THE FARTHEST NORTH.

Lockwood and Brainard, of the Greely expedition, on May 13, 1882, reached a higher latitude than had ever before been attained in that quest to reach the pole which has tempted ambitious explorers for over three hundred years. Since that time their record, 83 degrees 24 minutes, has stood as the nearest approach to the pole yet made by man. Now Dr. Fridjof Nansen, a Norwegian, has attained the higher latitude of 86 degrees 14 minutes. Most of the details of this last expedition were given in last week's SCIENTIFIC AMERICAN, but we are now able to add some further particulars, together with a map showing the explorer's route. In a signed statement published in the London Chronicle Dr. Nansen says:

"On March 3 we reached 84 degrees 4 minutes north. Johansen and I left the Fram on March 14, 1895, at 83 degrees 59 minutes north and 102 degrees 27 minutes east. Our purpose was to explore the sea to the north and reach the highest latitude possible, and then to go to Spitzbergen via Franz Josef Land, where we felt certain to find the ship. We had twenty-eight dogs, two sledges and two kayaks for possible open water. The dog food was calculated for thirty days and our provisions for one hundred days. We found the ice in the beginning tolerably good traveling, and so made good distances, and the ice did not appear drifting much. On March 22 we were at 85 degrees 10 minutes north. Although the dogs were less enduring than we hoped, still they were tolerably good. The ice now became rougher and the drift contrary. On March 25 we had only reached 85 degrees 19 minutes north, and on March 29, 85 degrees 30 minutes. We were now evidently drifting fast toward the south. Our progress was very slow. It was fatiguing to work our way and carry our sledges over the high hummocks constantly being built up by the floes grinding against each other. The ice was in strong movement and the ice pressure was heard in all directions.

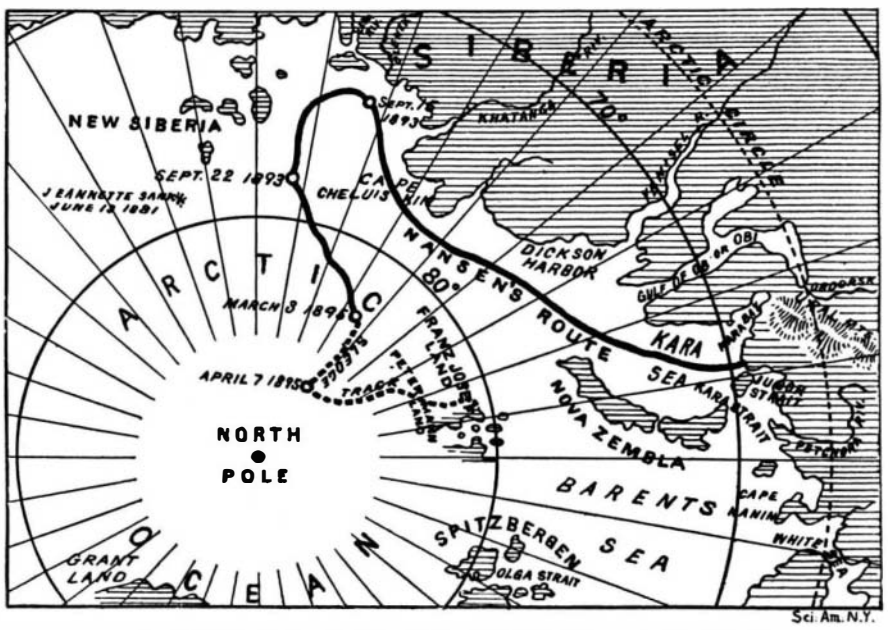
"On April 3 we were at 85 degrees 50 minutes north, constantly hoping to meet smoother ice. On April 4 we reached 86 degrees 3 minutes north, but the ice became rougher, until on April 7 it got so bad that I considered it unwise to continue our march in a northerly direction. We were then at 86 degrees 14 minutes north. We then made an excursion on skis further northward in order to examine as to the possibility of a further advance. But we could see nothing but ice of the same description, hummock beyond hummock to the horizon, looking like a sea of frozen breakers. We had had low temperature and during nearly three weeks it was in the neighborhood of 40 degrees below zero. On April 1 it rose to 8 degrees below zero, but soon sank again to —38. When a wind was blowing in this temperature we did not feel comfortable in our too thin woolen clothing. To save weight we had left our fur suits on board ship. The minimum temperature in March was —49 and the maximum was —24. In April the minimum was —38 and the maximum —20 degrees. We saw no sign of land in any direction. In fact, the floe of ice seemed to move so freely before the wind that there could not have been anything in the way of land to stop it for a long distance off. We were now drifting rapidly northward. On April 8 we began our march toward Franz Josef Land. On April 12 our watches ran down, owing to the unusual length of the day's march. After that date we were uncertain as to our longitude, but hoped that our dead reckoning was fairly correct. As we came south we met many cracks, which greatly retarded our progress. The provisions were rapidly decreasing. The dogs were killed one after the other to feed the rest.

"On May 31 we were in 82 degrees 21 minutes north and on June 4 in 82 degrees 18 minutes north, but on June 15 we had been drifted to the northwest to 82 degrees 26 minutes north. On July 22 we continued our journey over tolerably good snow. On July 24, when about 82 degrees north, we sighted unknown land at last, but the ice was everywhere broken into small floes, the water between being filled with crushed ice in which the use of the kayaks was impossible. We therefore had to make our way by balancing from one ice piece to another, and we did not reach land until August 6, at 81:38 north and 63 degrees east longitude.

"On August 26 we reached a spot in 81:13 north and 65 east, evidently well suited to wintering, and as it was now too late for the voyage to Spitzbergen, I considered it wisest to stop and prepare for winter. We shot bears and walruses and built a hut of stones, earth and moss, making the roof of walrus hide tied down with rope and covered with snow. We used the blubber for cooking, light and heat. The bear meat and the blubber were our only food for ten months. The bear skins formed our beds and sleeping bag. The winter, however, passed well, and we were both in perfect health. Spring came with sunshine and with much open water to the southwest. We hoped to have an easy voyage to Spitzbergen over the floe of ice and the open water. We were obliged to manufacture new clothes from blankets and a new sleeping bag of bear skin. Our provisions were raw meat and blubber. On May 19 we were at last ready to start. We came to open water on May 23, in 81:05 north, but were retarded by storms until June 3. A little south of 81 degrees we found land extending westward and open water which reached west-northwest along its north coast. But we preferred to travel southward over the ice through a broad sound. We came on June 12 to the south side of the island and found much open water trending westward. We sailed and paddled in this direction in order to proceed across to Spitzbergen from the most westward cape, but Payer's map was misleading." Dr. Nansen's account concludes as follows:

"We left Franz Josef Land in the steamer Windward on August 7 and had a short and very pleasant passage, thanks to the masterly way in which Captain Brown brought his ship through the ice, and thence in the open sea to Vardoe."

On August 20 word was received of the safe arrival of the Fram at Skjervoe, near the North Cape. After Dr. Nansen left her she drifted nearly two degrees northward, to 85° 57'. The deepest sounding taken by the Fram was 2,185 fathoms, and the lowest temperature recorded was 52° below zero. It is stated that on August 14 the Fram called at Danes Island, where a visit was made to M. Andrée, who is attempting to reach the pole by means of a balloon, but who had not yet made his ascension.



MAP SHOWING ROUTE OF NANSEN'S POLAR EXPEDITION.

September 15, 1893—Where Nansen was to have received a supply of dogs, but decided not to lose time by stopping.
September 22, 1893—The Fram was closed in by the ice at this point, and began her drift northward.
March 3, 1895—Where Nansen and Johansen left the Fram for their sledge journey.
April 7, 1895—Nansen's farthest north, 86 degrees, 14 minutes.

CYCLE TELEGRAPHS IN WAR.

As is well known, electrical communication plays an important part in the warfare of to-day, a part that emphasizes the necessity of developing it to the highest degree of efficiency for armies operating upon a base apart from a commercial telegraph system. Special attention has been given by the Signal Corps of the United States Army to provisions for temporary telegraphic or telephonic intercommunication. Flying telegraph trains equipped with the most modern appliances are located at several government stations in the West. Among pending experiments are those pertaining to insulators, wire, batteries and the most important one of the naked wire telephone.

The question of the reeling out and recovering of wire and outpost cable by bicycle, automatically, has come in for a considerable share of attention, and the results have been very satisfactory. The Signal Corps has now a bicycle equipped with an automatic reel that works perfectly. The attachment was made in San Antonio, Texas, under the supervision of its inventor, Captain R. E. Thompson, of the Signal Corps. The line was laid out and recovered at a moderate rate on the day of the first test. The speed was gradually increased, and it was found that the wire was paid out quickly. After dismounting for a moment to reverse the action, the officer began a return trip, keeping in the middle of the road and riding hard. The recovery was perfectly made, the wire being spooled evenly and the tension was at no time troublesome, although the course of the line was occasionally departed from by many feet, showing that the problem of compensating for increased speed of the recovery due to increasing bulk of the spool has been solved. The time occupied in running out and then picking up the reel of wire was two minutes, the reel holding about one-third of a mile of cable. Practical use has been made of the equipment in sending messages at other times than on the trial trip.

We present an engraving of a device for the same purpose which has been invented by a German who is at present living in London, Mr. Leo Kamm. This is a cycle for laying wires for military purposes. It consists of an ordinary pneumatic tired safety provided with two or three drums of wire of about four inches in diameter. On each of the spools is wound a twisted wire composed of fine steel threads. Each reel carries a mile of wire. The wire passes over a wheel connected with a telegraph receiver. As the rider travels, the rotation of the bicycle unwinds the wire from the drum, leaving it on the ground. The bell rings before the wire is entirely paid out from the drum. When it is desired to send a message to the starting point, the rider dismounts and fixes in the ground an earth rod which is carried for that purpose. The apparatus for laying the wire weighs 7 lb., and each mile of wire weighs 10 lb. This machine was actually employed at the recent Aldershot maneuvers. It was also shown at the military tournament at Agricultural Hall.

TELEGRAPH LAYING CYCLE.

The Storing of Dry Plates.

Ever since the dry plate has been commercially used, defects or deterioration due to the packing of plates have become known. It was found chemicals in the paper separator strips, combined with the moisture of the atmosphere, acted on the film, producing a developable fog. Mr. A. L. Henderson, in a paper lately read before the London and Provincial Photographic Association, described a series of experiments he had made, and came to the conclusion that paper was unsafe as a receptacle for holding plates. His recommendation is that plates be separated by strips of tinfoil and stored in metal boxes, a suggestion which seems feasible in view of the facility which the X rays have of passing through paper. There appears to be a phosphorescent action from paper on the film, as well as chemical, according to the results of his experiments.

THIS year's recruits for the Russian army numbered 270,000, which is considerably more than the whole British army.

More About Strange Explosive Sounds.

BY A. S. HOOKER.

The recent article in the SCIENTIFIC AMERICAN on "Barisal Guns and Mist Pouffers" is worthy of the journal that, since my boyhood, has given so many interesting articles on the mysterious and unexplained things in nature, to the delight and wonderment of thousands of readers. These curious explosive sounds, called "guns," while not all of the same origin, take strong hold on the superstition and the wonderment of mankind. That beautiful sheet of water, Seneca Lake, in the State of New York, has achieved quite a local reputation for its mysterious "lake gun." A writer in Mrs. Stephen's Monthly, in 1857, speaks thus: "The lake gun is a mystery. It is a sound resembling the explosion of a heavy piece of artillery, that can be accounted for by none of the known laws of nature. The report is deep, hollow, distant, and imposing. The lake seems to be speaking to the surrounding hills, which send back the echoes of its voice in accurate reply. No satisfactory theory has ever been broached to explain these noises."

In my work on "Great Earthquakes," it is related, page 123, that long after the earthquake of "November 16, 1827, in New Granada, subterranean detonations were heard in the whole valley of Cauca during twenty or thirty seconds, without any perceptible vibration."

"One of the most remarkable of these 'earth bellowings' is that described by Humboldt as occurring in the elevated Mexican plateaux, called by the inhabitants the 'roaring and subterranean thunder (bramidos y truenos subterraneos) of Guanaxuato.' Far from any active volcano, the noise began about midnight of January 9, 1784, continuing for a month.

"From the 13th to the 16th of January it seemed to the inhabitants as if heavy clouds lay beneath their feet, from which issued alternate slow rolling sounds and short, quick claps of thunder. The noise abated as gradually as it had begun."

At Moodus, near East Haddam, near the mouth of the Connecticut River, every few years a succession of explosive sounds are heard, which have received the name of "Moodus noises," and are noted as far back as 1728 and as recently as two years ago. In the former year, Rev. Mr. Prince said: "I have myself heard eight or ten sounds successively, and imitating small arms, in the space of five minutes. Oftentimes I have observed them coming from the north, imitating slow thunder, until the sound came near or right under, and then there seemed to be a breaking, like the noise of a cannon shot, or severe thunder, which shakes the houses and all the people that is in them."

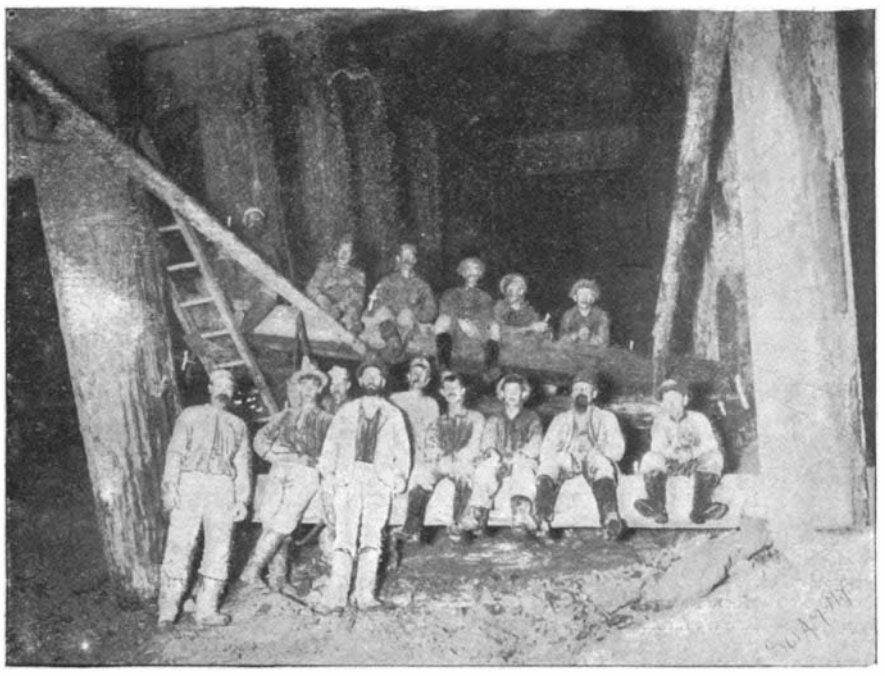
C. Barrington Brown, in his explorations in British Guiana, 1868–72, says: "As we were on the point of leaving the landing to descend the Issano, we were all startled by a heavy booming sound, resembling the distant discharge of a heavy piece of artillery. The sun shone brightly at the time, and not a cloud was to be seen in the sky. On making inquiries, I learned from the Indians that these sounds were frequently heard at this place, and are supposed to have their origin in the mountains to the south."

In 1874, Bald Mountain, in North Carolina, gave forth a series of sounds of a startling nature, loud and explosive, seemingly from its interior, and succeeded by shakings of the earth, and the inhabitants thought it was about to break forth into a volcano.

"Four years later, about May 25, 1878, the residents of the mountain, especially a section of the 'Bald' about four miles away from the first manifestation, were startled by sudden movements of the earth, and loud rumbling and crackling noises, with sudden movements in the mountains, and the wildest reports were spread abroad by telegraph and rumor. The newspapers announced, with startling headlines, that Bald Mountain had suddenly become a volcano, and it was some time before the 'volcano' was resolved into ordinary forest fires, and the noises into subterranean sounds, produced by the sliding and breakage of the tilted-up strata of the mountain, near where, a century before, there had been an extensive slide, when a portion of the mountain a quarter mile wide had moved down 500 feet. Now violent explosive sounds, crashing and rumbling noises, and shakings of the earth occurred. Fissures opened in various directions, splitting the steep wall of the mountain in various places. One of these large fissures extended along the 'Bald,' almost at the top, for over 300 feet southeasterly, then turned south and ended a hundred feet farther. The surface opening is from 2 to 6 feet wide, and is entered by two funnel shaped holes, and extends downward in some places 70 feet. The sides are of gray granite, with nowhere a greater width than 8 feet. New cracks were discovered almost every week, running through sections of solid granite."—Great Earthquakes, pages 127, 128.

A cave of large size was discovered under the mountain, and a writer for the New York Herald described the tilted-up and almost perpendicular strata as "large flakes of rock 80 feet high by 50 feet wide and 10 inches thick," and thinks the fall and sliding of these rocks the cause.

DR. LUDWIG MOND, of London, has given to the Royal Institution the freehold of No. 20 Albemarle Street, adjoining the building of the Royal Institution in London, and has also equipped and endowed it to be known as the "Davy-Faraday Research Laboratory of the Royal Institution." It is to be freely open to a limited number of persons who have already done original scientific work or are fitted to do it, without reference to nationality or sex. The laboratory is one of the finest in the world, and Dr. Mond's generosity cannot fail to result in the facilitation of important researches. The directors are Lord Rayleigh and Professor Dewar.



IN THE HOMESTAKE MINES, LEAD CITY, SOUTH DAKOTA.

THE HOMESTAKE GOLD MINES AND STAMP MILLS, SOUTH DAKOTA.

In the native state gold is found crystallized, more commonly in the form of the cube or in plates, ramifications or nodules, commonly known as nuggets. It is generally alloyed with silver and sometimes with tellurium, bismuth, lead, etc. It very frequently occurs in small quantities in metallic sulphides, as in iron, galena and copper pyrites. The alloys, or its combinations with other metals, are very numerous, those with copper and mercury being the more numerous and most important. Gold and copper are found combined in all proportions without materially affecting the color of the former, except that it is somewhat redder. The density of the compound is much less than that of gold, but the hardness is greater and it is more fusible. The extraction of gold is effected more by mechanical than by chemical process.

In its compact state gold possesses a characteristic yellow color of high metallic luster, is nearly as soft as lead, and is the most malleable of all metals. It can be beaten into leaves of a thickness not exceeding $\frac{1}{200000}$, or according to some estimates $\frac{1}{280000}$ of an inch, through which light passes with a green tint. One grain may thus be distributed over 56 square inches of surface. The supreme ductility of the metal is such that the same quantity may be drawn out into 500 feet of wire.

It fuses at 2,016 degrees, and when in this state is of a bluish green color. It is not at all volatile in the heat of the furnace, but by a powerful electric discharge, by the concentration of the sun's rays by a powerful sun glass, or by the oxyhydrogen jet, it is dispersed into purple vapors. Gold has little if any affinity for oxygen.

It undergoes no change on exposure to the atmosphere, and is not affected by hydrochloric, sulphuric or nitric acid, or by any simple acid except selenic acid; nor do the alkalies affect it. It is however dissolved by any mixture which liberates chlorine. Its usual solvent is aqua regia, which is prepared by mixing one part of nitric acid with four parts of hydrochloric acid. For heat and electricity gold has been found to be one of the most perfect conductors.

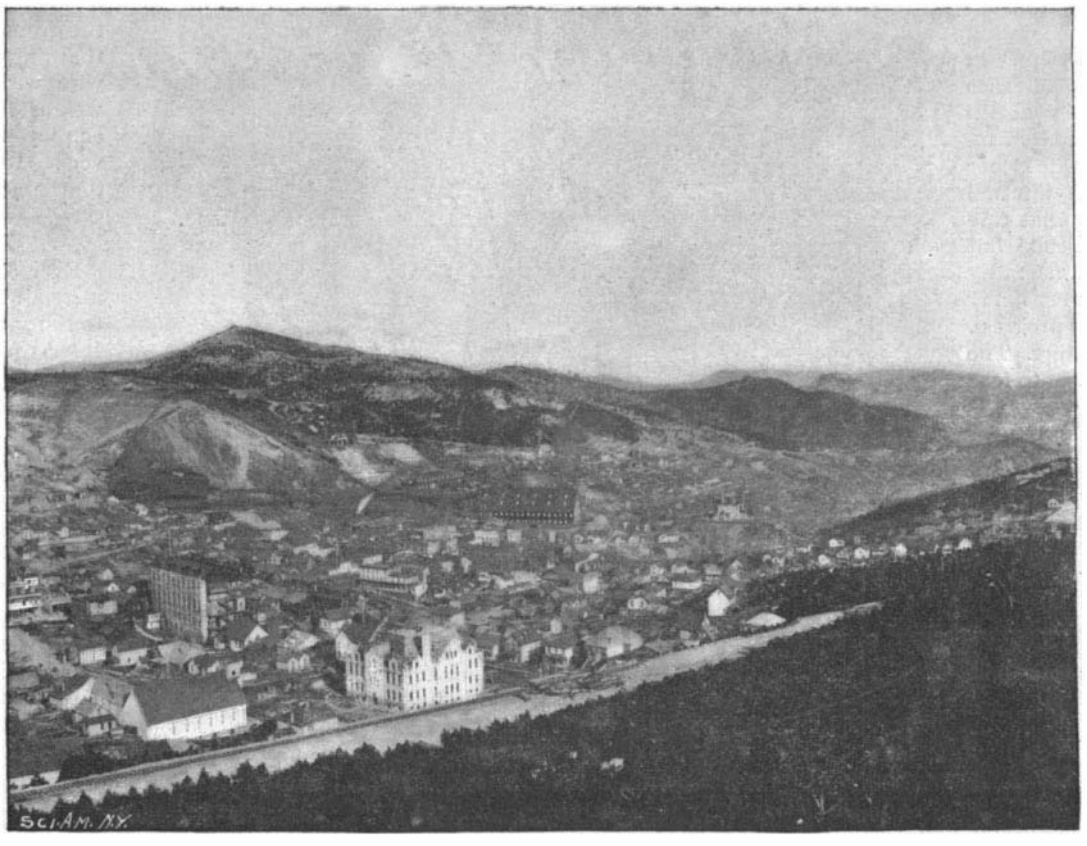
The specific gravity of this metal is less than that of iridium or platinum, ranging from 19·2 to 19·4.

One kind of gold crushing is done by means of large cast iron rollers, which break the auriferous quartz as it passes between them. The more common form of crusher is the stamp mill, with iron-shod piles of wood, worked by an axle with projecting cams after the fashion of the flint mill. The ore pounded by the stamp is washed, and for doing this there is an endless variety of contrivances. In one of the richest quartz districts of Dakota, it is carried by a steady current of water over coarse woolen blankets laid on inclined boards. By this means the lighter particles of quartz are carried away and the gold, which of course is the heaviest, becomes entangled in the fibers of the wool. The blankets are changed and washed each day.

The gold contained in these drifts and in the stamped quartz is recovered by amalgamation, and the mercury is afterward distilled off in a retort, leaving the gold chemically pure.

At Lead City, Dakota, are the celebrated gold mines known as Homestake, which form the subject of the accompanying illustrations. The ore bodies mined here have an average width of from two hundred and fifty to four hundred feet, and penetrate into the bowels of the earth to an unknown depth. Six hundred stamps, crushing 20,000 cubic feet of ore every twenty-four hours, drop incessantly day and night in the six mills without intermission, even Sundays.

The Black Hills, Dakota, are seamed with veins of ore-bearing rock which will return $35 to $175 in gold to the ton of ore stamped. But unfortunately the ore is refractory, and cannot be treated by the ordinary process of amalgamation. Only recently it has been discovered that by a process



LEAD CITY, SOUTH DAKOTA.