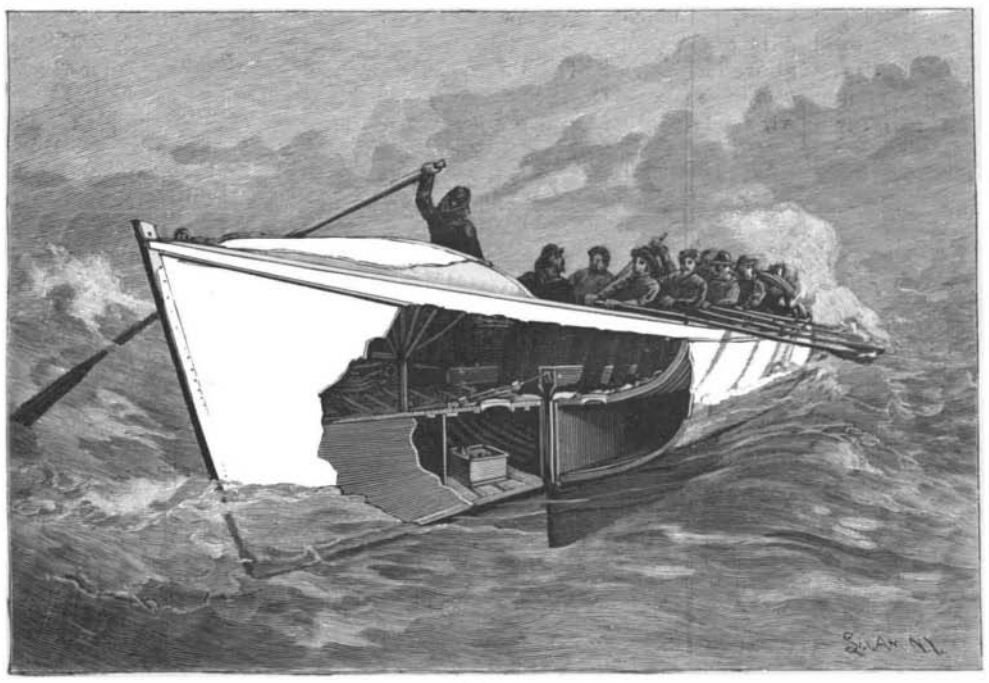
TAYLOR'S LIFEBOAT.

The lifeboat shown in the illustration is intended more especially in its construction and arrangements for storing provisions, water and clothing, to be carried for use in case a vessel has to be abandoned at sea. It has been patented by W. H. Taylor, of Narragansett Pier, R. I. The boat is divided for its entire length into two parts by the keel and centerboard box, the former of which extends from the bottom of the boat up to the second bottom or floor, the centerboard box extending still higher. By this division the boat, under the floor, is converted into two watertight compartments, which are filled with airtight metallic tanks, all of which, except the tanks at the ends, are provided with caps screwing into collars in the floor of the boat. These tanks are adapted to be used for provisions, water, clothing, etc., and if need be, on naval vessels, with ammunition. This boat may be launched in any shape, as she quickly frees herself of water through valves in the sides of the centerboard box, and is therefore self righting and baling. The tanks answer also for the purpose of keeping the boat from sinking, if it should get stove. The centerboard box is strengthened by castings held by bolts passed through the keel and by stay rods, while the metal centerboard, which is adapted to be readily raised and lowered, has vertical slots to correspond with the castings, making the entire construction very strong. The boat has been approved by the board of supervisors of steam vessels.



TAYLOR'S LIFEBOAT.

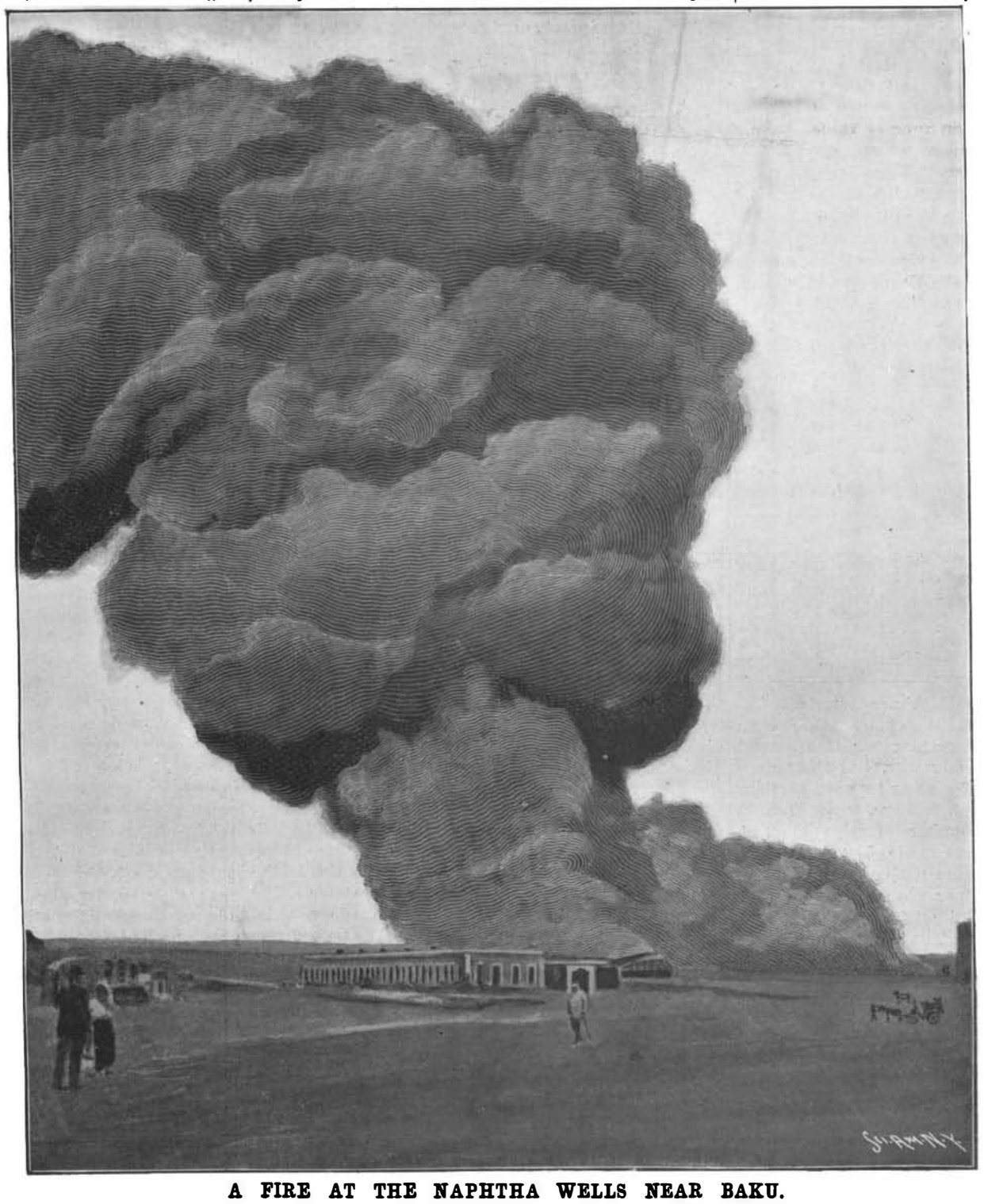
BAKU AND ITS OIL WELLS.

The accompanying engraving, for which we are indebted to Globus, gives us a very good idea of such a fire as sometimes occurs in the naphtha spring region near Baku. The danger of fire in this region is so great that every precaution is taken; smoking is prohibited, and the lamps used during night work are carefully closed, but in spite of all this there is an occasional conflagration. Some time ago a fountain of naphtha shot up suddenly, carrying with it many stones, which destroyed the electric lamps, and in a minute the whole column of naphtha, extending to the heavens, had taken fire. No earthly power can do anything to stop such a fire; water would only give fresh power to the flames. All day the clouds of thick, black smoke rose, covering everything in the neighborhood and making it seem like night, until the fire had devoured all that it could find to feed upon. The wooden planking over the excavations is covered with earth and sand to prevent such casualties.

The crude naphtha is carried from the reservoirs, the largest of which can hold 6,000,000 poods (216,000,000 pounds), in pipes to the "Black City," where we find a whole forest of smoking chimneys. The buildings, streets, trees, men and animals are covered with soot and smoke. The workshops and refineries extend far along the shore of the Caspian Sea.

The oil fields of which Baku has thus far been the principal center extend for a distance of 700 miles between the Black Sea and the Caspian, most of which has been but imperfectly explored, while only a small fraction of the known highly productive territory has been commercially worked. During 1894 the wells near Baku produced 38,000,000 barrels of oil, the production in the same year in the United States being 50,000,000 barrels. Besides this the production from other districts in Russia was considerable, the area of oil territory being officially estimated at 14,000 square miles. There are also many evidences of oil and natural gas strata beneath the Caspian Sea, to the east of which the territory is rich in ozokerite, or natural paraffin wax, which has within recent years found an important use as an insulator for electric wires.

In the oil districts of Russia the wells yielding the most oil are all less than 800 feet deep, yielding oil generally in the form of a fountain or so that it may be baled out, and the wells are much larger, being sometimes of a surface diameter of 24 inches. The yield of some of these wells has been so enormous as to seem almost incredible. From one well sunk in 1886 the flow reached 2,750,000 gallons a day before it was controlled by the engineers, on the fifteenth day, and from the largest well yet known, sunk in 1893, the flow for the first few days exceeded 4,000,000 gallons per day.



A FIRE AT THE NAPHTHA WELLS NEAR BAKU.

The Russian oil differs largely from the American oil, the latter producing about twice as much kerosene or lamp oil as the Russian, while the Russian oil in ordinary lamps gives a smoky flame. This, however, may be corrected by lamps designed especially for its consumption, and affording a more perfect supply of air to the flame. The residuum of the stills is also well adapted as fuel. All the oil produced in the Baku region for foreign use has now to be transported by rail to Batoum on the Black Sea, a distance of about 400 miles, and with railway facilities none of the best.

The relative capacity of the Russian and American supply was touched upon in a recent number of the London Engineering as follows:

"Now that the adequacy of the Russian supply, in face of an evident falling off of the American production, has been shown, and the probability that ere long we must still further have to depend on Russia has been indicated, it is of importance to consider what steps should be taken by the Russian producers to render their oil more readily available to users in this country. For use as fuel, the Russian astatki—the residuum from their stills after distilling off the light naphtha, lamp oil, and lubricating oils—is sufficiently well known to insure its employment when sufficiently cheap to replace coal, or in cases where liquid fuel can be more readily used, but the principal field lies in the lamp oil, and the only means of insuring its use is the introduction of suitable lamps sufficiently easy to manage, and, above all, sufficiently low in price to bring them within the reach of the masses. Such an innovation is by no means impossible of realization. It was found possible in the sixties, when American petroleum commenced to displace the colza and other oils which were previously in use, and would probably be still more simple at the present time, when less prejudice has to be overcome.

"The perfect organization of the American producers has hitherto had the effect of securing to them the principal markets of the world, and it would be difficult to organize another trust having anything like the wealth and power enjoyed by the Standard Oil Company of America. Even they, however, cannot control the market in the face of a constantly falling supply of the raw material, and a well arranged attempt on the part of the Russians could scarcely fail to give them a largely increased outlet for their enormous supply. Even the agreement which has so often been reported as about to be signed between these great rivals would be by no means a false step on the part of either."

Transatlantic Passenger Traffic.

With steerage rates of 35s. to 42s. for the passage from this country to the States, and correspondingly low rates for the second class cabin berths, one would have expected a large accession to traffic in 1895. The official returns issued lately show an improvement on the abnormally low total of the previous year; but when comparison is made with normal years, the total of 96,558 cabin and 258,560 steerage passengers is found to be less in the one case by 25 per cent and in the other by 33 per cent. Five years ago there were 144,178 cabin and 371,593 steerage passengers, and in the following year—when the Chicago exhibition was open—the numbers were still higher, but since then the totals have dropped, although, as we have said, there was in 1895 an improvement of 4,000 cabin and 70,000 steerage passengers on the figures of 1894. We must, therefore, assume that the inducement of low rates has been counteracted by the stringency of the immigration laws, perhaps, also, by the less satisfactory views entertained as to labor prospects in the immediate future in the States. Even two years' figures, however, cannot be taken as indicating any trend, and we must, therefore, confine our consideration to the steamship working. The reduction in passengers is mostly from the Continent, for the companies who have experienced distinct decreases are chiefly those sending ships occasionally from different ports. The regular liners have not suffered to the same extent. The withdrawal of the occasional emigrant steamer is shown by the fact that only 792 trips were made to New York in 1895, as compared with 879 in 1894 and 975 in 1893. Thus the number of cabin passengers per steamer last year was 122, as against 105 and 125 in the two previous years, while the number of steerage passengers per ship was 326, as against 214 and 374.

The revenue per ship might have been almost the same as two years ago had not rate cutting operated to the contrary. As to the relative positions of Liverpool and Southampton, the latter has increased its total cabin passengers from 35,203 in 1894 to 37,494 in 1895, due solely to the gain of the American Line. Liverpool has practically remained stationary, the cabin total of the Mersey ships for 1895 being 30,649. Of course the Southampton steamers include the few cabin passengers from Bremen and Hamburg. Both ports experienced a decrease on the figures of 1893, but the Liverpool recovery is less pronounced. Time and again it has been pointed out that the new steamer has the preference, and this is partly the reason why the American Line, with their new St. Paul and St. Louis, have increased their total in greater proportion than any other line, 2,586 cabin and 3,675 steerage passengers having been carried in excess of the total of 1894. They come within 2,700 cabin passengers of the Cunard total, although they have six trips less; and again, it should be remembered that four Cunard steamers are engaged for three American liners, a great difference in respect of capital. Each line, of course, must have a stand-by steamer. The Cunard top the list again, with the American next, and the White Star third; but figures will be more readily consulted if we tabulate the totals of the principal lines:

Line.	1893.		1894.		1895.	
	Cabin.	Steerage.	Cabin.	Steerage.	Cabin.	Steerage.
Cunard	18,462	25,103	18,362	19,175	18,844	21,724
American	14,374	12,100	13,560	15,805	16,146	19,580
White Star	13,327	28,876	11,520	20,898	11,805	30,725
North German Lloyd	15,930	68,465	12,049	19,927	10,895	44,326
Hamburg-American	13,052	33,091	9,594	18,463	10,543	30,141
French (Havre)	10,205	16,559	7,490	9,589	7,587	16,469
Anchor (Glasgow)	8,510	11,546	5,703	6,437	6,604	10,011
Red Star (Antwerp)	7,015	24,483	4,513	8,609	4,890	12,554
Netherlands (Rotterdam)	6,033	27,381	3,316	9,638	2,855	11,416
Allan State	3,459	10,298	2,322	2,909	2,509	3, 12

The North German Lloyd, Hamburg-American, Cunard and Anchor Lines all have steamers sailing from the Mediterranean, which, with other Continental lines, bring up the total of emigrants, but these need not be referred to. It is interesting to note, further, that the Cunard ships, on an average, took 336 cabin and 388 steerage, the total number of trips being 56. The American Line steamers made 50 voyages and took 323 cabin and 392 steerage passengers each trip. This is 40 cabin passengers per voyage more than in the previous year. The White Star took 231 cabin and 602 steerage passengers. The latter company has always had a large company of emigrants in their ships, as the table suggests. The French steamers made 54 voyages, taking 140 cabin and 305 steerage passengers per ship; and the Hamburg-American 93 voyages, taking 113 cabin and 324 steerage passengers; and the North German Lloyd 130 voyages, the averages being 83 and 341 respectively. But in the last two instances it should be stated that intermediate steamers are frequently sent carrying only emigrants, so that while the number of emigrants per ship compares favorably with British ships, the number of cabin passengers is necessarily less. Of cabin passengers 40 per cent were carried by British-owned steamers and 60 per cent of the emigrants.—Engineering.

The New East River Bridge.

Chief Engineer L. L. Buck, of the new East River Bridge Commission, has forwarded to the War Department, at Washington, for approval the preliminary data of the proposed bridge, showing the clear height above mean tide and the encroachment of the piers upon the river. On the Williamsburg side the bridge will land about two blocks above the present Broadway Ferry house, and on the New York side the approach will be between Broome and Delancey Streets. Mr. Buck's report to the commissioners, which was adopted on January 29, favors a six track bridge, with two elevated tracks in the middle and two trolley tracks on either side. The total width is to be 118 feet, and to accommodate the roadway and walks it will be necessary to place them over the railways instead of on the outside of the trusses, as originally proposed. Mr. Buck thinks this can be done without exceeding a live load of 10,000 pounds per linear foot, but he will raise this amount by 20 per cent to provide for future contingencies. The scheme contemplates a loop terminal at each end for the car lines.

It is suggested that the park commissioners and other interested parties be requested to "co-operate in the removal of all buildings for the length of the bridge approaches, for the purpose of making small parks of the land not occupied by these approaches."

It is calculated, as regards the trolley lines, to run the cars across the bridge singly or in trains made up of a motor car followed by three or four trailers.

As soon as the general plans sent to the war office have been approved, the full working details of the bridge will be prepared.

Preservation of the Palisades.

The most magnificent piece of natural scenery near New York is the Palisades of the Hudson River. For a distance of fourteen miles, the river is bordered on its west bank by a wall of solid rock varying from 250 to 550 feet in height, to which the name Palisades has long been applied. The cliffs rise from a narrow shore at the river's edge, and from their summit the ground gradually descends to the westward toward the valley of the Hackensack. The material of the Palisades is traprock, used extensively for paving and road making, and the rock is being thrown down in great quantities by blasting; is sold for municipal and other uses. A special commission has been appointed to propose measures to prevent the destruction of the great cliffs, and, as a result of their efforts, a bill has been presented in the House of Representatives authorizing the purchase by the Federal government of ten thousand acres of land along the edge of the Palisades, and corresponding bills have been passed by the legislatures of the States of New York and New Jersey, ceding the jurisdiction over this ground to the United States government.

In preserving the Palisades, the Federal government will merely perform another act in its character of preserver of objects of national interest, such as the Yellowstone National Park, Gettysburg and other battle fields of the civil war. The region along the edge of the mighty cliffs can be made a park of surpassing beauty. At Niagara Falls there is a State reservation on the American side and a correspondingly protected portion held by the Canadian government on the Canadian shores to protect the Falls from injury.

As regards practical availability of the region, it is provided that it shall be open to the use of the State militias of New York and of New Jersey.

Soapsuds on the Waves.

Some experiments have recently been made, says Railroad Gazette, which show that soapsuds will reduce a sea almost as well as oil. This was first tried on the Scandia, an English steamer, in a storm on the Atlantic. Having no great quantity of oil, the master dissolved a large quantity of soap in water, which was discharged over the bow. The effect was nearly instantaneous, the height of waves being so diminished that the vessel could be managed without difficulty. Captain Le Gall, of the French steamer Sénégal, sailing the Adriatic, was struck by a squall and used soap and water with same result. He used three kilogrammes of soap dissolved in 70 liters of water. The solution when dripped over the bow made a quiet space about 10 meters wide, preventing the waves from breaking over the vessel.

A CONTEMPORARY makes the statement that the greatest corporation on earth is the London and Northwestern Railway Company, of England. It has a capital of $595,000,000 and a revenue of $6,500 an hour; has 2,300 engines, and employs 60,000 men. Everything is made by the company—bridges, engines, rails, carriages, wagons, and an innumerable lot of other things; even the coal scuttles and wooden limbs for the injured of its staff. Repairs to the permanent way cost $130,000 a month.

Prof. Herkomer's New Art.

On the afternoon of January 28, at the rooms of the Fine Art Society, in London, Prof. Herkomer, R.A., gave a demonstration and explanation of his "New Black and White Art," says the Evening Post. Prof. Herkomer spoke as follows:

The black and white art, which I now present to painter and public, is new from nearly all points of view. It is patented under the definition of "an improvement in artistic printing surfaces," and not the least part of the novelty lies in the fact that this "printing surface" is the result of a peculiar treatment of an artist's painted handiwork. Thus, probably for the first time, the painter has it in his power to do black and white work, diffusible by the printing press, without departing from his accustomed methods of work, for I give him "paint" to manipulate with the "brush." He has no new technicalities to acquire, such as are needed for the production of various forms of engraving—technicalities that have hindered many an artist from taking to "plate work." I will describe the working of this new invention.

First, then, on the polished surface of a copper plate, which is coated with silver, the artist paints his picture with a thick black pigment resembling printer's ink. In the production of this painting he uses brushes, leathers, stumps, dabbers, pointed bits of wood, his finger tip, or anything, in fact, that will enable him to get the desired effect. So far, you will note, it is a positive process, requiring, therefore, no reversion of the subject on the plate—an inestimable boon to the artist. Although the further development of the process requires that the ink shall remain wet, the artist need in no way hurry himself, as the ink I have invented for this method of work practically never dries. But I rather think the artist will rely on rapidity of work for success, as he will find response to the touch so very perfect. On examination of the painted plate, it will be seen that the ink is on the surface in different degrees of thickness. In this variety of depth in the ink lies the first vital point of the invention. The artist need in no way think of this necessary condition; it comes without conscious effort in the making of his tones and gradations.

This printed surface, with the ink still wet, or soft, is now dusted over with a particular powder—dusted thickly until neither the black paint nor the brighter parts of the plate are visible. A knock on the back of the plate will cause much of the superfluous powder to fall off, but by no means enough. Therefore, a soft, broad, camel hair brush has to be used to brush the surface gently and in all directions, until no more powder comes off. As this powder contains both coarse and fine particles, it will be found that it has stuck to the various parts in the most discriminative way—that is, the coarser grain has adhered to the parts where the ink happened to be thick, and the finer where the ink was less, such as in the gray or light tones. The importance of this discrimination cannot be overestimated, as it affects so materially the quality of the printing surface. We have now, at this stage, a painted picture dusted with a powder which granulates the painted touches in perfect proportion to their depth of tone, without, however, in any way altering their autographic character. But it causes the paint to cover new technical ground, and is the first stepping stone toward the conversion of the painted surface into a printing surface. I may mention that the ink used is composed of German black and a mineral oil, and that the powder is composed of an inert and an active ingredient—the one to give granulation and the other conductibility.

We now enter the third stage and take of this granulated surface a "metallic mould," or, in other words, an electrotype. Such is the conductibility of this surface that (all things being right) in ten minutes a blush of copper spreads over the whole surface when subjected to the electric bath. This settles in and repeats the most minute crevices and interstices. The electric current and quality of the bath for this particular work is a matter of careful experiment, but when once successful, is absolutely certain in its action. The plate is left in the bath until the copper deposit is as thick as an ordinary printing plate, which may mean anything from six to ten days, according to the thickness required. In taking the plate out of the bath it will be seen that the deposit of copper has not only gone over the edges of the original plate, but that the new, deposited plate is thickest nearest the edges. By filing the edges we are enabled to separate the deposited from the original painted plate, and in the deposited plate we get an exact negative or mould of the painted and powdered surface, from which, by the ordinary methods of copperplate printing, a perfect reproduction of the original painting is obtained. That is the process.

THE sum of $22,500 has been subscribed toward defraying the expenses of the meeting of the British Association at Toronto, Canada, in 1897. Ten thousand dollars is contributed by the Dominion government; $7,500 by the Provincial government and $5,000 by the city of Toronto.