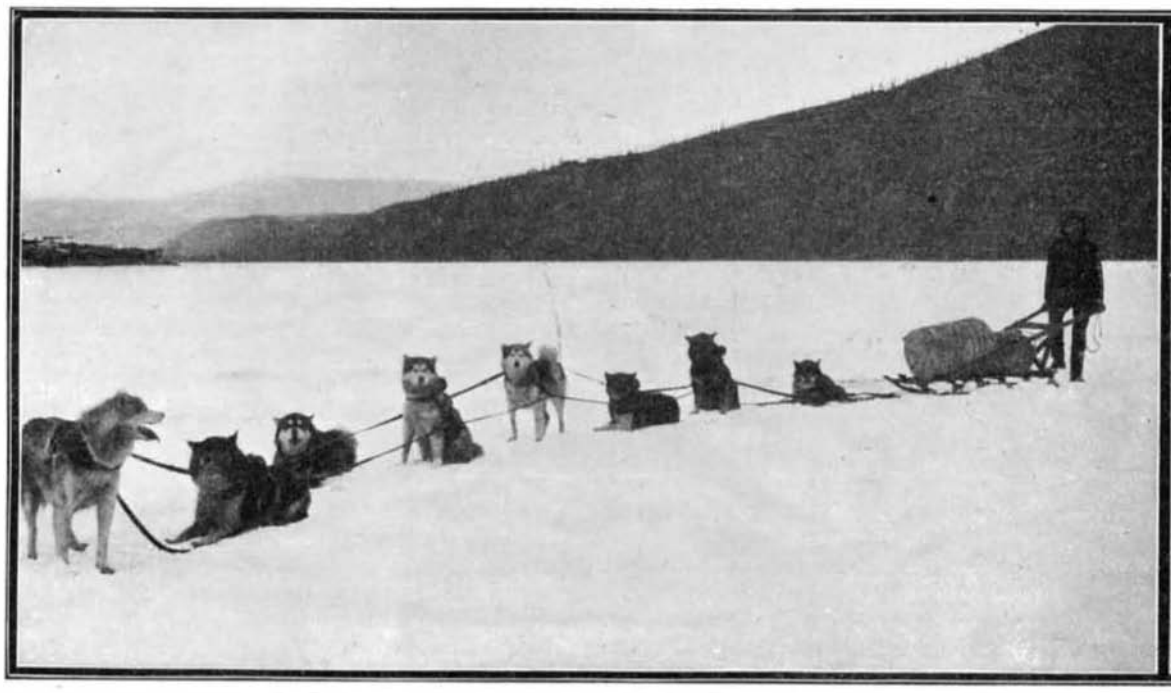
The miners, while digging prospect-holes in the Klondike region, have found from time to time bones which indicate that the animals inhabiting the Yukon region in prehistoric times were very different from those living there at the present day. In some of the creeks in the Klondike region great ivory tusks, evidently from an animal similar to the elephant or mastodon, have been discovered. The tusks vary in length from three to eight feet, some of the largest being ten to twelve inches thick. Though these remains are interesting scientifically, they are of no commercial value except as curiosities, the ivory having turned yellow from age and the long, severe frosts having cracked it so badly that it is of no use in the arts. These tusks are always found close to bed-rock, buried beneath the frozen gravel at a depth of ten to sixty feet. The miners bring them up to adorn their cabins. The tusks are much curved and on the under side are worn away, giving the impression that the great animals to whom they belonged fed on moss or swamp.



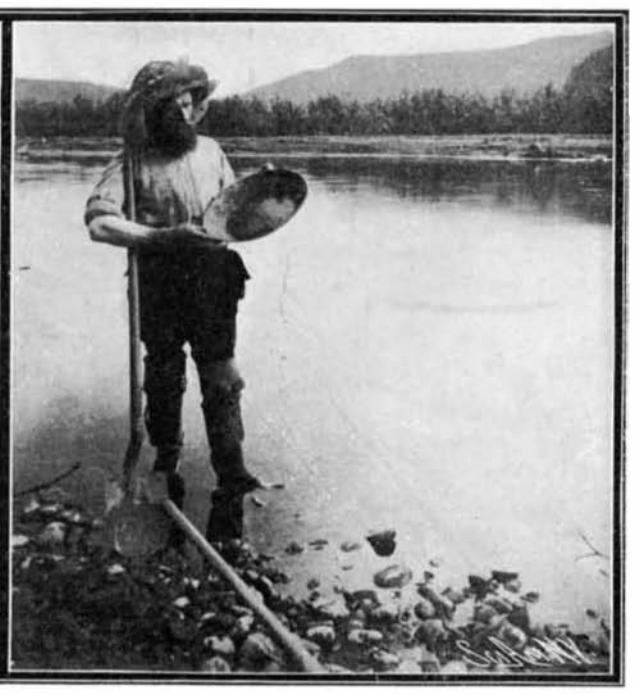
A Glimpse Down The Shaft.



"Burning-in" with a Wood Fire.



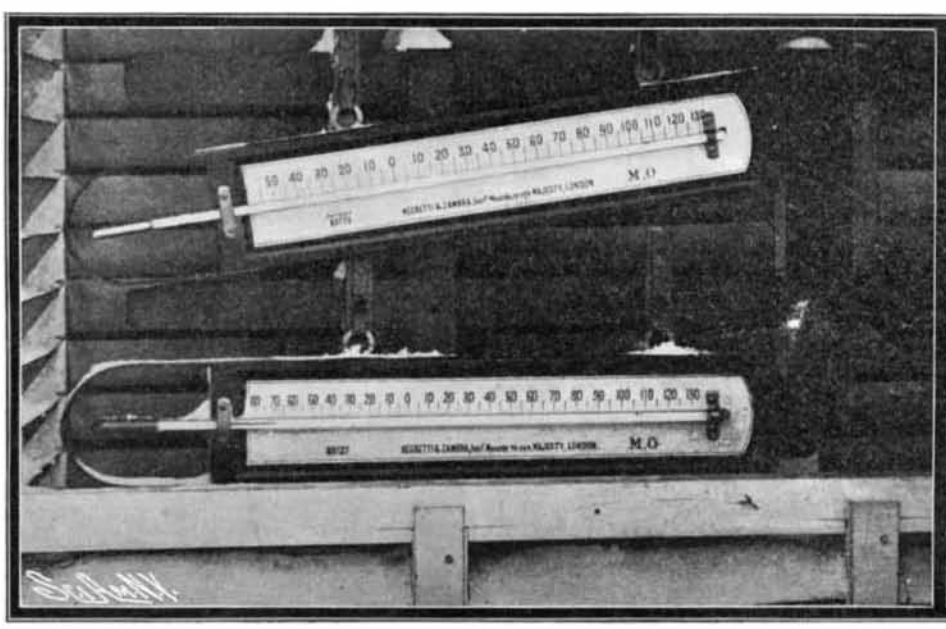
Team of Malamute Dogs and U. S. Mail Carrier on the Frozen River Yukon.



Panning Out.

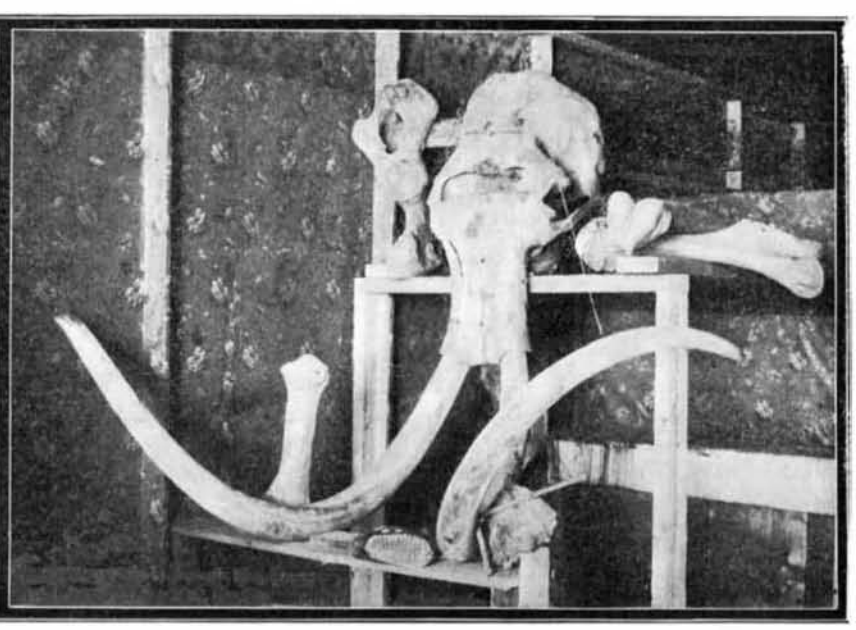
"Mushing."

Prospector and His Pack Dogs.



Photos by G. G. Cantwell.

Thermometer Registering 68 Degrees Below Zero.



Remains of a Mammoth's Skeleton.

STRANGE SIGHTS IN THE FAR NORTH.

grass and that the tusks slid along the surface in front of them as they moved. The mammoth remains shown in the photograph were found in the bottom of a mining shaft, 55 feet deep, on the Hunter Creek.

During the winter, when the river is closed to navigation, the native dogs of Alaska and the Northwest Territories furnish the principal means of travel. By the aid of teams of dogs harnessed to sleds, prospectors, mail-carriers, and others have accomplished long journeys that would have been impossible without them. In the fall, when the frost has begun to bind land and water in its icy grip, the gold seekers start in to carry their winter supplies up to the mines, and for this work dogs are indispensable. Teams of five, six, or more dogs are attached to sleds and draw heavy loads over the snow or the frozen surface of the rivers. During the summer the dogs generally have an idle time, but occasionally the miners, finding themselves short of some supplies, fasten pieces of sacking on the dogs' backs and load small packs on them. The weight of the pack varies according to the size and strength of the dog and may be as little as ten pounds or as great as forty to fifty pounds. The dogs pick their way through the swamps and among the rocks, showing by their carefulness that they are quite aware of the damage a bad fall might do to their packs. During the working season the dogs are fed on dried fish, the Indians near the mines doing quite a good business in summer catching salmon and drying it for use during the following winter. The price of salmon varies from about ten cents to a dollar per fish. A dog under ordinary circumstances eats two pounds of salmon per day, but if the fish cannot be obtained, is fed on bacon and rice cooked together, of which three to four pounds are required to feed him each day. It is the custom to feed the dogs only once during the twenty-four hours, and at night, as a dog, after he has been fed, becomes disinclined to work. Some few miners, kindlier than the rest, give each dog a small piece of fish at noon, but most men feed them only at night, giving them all they can eat at that time.

Specially-constructed instruments are necessary to register the extremely low temperatures of winter in the Far North, the ordinary mercurial thermometer becoming useless at 40 deg. below zero, as the mercury freezes at that temperature. In the early days of Dawson the only trustworthy thermometers in the camp were the property of the captain of the Northwest Mounted Police at the barracks. They were manufactured especially for recording very low temperatures. The minimum temperature registered during the winter of 1897-8 was 72 deg. below zero in a rather exposed place on the Klondike River, where the cold is some degrees greater than in the city of Dawson. Only one of the two thermometers shown in the accompanying photograph is capable of registering the temperature of 68 deg. below zero shown by it. In the other the spirit, disgusted at the extremely low temperature, has retired into its bulb, not to emerge for business again until the temperature shall have had the decency to rise to 60 deg. or 55 deg. below zero. The photograph was taken in Dawson on January 15, 1901.

Clearing Out Space.

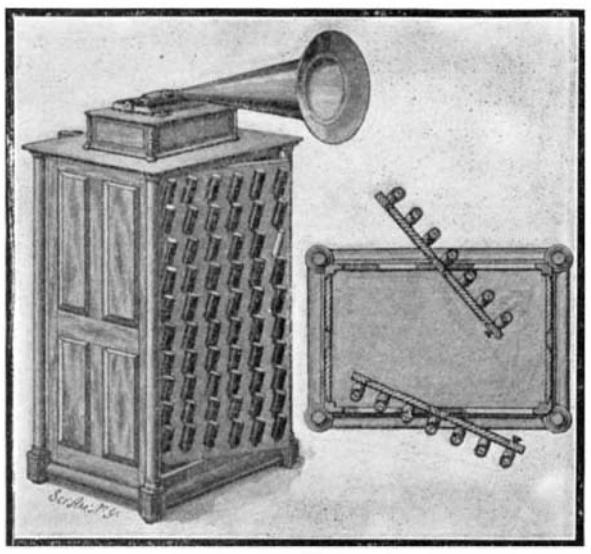
BY EDGAR L. LARKIN.

With a parallax of 0.021 sec. for the star Antares, as given by Sir David Gill, its distance in round numbers is one quadrillion miles. From photometric considerations. J. E. Gore, SCIENTIFIC AMERICAN SUPPLEMENT, No. 1474, page 23622, computes the mass to be 88,000 times that of our sun. An incredible quantity of matter must therefore have been drawn in from all adjacent space to build up its giant mass. This space should be, in the nature of the case, comparatively clear of matter. The fact is, that a wide region north of Antares, extending from northeast to northwest, for quite a distance, is about as void of stars as any known to the telescopist. With the 16-inch glass in this observatory, focal length 22 feet, and with a power of 200, many starless fields are encountered, and several with a wide eye-piece of power 132. These blackened and waste areas show no stars; or if any, they are at the extreme limit of vision in this splendid and pure mountain air. And in these dark expanses no trace of the delicate, pearl-white, shimmering background of the sidereal structure can be seen. Space is swept clean. The inference may be made that all the matter once in this wide area has been drawn in to build up the colossal sun Antares. And as that star is now in a region where there are others, a further deduction is possible, namely, that since formation, Antares has drifted southward. Sagittarius and Scorpio present many black fields without either star or the nebulous background which lies beyond the entire visible universe except in these dark openings, deeps, or caverns. There are at least one hundred starless fields in these constellations. One typical and most beautiful example is in right ascension, 18 h., and south declination 27 deg. 54 min. It is jet-black as seen here. The edges of the sidereal cistern are clear-cut, as though dug in glittering sand. To the east is a circle of small stars, in an intensely rich region. A theory is possible that the cluster of suns formed where the cavity now is, and then moved toward the east. Whether the shining base, or substratum of the entire sidereal structure is made up of quadrillions of suns, or whether the whole universe is immersed in nebulous matter, may never be decided. But the marvelous object is always visible in its majestic splendor, when the moon is absent. All nature is enshrouded in a cloth of pearl, except where these rents appear.

Lowe Observatory, Echo Mountain, California.

CABINET FOR STORING PHONOGRAPH RECORDS.

Phonograph records being ordinarily made of wax, are very fragile and must be preserved with consider-

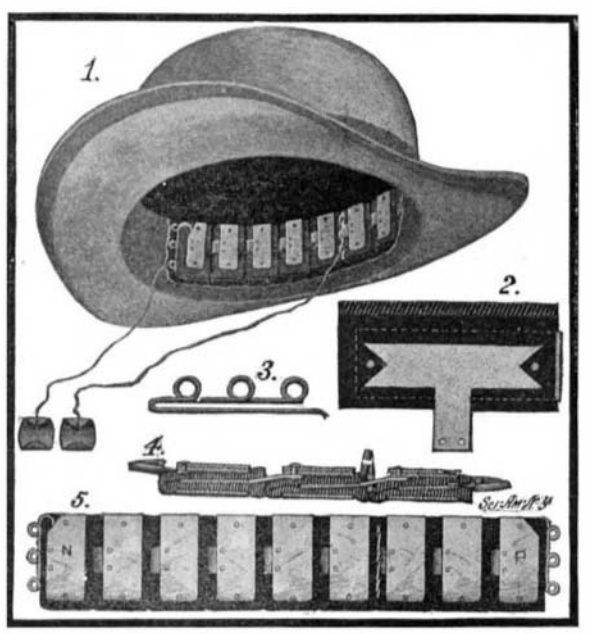


CABINET FOR STORING PHONOGRAPH RECORDS.

able care, and when many are to be provided for it becomes a matter of difficulty to do this and at the same time have them accessible for ready selection. We show herewith a cabinet invented by Mr. Edgar Krom, of 538 West 159th Street, New York city, which provides for the safe keeping of a large number of records. The cabinet is formed with two swinging doors pivoted centrally at the top and bottom. The inner face of each door is provided with a number of pins upwardly inclined, on which the records are supported. On the upper end of each pin is printed or written the name of the particular record thereon supported. The cabinet is preferably of such height as to furnish a convenient support for the phonograph. In use the cabinet will be preferably placed at sufficient distance from the walls of the room to permit swinging of either door upon its central pivots. When the doors are thus opened, all the pins and supported records may be seen, and any of the latter desired may be removed without disturbing the others. It will be seen that this cabinet provides for the storing of a great number of records in a comparatively small space, renders each freely accessible, and does away with any danger of injuring the one removed or those about it. At the same time it is comparatively inexpensive to construct, and furnishes an ornamental and convenient support for the instrument in connection with which the record is to be used.

MEDICAL BATTERY.

A convenient form of medical battery has recently been invented by George Francis Webb, M. D., of Geneva, Ohio, which may be conveniently carried about one's person. As an example of its convenient form we have shown the battery as carried within the sweatband of a hat. The battery cells are each made up of a strip of felt or flannel folded over on itself and enveloping a copper plate which forms the negative element of the battery; the positive element consists of a U-shaped zinc band which is slipped over the felt strip. A strengthening plate, also of zinc, is fitted under the upper arm of the U-shaped band, and together the two zinc strips are securely riveted to the felt strip. The copper plate is formed with a projecting stem as shown in Fig. 2, and in connecting up the cells of the battery this is bent up and riveted to the upper arm of the next cell of the series. Instead of binding-posts at each end of the battery, the inventor uses wire clips such as that shown in Fig. 3. The wire is bent to a U-shape with loops formed on one of the arms. The straight arm is fitted between the felt and the copper or zinc plate as the case may be, and wires are attached to the loops which also serve as handles for readily manipulating the device. Electrodes of the form shown are secured to the ends of the wires. They are made of aluminium, the metal being frosted so as to distribute the effect and also to present a neat appearance. In use the felt strips are saturated with a corrosive solution such, for instance, as salt water or water containing a small proportion of sulphuric acid. The current set up by the chemical action of the corrosive solution on the metal plates may then be conducted by means of the electrodes through the diseased organ or part. To increase or diminish the electromotive force it is not necessary to disengage the wire, for the wire clip may be moved into engagement with any one of the stems of the copper plate, as indicated by Figs. 1 and 4.



MEDICAL BATTERY.

Calcareous Bricks in Germany.

There are as yet no factories for the production of sand-lime bricks within the limits of this district, though many have been erected in Germany within the past few years. There does not seem to have been uniform success in the production of sand-lime bricks in Germany. In a recent number of the Thonindustrie-Zeitung reasons for this non-success are freely discussed, and may be summarized as follows:

So many plants have been suddenly erected that bad results have grown out of the lack of proper experience in handling, rather than out of defective equipment. The main causes for defective products are inexperience in slacking lime and in mixing the mortar. Good white lime and clean, sharp sand are necessary for good results. The product is rarely spoiled in the mere pressing and drying. Naturally that brick will be best which is pressed the hardest, but the customary presses are entirely adequate; hence, the two reasons above assigned alone remain. In handling sand-lime bricks one frequently finds in them clods of clay the size of a filbert that naturally destroy their value, which depends upon so perfect a mixture that no lumps remain and every grain of sand has its coating of lime. Imperfectly slacked lime is even more detrimental. The process of slacking greatly increases the volume of the article, and if insufficient water be added in the process, absorption of moisture from the atmosphere takes place after the brick is made, expanding it and causing seams or cracks in it. Such cracks may be too small for ordinary detection, yet the defect is nevertheless a serious one. It is best to use in slacking, sufficient water to produce a soft, mushy powder, damp enough to admit of balling, but the plan of allowing the mixture to rest in the bed for at least twenty-four hours, instead of at once feeding it to the press, is the safest. Little differences in composition are thus equalized and the mixture becomes more pliable and plastic.—Hugo Muench, Consul at Plauen, Germany.

The Current Supplement.

The current SUPPLEMENT, No. 1493, opens with the conclusion of Emile Guarini's article on the electrometallurgy of iron and steel. Many illustrations of plants actually in operation accompany the text. Mr. William R. Hill, formerly engineer of the Aqueduct Commission of New York, tells something of the modifications of the plans in the new Croton Dam. Dr. Wiley's exhaustive paper on the results of his borax experiments is concluded. Mr. E. A. S. Whitford describes a new design of reinforcement for concrete steel girders. The St. Louis Exposition is represented in the number by two articles of widely different nature, the one on the Tyrolean Alps, the other on the Curtis steam turbine. Both articles were prepared by a representative of the SCIENTIFIC AMERICAN at the fair. "The Chemistry of Cottage Cheese" is the title which Mr. F. H. Hall has selected for a very instructive article. Mr. Charles H. Stevenson, whose articles on the aquatic industries have doubtless attracted no little attention, writes on oil from the livers of sharks and related species, and on beaver furs. T. H. Blakesley, M.A., in an article on direct-vision spectroscopes, writes in a scientific vein. His article will doubtless be appreciated at its true worth by students of chemical physics. The succession of changes in radio-active bodies is made the subject of some comment.