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ADVANCE OF POLAR EXPLORATION.

The expedition of Lieut. Peary for the exploration of North Greenland, which left New York June 6 last year, accomplished one of the most successful Arctic trips ever made, and arrived at St. Johns, Newfoundland, on its return, September 11. The surprisingly short time in which the expedition was made, and its small cost, as compared with previous Arctic voyages, are especially notable, for it will be remembered that the explorers consisted only of Lieut. Peary and his wife, and five men, taken out by the Kite, a small and stanch steam vessel, and left, in August last, at a depot established on McCormick Bay, on the west coast of Greenland, * at 77° 20' north latitude.

The plan of Lieut. Peary's expedition was based upon the theory that nearly the whole interior of Greenland is covered with an uninterrupted ice cap, nearly or quite co-extensive with the land, and his idea was that the northern terminus of Greenland is not north of the 85th parallel of latitude. On this ice plateau he proposed to make his journey to the far north, traveling on skiers or Norwegian snow shoes, and dragging sledges, starting on the journey with the northward movement of the sun in the spring. His experience was entirely confirmatory of his previous conjectures.

During September and a part of October the little party made themselves as comfortable a home as possible in preparation for the cold and storms of the long Arctic night, at the beginning of which they had a supply of thirty-one reindeer, several seals and walrus, and hundreds of birds in the larder, with a warm, snug house to shelter them. Natives came and settled near them, and the winter passed rapidly, there being in the middle of February a furious rain storm during which the temperature rose to 40° Fah. During March and April the temperature ranged at 40° to 50° below zero, and up to May 15 the time was occupied in removing the inland ice supplies and equipment to the top of the ice cap at the head of McCormick Bay, at an elevation of some 4,000 feet.

The real start over the ice cap was made on May 15, Lieut. Peary and Astrup, the Norwegian, going together, and leaving the others of the party as supports in charge of the stores, etc. On May 24, the edge of the great basin of the Humboldt Glacier, about 130 miles away, was reached. At midnight of May 31, Petermann Fiord was seen from the edge of its great glacier feeder basin, and eight days later was seen the land at the head of St. George's Fiord, two weeks longer being required, owing to storms, fogs, crevasses and steep ice slopes, to weather the feeder basins of the St. George's and Sherard Osborne glacier system. On June 26, at the 82° parallel, land confronted the explorers to the north and northeast and east, so that their course was deflected to the southeast, and on July 4, after three days' travel overland, a great bay was reached, opening out east and northeast, in latitude 81° 37', longitude 24°. It was named Independence Bay, in honor of the day, and a great glacier flowing north into it was called Academy Glacier. The land around the bay was red and brown in color, almost entirely free of snow, and covered with glacial debris, flowers, insects, musk oxen and game being abundant. On July 9, the explorers started to return, taking a more inland route, and in seven days were struggling through snow and wrapped in snow clouds at an altitude of over 8,000 feet on the great interior plateau, from which they descended to the east of Humboldt Glacier. In seven days more, traveling at the rate of thirty miles a day, McCormick Bay was reached, the explorers there meeting Prof. Heilprin and his party of the Greenland Relief Expedition sent out this year. The journey of 1,300 miles over a portion of Greenland never hitherto covered was at an end.

Perhaps the most unfortunate feature of the expedition was the loss, a few days later, of young John M. Verhooff, a promising mineralogist, who, in what was intended as a brief geological trip, a few days before the return, is supposed to have perished in one of the numerous glacier crevasses. In the words of Lieut. Peary, "With the exception of this sad accident, the expedition has been throughout most fortunate, and has carried out almost to the letter the original programme. The convergence of the Greenland coasts above the seventy-seventh parallel, the deflection of the main divide to the northwest above the same parallel, the termination of the continental ice cap below Victoria Inlet, and the existence of large glaciers in all the great northern fiords are among the discoveries. The expedition brings back much ethnological material, including tents, costumes, sledges, kayaks and dogs of the northern Eskimo, meteorological and tidal observations, and a large number of photographs of natives, dwellings and costumes, and Arctic scenery."

There seems to be but little room now for doubt as to the extent and direction of the Greenland coast, the northern limit of which was probably reached by Lockwood and Brainard in 1882, at 83° 24' north latitude.

* Full particulars of the equipment of the expedition, and what it proposed to accomplish, are given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 808.

tude. When Peary started homeward from Independence Bay he was less than two hundred miles southeast of this point, and had for four days paralleled the coast in a southeast direction. The unexplored region stretching to the pole from the north of Greenland, where the nearest approach to the earth's northern axis has been made, includes a distance of about 450 statute miles; from Petermann Land and Spitzbergen, lying to the north of Europe, the distances to the pole are respectively about 500 and 560 miles, while toward Asia the Henrietta Islands, discovered by De Long, are some nine hundred miles distant from the pole. The great Arctic Ocean, still practically unexplored, stretches nearly two thousand miles from Spitzbergen to Alaska, and some fifteen hundred miles from Greenland to New Siberia.

A New Bleaching Process.

In the *Faerber Zeitung* a short description is given of a new bleaching medium for silk and wool, or for fabrics containing those fibers. This new compound is sodium superoxide, which would probably be represented by the chemical formula Na_2O_2 , and is analogous to barium and hydrogen peroxides in its properties. All these bodies bleach by virtue of their containing an excess of oxygen ready to act upon any coloring matter with which it may come in contact. The advantage which the new sodium superoxide has over the old peroxides can be seen when the amount of active oxygen contained in each is compared. Hydrogen peroxide of the usual twelve volume strength contains 1.5 per cent of active oxygen; barium peroxide contains 8 per cent, while the new sodium superoxide contains 20 per cent. It is sent out in the form of a white powder, readily soluble in water to a strongly alkaline solution, which, on adding acids, forms a clear neutral liquid containing peroxide of hydrogen. This can be used for bleaching by the ordinary well known bleaching processes. A method of working consists in taking from 10 to 30 per cent of the sodium superoxide, adding 30 per cent of Epsom salts, the percentages being of the weight of the fiber which is being bleached. For wool and ordinary silk, about 10 per cent will be required; for tussur silk, 30 per cent, on account of the darker color of the fiber. It takes from two to three hours to bleach with this new material, a much shorter time than is required for peroxide of hydrogen, while the bleach is just as effective. It is rather hygroscopic, and, therefore, has to be stored with great care, but, with proper storage, it is very stable, being much superior in this respect to either hydrogen peroxide or barium peroxide. It is also said to be cheaper.

Photographic Frost Pictures.

A very effective background may be imparted, says the *Photographic News*, to photographic portraits by the following method, described by Mr. Franz Pfenigberger in the *Phot. Rundschau*:

A concentrated solution of magnesium sulphate in beer is prepared, and the solution is boiled down for a short time, in order to have the saccharine principle of the beer, which serves as a cement, slightly in excess. The preparation, if stored in a well stoppered bottle, keeps well. The photograph is then treated in the following manner:

The figure is masked in any convenient way, leaving the background open, and the latter is quickly coated by means of a broad brush with the solution. It is well to apply it a little thicker around the shoulders, in order to produce there a more vigorous crystallization. After all has been coated, the picture—which may be printed on any kind of silvered paper—is laid aside. After about ten minutes, the formation of crystals will be completed, and, at the same time, the layer will be dry. The picture is then, by means of a pad of fine cotton, dusted with gilt bronze. If it is desired to strengthen some portions of the picture, it is only necessary to breathe upon them. Finally, the superfluous powder is carefully dusted off, when the portrait will appear on a bronzed ground covered with frost-like crystals. To protect the picture from being injured, it is necessary to coat it with matt varnish. The gilt bronze may be replaced by any other suitable powder, and the crystallization may as well be applied to the film side of the negative instead of to the print. In this case the crystalline forms will appear lightly on a darker ground, which also gives a good effect.

A New Anæsthetic.

A new anæsthetic, similar to cocaine, has been found in *eugenol-acetamide*. By successive reactions eugenol is changed into eugenol-sodium, eugenol-acetic acid, ethyl eugenol-acetate and eugenol-acetamide. Crystallized from water, it forms lustrous scales; from alcohol, delicate needles melting at 110° C. Applied in the form of a fine powder, it produces local anæsthesia, without any caustic action; this effect, in conjunction with the strong antiseptic property of eugenol-acetic acid, speaks for the new compound securing a place in the treatment of wounds. Patents for its preparation have been applied for by the Faerbwerke. —*Pharm. Centralhalle; Am. Jour. Pharm.*

The Volatilization of Quartz.

It is not so very long ago, says *Industries*, when the fusion of quartz was considered to be a feat sufficient to warrant a good deal of interest being displayed in the mode of manufacture as well as in the electrical properties of the quartz fibers with which the name of Mr. Boyes became so intimately associated. Now we have gone a step farther, and soon not only the fusion, but the distillation, of quartz may become an everyday occurrence. Dr. Seger, the well known German ceramic technologist and editor of the *Thonindustrie Zeitung*, has published a paper in which he claims to have volatilized quartz in an appreciable quantity. It is noteworthy that the furnace employed was by no means a particularly sensational instrument. One would have expected that for an undertaking of this kind the very latest variety of electric or oxygen injector furnace would have been used, but the furnace actually chosen was of an older and more conventional type. It was of what is known as the Deville pattern, and consisted of a simple cylindrical sheet iron case lined with dead-burnt magnesite, leaving an internal cavity of about 5 inches diameter and 11 inches high. The magnesite lining only extended about two-thirds the length of the cylindrical casing, which was divided at that point by a perforated iron plate, forming the floor of the furnace proper, and supporting the crucible.

Below this division was the air chamber, into which a blast was injected by a side opening, and which served for the preliminary warming of the air before it came in contact with the burning fuel. The crucible was of carbon, and was inclosed in another of magnesite. The fuel used was retort carbon, and was kindled by a few fragments of burning charcoal. The quantity of the former used was 4 kilogrammes, which is certainly a very moderate expenditure. After the experiment it was found that the quartz had undergone fusion, to judge by its appearance, and was noticeably smaller. When weighed it was found to have been reduced to the extent of over 40 per cent, the total mass taken being about 2.5 grammes, and the quantity that had disappeared amounting to 1.1 gramme. That this was in no sense due to accident was proved by repeating the experiment with another piece of quartz, with a precisely similar result. The comparative constancy of the loss might lead to the supposition that there was some limiting factor in the volatilization; but a second heating of the same test piece caused a further loss of about 15 per cent on the original weight, and on repeating the heating twice the piece of quartz vanished altogether.

It was observed in the course of the experiments that when the quartz was cooled rapidly it had an opaque, porcelain-like aspect, while when the cooling took place gradually the test piece was perfectly transparent. The results we have recorded are sufficiently startling, and if they had emanated from a less careful technologist than Dr. Seger, would be regarded with some doubt. Even as it is, one cannot help wishing that further details were forthcoming, to set at rest the supposition that some of the basic material with which the furnace was lined may have obtained access to the inner vessel, and by fluxing the silica have rendered it sufficiently fluid to soak into the substance of the crucible. The one way to clinch the matter is to ascertain whether the lost silica goes—in fact, to turn the volatilization into a true distillation. Who knows, when silica is fractionally distilled, of what homologous, but not identical, bodies it may not prove to be composed?

Electric Spark Photography.

Professor Vernon Boys lately brought together in the United Presbyterian Church Synod Hall, Edinburgh, a monster audience to hear his lecture, with experiments, on "Electric Spark Photography." In the course of the lecture Professor Boys explained that by the electric spark articles moving at the rate of 10,000 miles an hour can be photographed, and by the introduction of a revolving mirror a speed of 180,000 miles an hour can be coped with. The mirror makes 1,024 turns every second, worked by electricity, which is equal to about 150 times as fast as a rifle bullet travels. The whole photographic power of the spark is over in a time equal to the ten or eleven millionth part of a second, and it is during that incredibly brief space that the image is made on the sensitive plate.

CHLORIDE of gold and sodium is recommended by Dr. Boubila as a remedy in progressive general paralysis, augmenting the chances of resistance and retarding further development during the period of decline. It is given morning and evening in doses of 2 milligrammes in a potion of 120 gm.; after fifteen days the dose is increased by 2 mgm., until 1 centigramme is reached, which is continued for a fortnight. The treatment is then discontinued for a month, after which time it is resumed in the same manner. Under the conditions named these large doses are borne without inconvenience.—*Rev. Internat. de Bibl. Méd.; Am. Jour. Pharm.*

Bristol and the Chicago Exposition.

The people of the United States have designed their great exposition to illustrate their four centuries of development. They will make much of the discovery period of the new world and of the great pioneers who found two continents. Columbus will be first in their hearts, their memories, and their acclamations. And this will be entirely proper. His qualities were great as his achievements, and he is one the world may honor without reservation. It is not to his derogation that the people of Bristol propose to commemorate at Chicago the doings of the Cabots.

It is their opinion that the Columbian Exposition might have a Valhalla, and no individual god be any the less. They recall with pride that their ancient city was first in westward exploration; that their ancestors' money fitted out the first expeditions from England to the new world; that their fellow citizens were the devisers and leaders of the voyages. They say that the part of the Cabots in reserving to the Anglo-Saxon race the northern continent has hardly been adequately noticed in history; and that they wish to bring to the attention of the world, from honorable motives of national and municipal pride, the striking influence exercised by their forefathers over the future of the new world.

The two Cabot voyages, those of 1496 and 1497, have had comparatively little notice from chroniclers for several reasons. In the first place, to minds influenced by enthusiastic accounts of the doings of Columbus, the expeditions seemed barren of results. Again, there is confusion between Cabot father and Cabot son, and there is not the sharp identity necessary to make a hero. Sebastian, notwithstanding a long and brilliant career, passed alternately in the service of England and Spain, died unnoticed in the reign of Philip and Mary, and the voluminous records and careful maps that were the pride of his declining days disappeared without a trace. Had accident or chicanery left to us the diaries and records of Sebastian, there is little reason to doubt but that his niche in the temple of fame would have been forever held inviolate. Amid all the doubts and uncertainties of his almost unchronicled career we may discern one splendid fact, one momentous circumstance, fraught with results to the human race not to be computed by the finite mind, and far-reaching even beyond the bounds of time.

Sebastian Cabot pre-empted North America for the Anglo-Saxons. In a map drawn in the year 1500 by Juan de la Cosa, friend and hydrographer to Columbus, the northeast coast is starred with five English flags, thus marking the Spanish admission of English rights, in virtue of prior discovery. Other considerations doubtless to some extent operated in preventing Spain and Portugal from attempting to extend their dominion over the north, but the primary fact was that England had established herself there. She was tacitly left to the free enjoyment of her territory. It is idle to speculate on what might have been the history of North America if Spain or Portugal had obtained a foothold there. It is probable, however, within bounds to say that if Chicago were speaking Spanish to-day it might not have so splendid a national development to celebrate at the coming festival.

The people of Bristol for over a year have been working at a plan for representing in a simple yet adequate way the share of their ancestors in the national glory of America. At a representative meeting held some months ago in the hall of the Society of Merchant Venturers (Sebastian Cabot was the first governor of the parent society in London), the whole matter was placed in the hands of a representative committee of citizens, who in turn delegated their authority to a sub-committee composed of those who by antiquarian studies were qualified to conduct such a matter intelligently. This sub-committee has held many meetings during the past few months, and has finally matured its plans. It decided to reproduce in Chicago some characteristic Bristol structure, and to display therein such illustrative memorials of antiquity as might be available.

After a careful inspection of such buildings as came at all within the purview of the plan, the final decision rested upon two mediæval rooms in the building now in the occupation of Messrs. Franklyn, Morgan & Davey. The building in times past was the residence of merchant princes, and these two chambers, the drawing room and the ante room, have been carefully preserved through the vicissitudes of time and the changes of fortune. They are paneled throughout in oak, elaborately carved and ornamented, decorated with rich friezes, and embellished with a profusion of chaste detail. The larger room contains a chimney piece of florid design, reaching to the ceiling, this latter being of an ornate workmanship in keeping with the general artistic opulence of the chamber. It is intended to reproduce these two rooms, exactly as they stand, in oak, with the carving done by hand. The reproductions will, in fact, be equal in artistic excellence to their models, and there will be nothing of sham or papier maché about them. It is proposed that they should be displayed as a separate structure, and the exterior will be in complete accord as to period

and workmanship with the interior. The rooms, in themselves no mean display, will be used for the receiving of objects of antiquity associated with and illustrative of the discovery and colonial periods of American history.

It is to be regretted, of course, that the meager records left of the lives of the Cabots do not afford means for reproducing objects directly associated with them; but it is not even known in what house they lived, though their parish is recorded. The house that will be reproduced is believed to look down upon the very spot in the Avon whence their little vessel, the *Matthew*, weighed anchor for the unknown world; but more of personal association than this it has been found impossible to compass. Nor is it possible to obtain articles for the exhibition that have a direct relation with the explorers. Articles having even an apocryphal association with them are lacking. Under these circumstances the Bristolians have done the next best thing. They are collecting objects of authentic history connected with the times; and they have a great mass of material to select from which shall illustrate the close relations of their ancient city with the beginning and the development of the new world.

Their plan involves the expenditure of some 3,000*l*. They have had the co-operation of the Royal Commission, which has made them a grant of one-half this sum; and they are expecting further aid from the exhibition authorities at Chicago, to the extent of 500*l*. The remaining 1,000*l*. they expect to raise among themselves; and this, in view of the purely sentimental nature of the display, and of the prevailing commercial depression, cannot but be regarded as a handsome contribution to municipal pride. There can be no two opinions as to the interest that will attach itself to this exhibit; but we are not without some apprehension that the necessary funds will be subscribed, and in any case we think it would be a useless expenditure to provide a separate building for the installation of the memorial. The beautiful decorations would be in every way suitable for two of the rooms in the large building now being erected at Jackson Park for the headquarters of the Royal Commission, and if the memorial was installed there, a large expense would be saved the Bristol Committee and the Commission.—*Engineering*.

Locomotive Smoke Consumers.

As the result of experiments recently conducted the Pennsylvania lines west of Pittsburg are equipping their locomotives running, according to the *Railway Review*, into Chicago with a smoke-preventing device, which gives excellent satisfaction. The fire boxes are fitted with the usual steam jet entering both the front and rear, but instead of carrying air in with the jet which is taken from the atmosphere, pipes are carried to the ash pan, and the air taken from directly beneath the grates. The object of this is to avoid carrying comparatively cold air directly into the fire box, which must detract to some extent from the heat of the box. This will also lessen any tendency which the air might have to condense the steam and produce moisture in the fire box. A blower is placed in the smoke stack to operate in connection with the arrangement, the opening of one valve in the cab throwing them both into operation. It is the intention to use this attachment only within the city limits, where the smoke produced is a nuisance, and for this reason it is not made automatic, but is thrown in and out of operation by the use of a globe valve. The device has been carefully tested and appears to be effective in preventing the emission of heavy black smoke, and the engines are all being equipped with it as fast as practicable.

Amidol, a New Developer.

It can be used in a sulphite solution alone, without any admixture of free alkali, and thus dissolved it is sufficiently permanent to serve as a one-solution developer, being diluted for use with three or four times its bulk of water immediately before employment.

The stock solution in concentrated form is prepared as follows:

Distilled water.....	1,000 parts.
Sodium sulphite cryst.....	200 "
Amidol.....	20 "

Further diluted, and used with a small proportion of potassium bromide as a restrainer, the images can be made to appear with any required speed and the density modified merely by altering the strength of the developer; the resulting negatives seem uniformly clear and brilliant, without any trace of fog. It is easy to develop many plates in succession with the same solution. Amidol is specially suited for the development of gelatino-bromide prints.

Intensifying "Blue" Prints.

Captain Hemly recommends, for imparting greater intensity and brilliance to blue prints, an immersion in a solution of a ferric salt—perchloride of iron for example—of a strength of five per cent, the prints afterward being well washed.