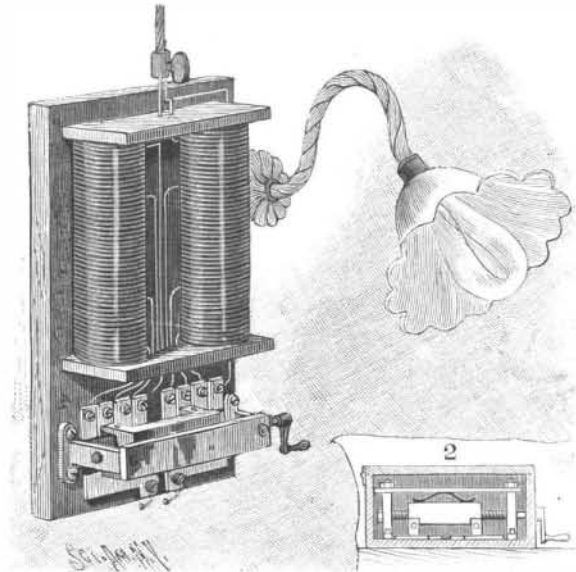


**A NEW ELECTRIC CURRENT REGULATOR.**

To regulate the intensity of an electric current, more particularly as used with incandescent electric lamps, the improvement represented in the accompanying illustration has been patented by William Hawker, of Windsor Mills, Quebec, Canada. The regulator is designed to be of especial value in a sick room or hospital, or in other places where it is desired to turn down the light as may be done with a gas jet, without entirely ex-

**HAWKER'S ELECTRIC CURRENT REGULATOR.**

tinguishing it, and it may also be used with many devices, the principle being designed by the inventor for application with either alternating or direct currents. On a suitable base plate is a pair of resistance coils and four pairs of contact plates, as shown in Fig. 1, and shunts extend from the first pair of contact plates to connections with the lower ends of the coils. From the second pair of contact plates the shunts are tapped into the coils at a point perhaps a quarter or a third of the distance up, and from the third pair of contact plates the shunts are connected with the coils at a still higher point, while the last pair are connected with the lead wires, from one of which a shunt leads into the upper end of one resistance coil and from the other a shunt leads to the upper end of the other coil. On the base are two main contact plates with which the lamp wires are connected; and to close the circuit between them and the plates connecting with the resistance coils, a block of insulating material is employed, as shown in Fig. 2, the block being moved by a screw shaft having at its outer end a crank handle, and the block having at its ends metal plates electrically connected by a strip of metal. As will be readily understood, a varying resistance, increasing or diminishing the intensity of the light, is obtained by connecting the several plates to the resistance coils at different points. The improvement is here shown adapted for use in connection with one incandescent lamp, but the regulator may be made of any suitable size for use in connection with a series of lamps or other devices, although the inventor has patented another form of regulator designed to use with a number of lights.

**Celebration of Niagara's Electric Power.**

The successful transmission of electric power from Niagara Falls to Buffalo was celebrated January 12 by a banquet at the Ellicott Club, of Buffalo, which was attended by about 400 invited guests. The menu cards were elaborately gotten up, the covers being made of aluminum manufactured at Niagara Falls with the electricity developed there, and with the name of each guest engraved thereon. Among those present were Nikola Tesla, of New York; Elihu Thomson, of Lynn, Mass.; E. J. Houston, of Philadelphia; Charles F. Brush, of Cleveland; Elisha Gray, of Chicago; Charles A.

Coffin, of Boston; George Westinghouse, of Pittsburg; John E. Hudson, of Boston; W. J. Johnston, of the Electrical World; D. O. Mills, of New York; Edward A. Adams, president of the Cataract Construction Company; Francis Lynde Stetson, of New York; Charles Lanier, of New York; S. E. Barton, of Chicago; W. H. Lawrence, of Cleveland; Frederick A. Nichols, president of the National Electrical Association; Dr. Louis Duncan, president of the American Institute of Electrical Engineers; C. A. Cutler, of New York; S. Dana Green, of Schenectady; Dr. Coleman Sellers, of Philadelphia; Frank W. Hawley, of Pittsburg; and Joseph Wetzler, of the Electrical Engineer.

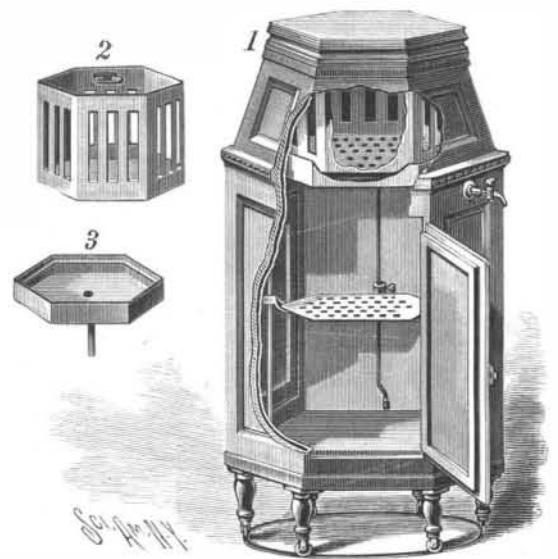
**A Sixth Century Copyright Suit.**

In Mr. George Haven Putnam's interesting work, "Books and their Makers during the Middle Ages," he gives what is probably the first contention for copyright in the history of European literature. St. Columba (A. D. 521-597) belongs to the Irish saints, though the greatest part of his life was spent in Scotland. When visiting his master, Finnian, he made a hurried and clandestine copy of the abbot's Psalter. He shut himself up in the church where the book was kept, to carry on his nefarious labors. A nocturnal wanderer, attracted by the light, carried the story to the abbot, and Finnian, indignant at the piracy, claimed the copy from Columba on the ground that the transcript is the offspring of the original work. Columba refused to give up the manuscript and the case was referred to King Diarmid at Tara for adjudication. The opinion of the king was given in a phrase which has since become a proverb in Ireland: "To every cow her calf, and, consequently, to every book her copy." Columba was greatly incensed at the decision and raised a revolt in which the powerful clans of his relatives succeeded in overcoming the king. This manuscript, which was the cause of civil war, was afterward greatly venerated as a kind of national and religious palladium. This Psalter went by the name of Cathoc, or "the fighter." It was preserved in the O'Donnell family for thirteen hundred years. It is believed that the famous "Book of Kells," a copy of the Gospels, was also the work of Columba, the poet monk.

A COMPLETE series of photographs of the late Chinese-Japanese war, taken on the spot, forms a feature of the international photographic exhibition now being held at Berlin, says Wilson's Photographic Magazine. The collection has excited much interest as the most comprehensive photographic record of war yet shown.

**A CONVENIENT HOUSEHOLD REFRIGERATOR.**

The illustration represents a refrigerator arranged to turn on a track, in order to afford ready access to its interior, for which purpose it is provided with three doors, on alternate sections of its hexagonal sides. The improvement has been patented by Joseph Bell, of No. 2087 Washington Avenue, New York City. In Fig. 1 the refrigerator is represented with one of its doors open, and a portion of the casing broken away to show

**BELL'S HOUSEHOLD REFRIGERATOR.**

the interior, Fig. 2 representing the ice box and Fig. 3 the drip pan, forming a support in which the ice box rests when in position in the refrigerator, the pipe in its bottom leading to the discharge faucet at one side. The body of the refrigerator has an interior lining of metal, at a slight distance away from the inner face of the body, to form an air space. The ice box has slotted openings in its sides to facilitate the free circulation of air, and has handles by which it may be readily removed, the ice being inserted by lifting the cover at the top, and the drip pan, in which the ice box is held, being supported by brackets. Adjacent to the closed sides of the refrigerator body are vertical supporting rods, on which are fitted to slide the projecting arms of shelves, which are secured in place as desired by means of thumbscrews. As will be seen, the interior of the body is readily accessible through either of its doors, the shelves may be conveniently adjusted up and down, and the various parts are readily removable to facilitate the thorough cleaning of the interior.

**RECENT IRRIGATION WORK ON THE NAVAHO RESERVATION.**

BY COSMOS MINDELEFF.

In its efforts to better the condition of our Indian tribes, the Indian Office has been devoting much attention to their industrial development, and the effects of this policy are already marked and in the highest degree satisfactory. It is now apparent that many of the tribes need only proper instruction and encouragement to develop into prosperous farming communities. The irrigation works and ditches on the Navaho Reservation afford a fair indication of what can be done. In March, 1893, Congress made an appropriation for irrigation ditches and artesian wells and for the increase and preservation of the water supply on that reservation. A superintendent of irrigation and engineer in charge was appointed about a year later—Mr. E. C. Vincent—and active work commenced in July, 1894. At that time there was an available balance of a little more than \$50,000.

The Navahos have always been classed as a "wild tribe," and, while they have given us comparatively little trouble since we acquired their country through its conquest from Mexico, in 1846, by Gen. Kearney and the "Army of the West," they are wild by nature. In fact, they have al-

**IRRIGATION WORK, NAVAHO RESERVATION.**



ways been thieves and robbers, and preyed upon their weaker neighbors. Their wealth, for they are a very wealthy tribe, consists of countless thousands of sheep and goats and innumerable horses; all descended from flocks and herds originally stolen from the Mexican settlements and the Pueblo villages along what is now the eastern border of the reservation and in the valley of the Rio Grande in New Mexico. When the Atlantic and Pacific Railroad was built, some fifteen years ago, many new trading posts were established in and on the borders of the reservation, but the industrial condition of the Navahos was very little changed, except that an outside market was created for their wool and pelts and the pastoral form of life became more fixed. Gradually, however, the white man's luxuries—sugar, coffee, flour, and calico—became more and more necessities.

The men looked after their herds of horses and took very good care of the few cattle which strayed into the reservation or were picked up about its borders; the women attended to their domestic duties, wove blankets for sale to the traders, and raised families of children, by whose aid they cared for their great flocks of sheep, for by long established custom the flocks belong exclusively to the women, and are their especial care. Under such social conditions large communities were impossible.

Each man built his little hut within some certain section, which had belonged from time immemorial to his family or clan, and he located it where the pasture was good. But he always had at least two such huts, and moved his family and flocks from one to the other, as the season or special circumstances dictated. Under such conditions agriculture could not thrive, and, in fact, it was practically unknown. A few patches of corn here and there in the sandy beds of intermittent streams and a few melon vines in favorable places, measured its extent, while the methods pursued were crude in the extreme.

With the removal of the duty on wool by Congress, a new era opened for the Navahos, and at first much hardship resulted. The wool furnished by their sheep is about the lowest grade which comes to market, and can be used only in carpets and such manufactures, but it meets competitors in the low grade Australian and Russian wools and recently in those from the Argentine Republic. When the duty was removed the value of the wool in the traders' stores fell at once to about one-half the former figure, and a flock of sheep no longer furnished the means of obtaining the articles which had grown to be necessities. As a result the whole tribe, numbering some 12,000 or 14,000 souls, are changing from a tribe of robbers, preying upon their neighbors and afterward subsisting on their spoils, into peaceable farmers living by their own labor.

The Navaho Reservation is practically waste land, and, except in a few places, principally along the northern border, there will

never be any trouble from that pregnant cause of Indian wars—the encroachments of the whites. In simple terms, the region consists of a vast elevated plain, sandy and arid in the extreme, crossed diagonally by a range of mountains. The great valleys which constitute the greater part of the reservation are cut and seamed by innumerable little canyons, and are practi-

small ditches have been put in by the Indian Office with a part of the appropriation and the work is still in progress on a small scale. The work already done has been a potent factor in the industrial revolution alluded to, and as time progresses its influence will be more and more widespread; for although the Navahos have never done work of any kind, except such as is incidental to war and forays, they are anxious to learn and now need only a little fostering and encouragement.

The northernmost of the ditches is in the Carriso Mountains, as the northern end of the range is called, near the locality of the recent excitement over gold diggings which did not materialize. A number of Indians are now cultivating small patches of land here. The Tse-alee ditch, in a beautiful valley of that name on the western slope of the mountains, is about two and a half miles long. The water is taken out of a little stream by the aid of a crib dam about 100 feet long, and practically the whole stream is diverted into the ditch. The cost of the work was about \$2,000, and there are 1,000 acres under the ditch; but the supply of water is not sufficient to cover all of this land, although with rigid economy of water which characterizes the Indian, either for personal use or for irrigation, it will go far toward it. This ditch was one of the first built, and when the Indian

Office failed to clean it out in the spring of 1896 the Navahos took the matter into their own hands, and not only did this work, but also repaired a break about 200 feet long, caused by the spring floods. Such action indicates a pronounced and permanent interest in the work.

About six miles south of the last mentioned place there is another valley, known as the Wheatfields, because of a tradition that, long ago, wild wheat grew there in great abundance. It is a beautiful valley, sheltered by the forests of giant pines which border it, and with a rich black soil, needing only irrigation to be wonderfully productive. In this valley the most important ditch of the group is located; it is three and a half miles long and cost \$3,500. Here also the whole stream is diverted by the aid of a dam 140 feet long into a ditch

which delivers it upon one side of the valley. About a mile below the dam there is a peculiar aqueduct by which the ditch is carried over an arroyo or little gulch. At the time the ditch was built it was impossible to procure lumber for the making of a flume, and as a heavy additional expense would be incurred by carrying the ditch around the gulch on grade, the difficulty was met and overcome by the building of a bridge or causeway of heavy pine logs, 100 feet long and 26 feet wide. The water runs in an earth bed on top of this structure; in other words, the ditch construction was carried right over the log bridge. Although this appeared to be a clumsy, and was regarded as a temporary expedient, two seasons have passed since the structure was built, and dur-



VIEW NEAR THE HEAD OF WHEATFIELD DITCH.

cally without water during most of the year. They are characterized by an almost entire absence of trees, which are replaced by an abundance of sage brush and greasewood. On the higher mesas and on the foothills there is a growth of scrub cedar and juniper; still higher these give way to dwarf pinyons, and then to giant pines, which are found up to the very summits. In the region of the giant pines there is excellent pasturage and a perennial, although scanty, supply of water, and to these regions the flocks are driven in the summer. Here also there are many little valleys with wonderfully rich soil, and the season is long enough, although the elevation is over 8,000 feet above the sea, to mature a crop of corn.

On the western slope of the Tunicha Mountains, which is the name of the range referred to, half a dozen



IRRIGATION NAVAHO RESERVATION—THE AQUEDUCT, WHEATFIELD DITCH.

ing both the ditch ran full of water without developing a leak.

About twenty miles south of the Wheatfields a wagon road comes up from the south and crosses the mountain through the only practicable pass in the range. This is known as Cottonwood Pass, and near it, occupying a small valley, there is another ditch. This is one and a quarter miles long and its total cost was about \$650. It is noteworthy that since the ditch was built every foot of land under it on that side of the valley has been fenced in by the Indians and nearly all of it is now under cultivation; whereas, before its construction, none of the land was used. There are also several other small ditches and a large storage reservoir, the work on which is not yet completed.

The ditches are simple earth structures of from four to eight feet bottom width, with an average earth cut of two feet, and capable of carrying if necessary a stream of water nearly four feet deep. But they usually carry from one foot to eighteen inches only, and not all of this water is utilized at present. The average cost of putting water on land throughout the arid region has been about \$8 per acre, and of works in the vicinity of the reservation about \$12 per acre. Here it has been less than \$5 per acre. The reason of this is that the work was done in the most favorable localities that could be found and almost entirely by Indian labor, at \$1 per day, without board. The problem of a market for products, which enters so largely into irrigation schemes, was not considered in this work.

At the time the work commenced few of the Navahos knew anything about manual labor. The commonly accepted idea of the Indian as essentially a loafer depending on the work of his women and considering all labor beneath his dignity, does not apply to these Indians. They had never done any work, merely because there was no work to do. There was always great rivalry among them to secure places on the work, and nine-tenths of the adult males in the tribe could have been put to work had it been practicable. As it was, as many as 300 were employed at one time.

They seemed to want the work because they liked it, and not because they needed it. To them it was a huge picnic. The old idea has come down to us from the far distant past that work is more or less of a hardship, but these people seemed to have some different point of view from ours and regarded it as a pleasure. If this mental attitude could be acquired in some school, such school would be a valuable adjunct to modern civilization. Out on the line, where there were from 60 to 200 Indians at work under white and Indian foremen, the greatest good humor always prevailed. Pithy, sententious statements and epigrammatic phrases were the order of the day, and everyone took part in a stream of chaff and badinage which flowed without intermission during the eight hours which constituted the working day.

With it all the amount of work accomplished in a day was wonderful. It was not unusual to measure off sections of the work and race through them for the mere fun of the thing, and the amount of earth moved in a day under such circumstances was a revelation. At times dirt was taken out and spread on the banks for five cents a cubic yard; to move the dirt with horses and scrapers would have cost in this locality from twenty-five to thirty cents a cubic yard. This comparative low cost of hand work could be attained only under conditions exceptionally favorable to that form of labor. On a larger ditch the advantage would have been with the horse scrapers.

The native interest in the work is very great and applications to the engineer in charge for the building of small ditches here and there throughout the reservation were made almost weekly. Many little ditches have been built by the Indians themselves since this work was commenced, necessarily without instruments, and with crude implements; and it seems probable that the effect of this work will be to change a blood-thirsty, warlike people into a peaceable farming population, living by their own labor and not on that of their neighbors.

TOKIO has adopted the arch system for the two miles of elevated railroad which it has been decided to build there at a cost of \$2,000,000.

#### Lieut. Peary Honored.

The annual meeting of the American Geographical Society was held at Chickering Hall, New York City, on the evening of January 12. The Cullum Geographical Medal was conferred upon Lieut. R. E. Peary, U. S. N., in consideration of his brilliant Arctic explorations. The Cullum Geographical Medal is awarded from time to time for geographical explorations, but this is the first time that the medal has been given. After the medal was presented by Judge Daly, Mr. Peary received it and expressed his thanks to the society for the high honor having been conferred upon him. He then devoted his remarks to outlining a plan for reaching the North Pole. He said that the pole was certain to be soon reached, and that it was now only a question of time and money. His own expedition had convinced him that, with a sufficient depot of provisions and equipment in the latitude of Independence Bay, the pole is attainable. He believes that the results of his own expeditions, together with those of Nansen and Jackson, show that there is left but one practical route by which to attain the North Pole, and that is the route through Smith Sound and along the northwest coast of Greenland.

Mr. Peary explained the objects and plan of the proposed work as follows, as reported by the New York Sun:

"The conquest of the North Pole, the complete delimitation of the Greenland Archipelago, the last of the

that early spring should find the party and the bulk of its supplies located at the northern terminus of the North Greenland Archipelago, probably not far from the eighty-fifth parallel, with caches behind it at each prominent headland.

"From this point, when the proper time came, with picked dogs, the lightest possible equipment and two of the best of the Eskimos, the dash for the pole would be attempted, with strong probabilities of a successful termination.

"Should the first season be unfavorable as regards ice conditions, it could be devoted to a detailed survey of the archipelago itself and a reconnaissance of the east coast as far south as possible, and the northern journey reserved for the following season or the next.

"Each succeeding summer the ship would attempt to establish communication with the party's base, succeeding probably every other year at first, then with increasing experience every year, and keep up its supply of food, dogs and Eskimos until the objects of the expedition were accomplished.

"Should the ship be unsuccessful in the passage of Robeson Channel the first year, the party should land at Hayes's Sound and devote the first year to explorations of that unknown region. Retreat from the colony at Sherard Osborne Fjord would always be practicable across the inland ice to Whale Sound.

"Here let me call your attention to a few points on which you must accept my dictum, as I have no time to enlarge. Arctic exploration may be regarded as safe. This is shown by the experience of the last ten years. Nothing is to be gained by numbers; in fact, numbers are a distinct danger, and the frightful catastrophes of previous work are, in my opinion, directly traceable to that cause. The entire annals of the Arctic regions is against large parties. Where three men will get along in safety and comfort, six would merely exist on half rations and twelve die of starvation. The two-men party is the ideal one. Both Nansen and myself have proved this.

"The leader of the expedition must be at the head of the advance party; no successful Arctic party can be led from the rear.

"The latitude of Lockwood and Brainard's furthest north is 83° 24'. The distance from this point, up to which we know there is land, to the pole and return is less than the distance from Whale Sound to Independence Bay and return, which I have twice covered, once with a single companion and again under the heaviest handicap.

"Quite likely the question comes up, 'If this method is so practicable, why has not the establishment of a base in this locality been attempted before? and why have I not attempted it myself?' It has been attempted before, but there being no means for a continued effort, failure in the first attempt has resulted in its abandonment. As for myself,

it has been entirely a question of money. The funds at my disposal have not permitted the charter of a ship beyond Whale Sound.

"The points in favor of this project are:

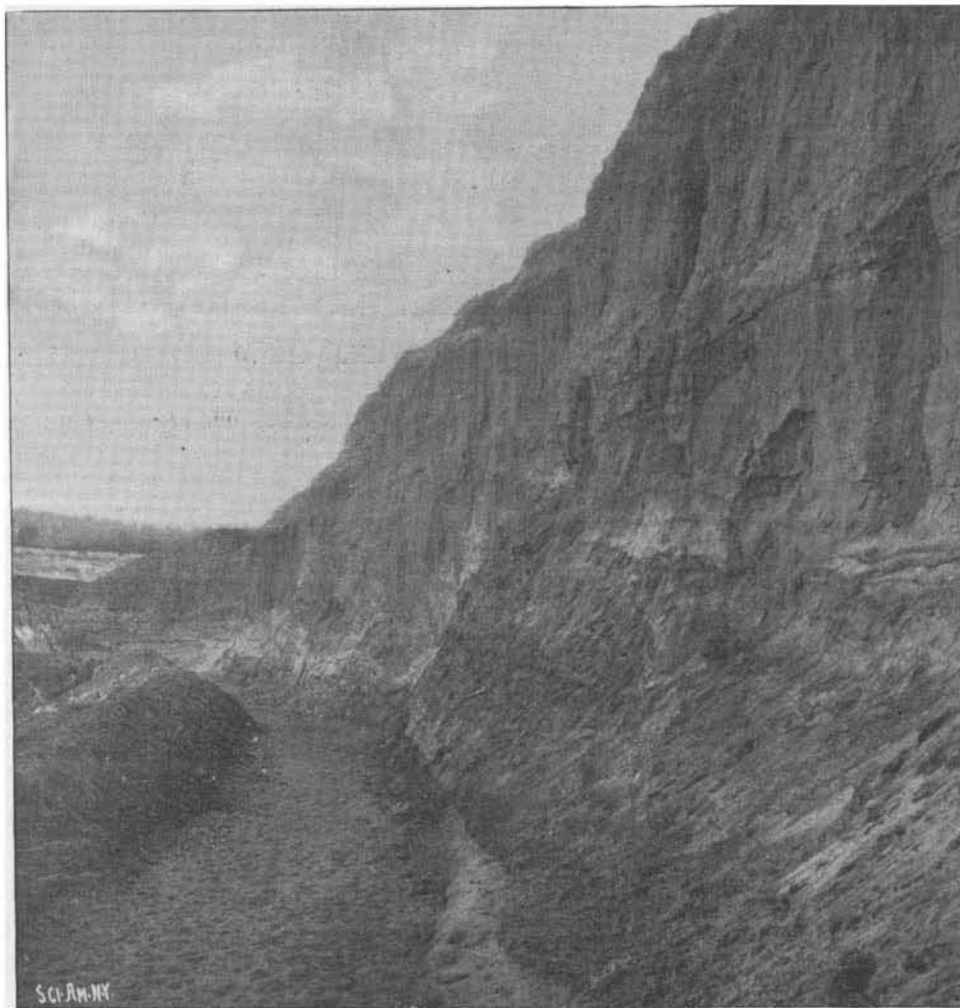
"1. The utilization of the Eskimo, the people best fitted in the world for that particular kind of work—men who, under the leadership of one whom they know to be their friend and in whom they have the utmost confidence, would follow to the end, faithful and loyal as their own magnificent dogs.

"2. Land for a base. The party launched into the icy waste from the Northern Archipelago would have some definite, fixed point to which to return, rather than a ship drifting with the drifting ice, to vanish like a will o' the wisp, as did the Fram from Nansen. Then, should the party be swept westerly in its retreat, it would still strike land, and finding depots at each prominent headland, could easily reach headquarters.

"3. A practicable and already utilized route for a retreat independent of the ship or outside assistance.

"In a nutshell, my project means: First, the raising of a sum sufficient to insure persistent, continued effort, so that if the attempt fails the first year it can be repeated the next, and the next and the next until it is done.

"Second, the establishment of a party of picked Eskimo families, a surgeon, and an experienced leader at the highest practicable point on the northwest coast of Greenland; with ample supplies, means of communication, which would enable the colony to sustain itself



A HEAVY CUT ON THE TRI-A-HI DITCH.

circumpolar island groups, and the elimination from our maps of the unknown area between the eighty-fourth parallel and the pole, are important geographical desiderata. This work can be accomplished without risk of life or health. It can be done at comparatively small cost.

"My plan is to raise a fund sufficient to insure the continuation of the work of exploration for ten years, if necessary, say \$150,000, and deposit it in a trust company, purchase a ship, give her a minimum crew, load with concentrated provisions, proceed to Whale Sound, take on board several picked families of my faithful Eskimos, with their tents, canoes, dogs, etc., force a way through Robeson Channel to Sherard Osborne Fjord or further, and land people and stores, then send the ship back.

"As soon as the freezing of the ice in the great fjords of the northwest coast would permit sledge travel, the work of advancing supplies northeastward along the coast would be commenced, taking comparatively short stages and light loads, so that the trips could be quickly made. As soon as the supplies had been advanced the first stage, the party itself would move forward, leaving a cache behind, and as they would be following Eskimo customs and living in snow houses, this could easily be done.

"Then the second stage of advance would be taken up and the work carried on until the departure of the sun. Each of the brilliant winter moons of the polar night would afford opportunities for continuing it, so



until its work is accomplished, and with a practicable line of retreat entirely independent of the ship.

"This project, in more detail and accompanied by maps, will be placed before your council, in the belief that it will meet the approval and indorsement of the society. With that indorsement, I believe the time is opportune for raising the money for the work."

#### A THEATER WITH TWO AUDITORIUMS.

The people of New York City have the reputation of being the most industrious theater-goers in all America; a statement which is verified by the ever-increasing number of large and well filled places of amusement. Of late years the growth of the popularity of the style of entertainments which are classed under the name of vaudeville has called into existence a special type of theater, which, in addition to the regulation stage and auditorium, includes special halls of entertainment, with lounging rooms, cafés, etc., and, for use in the hot summer months, the inevitable roof garden. To judge from the nightly programme of a first class house of this type, the excellence of the performance is measured, after its quality, by its length and variety. The more rapidly the various artists can make "their exits and their entrances," the more concentrated amusement can be packed into any given hour of a "continuous performance."

It was with a view to enlarging the stage capacity that the proprietor of Proctor's Pleasure Palace, in New York City, resorted to the bold expedient which is shown in the accompanying illustration, from which it will be seen that a single stage is made to do duty for two separate auditoriums. The way in which this was accomplished will be seen by reference to the sectional diagram, which is taken longitudinally through the auditorium proper, the stage, and the new auditorium, which is known as the Palm Garden, being so named after the palms and tropical plants and vines with which it is decorated. That part of the diagram which includes the auditorium and the stage shows the construction of a typical theater of to-day—the roof garden and the café in the basement being special features in a house of this kind that introduce no new structural features of much consequence beyond a strengthening of the roof supports. Stripped of its galleries and scenery, a theater consists of two four-walled structures, the auditorium being about square in plan, and the stage floor about the same width as the auditorium and half the depth. The walls of the stage are carried considerably higher than the roof of the auditorium, in order to accommodate the "drop curtains," which are hung by ropes that pass over pulleys attached to what is known as the "gridiron," a stout framework located near the roof of the "scene loft." When the "drop curtains" are not in use they are raised clear of the "proscenium," as the opening from the stage to the audience is called, and hang in parallel rows as shown in the diagram. Below the stage floor are shown the "traps," which are used for the disappearance of Mephisto and people of similar subterranean proclivity. Here, in the older theaters, were frequently located the dressing rooms of the performers, though the more modern arrangement is to build them at the sides or to the rear of the stage.

In carrying out the idea of a double stage a hall was built immediately behind the theater proper, and a proscenium arch was cut through the rear wall of the stage, the floor of which was carried out into the hall and provided with the regulation footlights. The new proscenium was provided with its own curtain, and all that was then necessary was to paint the backs of the existing wings and drop curtains with scenery, and the doubling of the stage was complete.

The original intention was to have three or four performances of such a character that they would not interfere with each other going on upon the stage at the same time, and during the summer months this was frequently done. Ordinarily, however, the curtain opening to the palm garden is kept lowered, and it is raised only during the intermissions, or when special acrobatic, gymnastic or animal acts are in progress. A passageway leads from the auditorium to the palm garden, which are both accessible to the audience at all times.

This is the first time that such an experiment as this has been tried, and its results will be watched with considerable interest. The effect as one looks through the stage may be judged from the larger of our engravings.

ON March 31, 1896, eighty-three men-of-war were building at English ship yards, having an aggregate tonnage of 312,375 tons. Sixty-four of these were for the British navy. Fifteen ships were under construction in the government yards, and at the private yards forty-nine vessels were building for the British navy, including thirty torpedo boat destroyers of a speed of 30 knots. The navy budget of the current year provides for the construction of sixty torpedo boat destroyers of a speed of from 30 to 33 knots, at a cost of \$300,000 each. There are to be built besides four battleships, four first-class cruisers, six third-class cruisers, or seventy-four ships in all.—Stahl und Eisen.

#### Recent Patent and Trademark Decisions.

Tuttle v. Claflin (U. S. C. C. A., 2d Cir.), 76 Fed., 227.

Plaiting Machine.—The Crosby & Kellogg patent, No. 37,033, for a machine for crimping textile materials, has been held valid and construed.

Accounting for Profits in Infringement.—Where an infringer makes no addition to the patented machine, but merely uses mechanical equivalents which may produce better work than the corresponding devices for which they were substituted, he is bound to account for the profits he has reaped, and they will be measured by the difference in the expense of doing the work by the device and by the method used prior to the patent. But if an infringer takes the whole of the vital and effective parts of an invention and superadds an improvement which contributes to the saving over the old methods, then the infringer is liable for the difference in expense of doing the work by the device and by the method used prior to the patent, after deducting the portion of the profits that accrued from the improvement added by the infringer; the amount of the profits accruing from the improvement must be established by the infringer. Where the infringer used the essential parts of the patented machine without which his infringing machine was worthless, it is not necessary to demand an accounting of profits that the equivalents substituted by the infringer improved the work of the corresponding elements of the infringing machine.

Marking the Article "Patented."—Where the pleadings are silent on the question of whether the complainant marked its article as patented or notified defendants of their infringement and the question was never actually raised or decided in the court below, the point cannot be raised upon appeal from the final decree.

Ascertainment of Profits by the Court of Appeals.—Where a suit for infringement had been pending for eighteen years and had been before three masters for an accounting and finally resulted in a decree for nominal damages only, the Court of Appeals, upon deciding that the complainants were entitled to recover a substantial sum, did not remand the case to the court below for further proceedings, but did itself determine the proper amount and render a decree therefor.

Ex parte Fratsch (Comr.'s Dec.), 77 O. G., 1427.

Use of Copper Matte to Purify Oil.—The use of pulverized matte to remove the "skunk" from oils is an improvement upon the use of a mixture of pulverized copper oxide and pulverized iron oxide such as would not be expected from those versed in the art, and therefore amounted to invention.

Couch v. Finnigan (Comr.'s Dec.), 77 O. G., 1595.

Acquiescence by Conduct.—In this case one of the parties, after learning of the other's patent, continued to make the patented article and did not object to the other marking his article patented, and even did not claim the article as his own invention until after his employers became involved in trouble with the other parties. It was held that this conduct was not that of a person who had actually made the invention.

Failure to Claim the Invention in a Prior Patent.—Where a party obtained a patent which disclosed all the improvements embraced in an interference contest before he filed his interference application, but his prior patent contained no claim for the matter in contest, this would indicate that he would not consider himself the inventor of such matter.

Bryant v. Seymour (U. S. C. C. A., D. C.), 77 O. G., 1599.

Delay in Appealing.—The rules of the Circuit Court of the District of Columbia provide that an appeal shall be taken within forty days of the Commissioner's decision and not afterward. In this case the appeal was taken nearly a year afterward, without any excuse for the delay being given. The court decided to adhere to the rules, and the appeal was dismissed.

Hien v. Pungs (U. S. C. C. A., D. C.), 77 O. G., 1600.

Time for Appeal to the Court of Appeals of the District of Columbia.—There is no justification for the theory that a party has two years in which to take an appeal from the Commissioner of Patents to the Court of Appeals of the District of Columbia on the ground that the statute gives an applicant a possible two years within which to prosecute his application. The right of appeal is not a vested right that may be altered by statute or by rules of court. If there was no rule in force at the time the Commissioner's decision was made, it applied to the case as soon as the rule was promulgated.

Pelton v. Evered (U. S. C. C. A., D. C.), 77 O. G., 1600.

Failure to Print Record.—An appeal from the Commissioner of Patents to the Court of Appeals of the District of Columbia will be dismissed, if the parties failed to print the transcript of record as provided for by the rules of the court.

Mackintosh Battery and Optical Company v. Bertman (U. S. C. C. A., 7th Cir.), 76 Fed., 368.

Electrical Machines.—The Atkinson patents, No. 275,347 and No. 331,754, for improvements in machines for generating static electricity, are void for want of invention.

#### Notes on Acetylene.

The following notes on acetylene are extracted from recent technical journals:

Mr. P. C. Frewin, F.C.S., U. S. A., says: "I filled an iron ball with acetylene to a pressure of five pounds to the square inch, and then subjected it to a series of blows from a large sledge hammer. Although the ball was bent all shapes, there was no explosion, neither has there ever been to my knowledge through this cause. Acetylene has a chemical action on pure copper, but none of a dangerous kind on brass. A series of experiments have been conducted by me before the Chemical Society of New York, and they all go to prove this. Several insurance companies in England are at present willing to insure houses, etc., lighted by acetylene, and, no doubt, in a short time, all will do so. I may add there were last year 730 people using acetylene as a general illuminant in New York, and that only three accidents occurred—two through escapes and one through a generator being charged with a candle close by—conditions under which coal gas would have acted just the same."

M. Brevans says that if ordinary acetylene from carbide be passed through a series of three washing flasks containing a solution of sulphate of copper, there is no effect perceptible within three hours; but after twelve hours the first flask contains a black-brown, brilliant precipitate, the quantity of which goes on increasing for as much as eight days, says the Gas World. This precipitate explodes on shock, friction, or heating, and it appears to be a mixture of phosphide and silicide of copper, of sulphate of cupro-acetylene, and a variable quantity of acetylide of copper. Its production appears to depend largely on the presence of ammonia in the crude acetylene gas; and it shows that the crude acetylene contains phosphureted hydrogen and silicureted hydrogen. The second flask contains a precipitate which is similar in appearance, but less explosive; and the precipitate in the third flask is not explosive. The explosive precipitate in the first flask will explode even under water, as, for example, when we try to rub it off the glass with a glass rod. As to the explosibility of acetylene there are two opinions: one that there may be metallic acetylides formed, which act as detonators to the acetylene itself, so that acetylene cannot be used with reservoirs which are capable of being attacked by it; the other that it can only be exploded when mixed with air, and that the influence of the outside explosions which can set it off cannot travel far through air. In any case, acetylene at a pressure not much exceeding that of the atmosphere is not explosive, though it is explosive at pressures above two atmospheres; so that there is no reason to fear an explosion through flame running back to a reservoir under a very small excess of pressure. Shock alone does not appear to cause explosion of the gas, only of the acetylides. The alleged poisonousness of acetylene—which has not, as yet, given rise to any accident—would appear to be due to the occasional presence of cyanogen compounds, and is not a feature of pure acetylene. The presence of sulphureted hydrogen in acetylene seems to depend on that of sulphide of aluminum in the carbide of calcium; sulphide of calcium may exist in it without forming this impurity. The blocking of gas jets by acetylene flames seems to be due to the formation of phosphoric acid. If oxygen be not present, acetylene does not attack copper; the oxide must be formed before the acetylide can be produced.

M. N. Grehan's experiments at the General Physiological Laboratory of the Paris Natural History Museum have shown that one volume of acetylene consumes during combustion two and a half volumes of oxygen, and yields two volumes of carbonic acid, thus favoring the belief that the combustion of this gas is complete, no combustible mixture containing carbon being generated. In order, however, to ascertain whether the products of combustion contain a trace of combustible gas, he tested them in a continuous grisometer, with platinum spiral kept incandescent by galvanic accumulators, and only obtained, during two hours, from 79 cubic inches in a baryta tube, a ring, scarcely visible, of baryta carbonate, showing so slight a trace of carbonic acid that it could not be determined. In another experiment an India rubber bag filled with acetylene gas, subjected to a pressure of 1½ inches of water, supplied a Manchester burner placed underneath a metal cone, connected by a refrigerator with two metal valves, and a muzzled dog breathed the products of combustion for half an hour. In the grisometer, 2½ inches of normal arterial blood showed a reduction equal to 3.7 divisions, while the same quantity taken at the end of the experiment showed a reduction of 3.8 divisions. M. Grehan concludes that the products of combustion given off by acetylene, when a Manchester burner is used, are free from the slightest trace of combustible gas containing carbon.

THE Duryea Motor Wagon Company, of Springfield, Mass., have received from the Motor Car Club, of London, a gold medal in recognition of their splendid performance in the London-Brighton run on November 14, 1896.