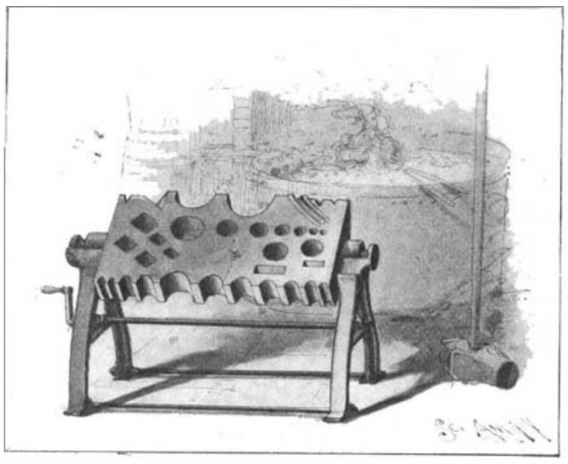
AN IMPROVED TYPE OF SWAGE BLOCK.

We show in the accompanying engraving an improved type of swage block invented by Mr. Horace B. Blood, of 89 Webster Avenue, Rochester, N. Y. For the benefit of those of our readers who are not acquainted with the term, we would define a "swage block" as a heavy iron block or anvil provided with notches and perforations which may be used by blacksmiths in shaping metal. The swage block illustrated



AN IMPROVED TYPE OF SWAGE BLOCK.

is so arranged that it may be readily clamped in any desired position and may as readily be released whenever it is necessary to adjust the anvil to a different position. The block it will be observed has trunnions or journals which engage open bearings formed on the top of the standards of the frame. The standards are connected with each other at their lower ends by bolts. Midway of their height they are connected by a clamping device which consists of a rod revolubly secured to one standard and threaded into a nut in the other standard. By operating a crank on this rod the upper ends of the standards may be drawn together to bind against the ends of the swage block and hold it from turning. Inwardly-directed flanges are formed on the standards just below the trunnion bearings, and these on being drawn inward form firm supports for the swage block when in horizontal position. The recesses lying between these flanges receive and securely hold the swage block when turned to vertical position. When the swage block is held at other angles the flanges sink into grooves formed in the ends of the block around the journals. The usual variety of notches, recesses, perforations, etc., are provided for assisting in upsetting bolts, shaping horseshoes, and forming all other devices which a blacksmith may be called upon to make. The construction of this swage-block is the extreme of simplicity, and the operator will find the tool useful because it may be so easily released from one angle, so readily adjusted to any other angle, and then so quickly and firmly clamped in the required position.

A METHOD OF MAKING GLASS MODELS OF MINES.

The Hill-Chamberlin Manufacturing Company, of New York city, has a patented method of making glass models of mines which enables them to reproduce in solid glass to an accurate scale all the underground workings and surface features of gold, silver, copper, iron, or coal mines.

The models are constructed of thick sheets of clear white glass, laid one upon another, and bolted together, thus forming a unit. The underground workings of the mine are excavated from the glass, and all drifts, shafts, stopes, winzes, upraises, crosscuts, etc., are shown as miniature excavations exactly as they exist in the mine. The top of the model, representing the surface of the ground above the mine, is cut to accurately represent the topographical features of the surface. Future workings can be added to the model as the development of the mine progresses.

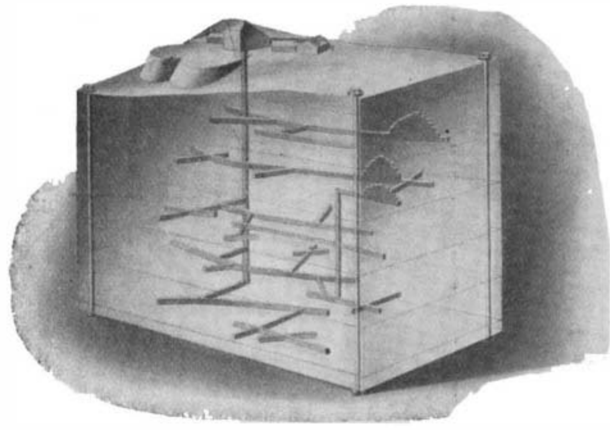
The sheets or plates of glass are fastened together by small bolts, one in each corner serving for the purpose; the holes for the same being drilled perfectly true and of uniform diameter, great care being taken to prevent even the smallest chips at the edges. The holes are drilled with such precision that no extra clearance is left between the bolts and the sides.

After the plates are securely bolted together, the edges are ground to a uniform plane on a horizontal iron disk charged with sand, and are then smoothed and polished. The top plates, intended to represent the topographical features of the surface, are ground upon upright iron mills and stones of various shapes and sizes, and are afterward brought to the same high polish as the sides.

The underground workings of the mine are excavated from the glass by small steel disks and drills of various shapes and sizes, charged with carborundum; the greatest care being necessary to prevent tool marks and small chips appearing in the cuttings. Stopes and other workings between the levels can thus be shown either vertical or on the dip of the vein. Shafts and winzes are shown in the model as rectangular openings with smooth sides. Veins and fissures are shown extending downward from the surface, and on their proper dip and trend across the property, by use of a sawing machine capable of cutting through glass of great thickness; being constructed as an endless band charged with carborundum and running at great speed.

An excellent representation of ore in place in the vein is accomplished by filling the saw cutting with a semi-transparent colored substance mottled to show the structure of the vein.

In assembling the various plates the horizontal planes are coated with a transparent substance adjusted to the same refractive index as the glass, there-



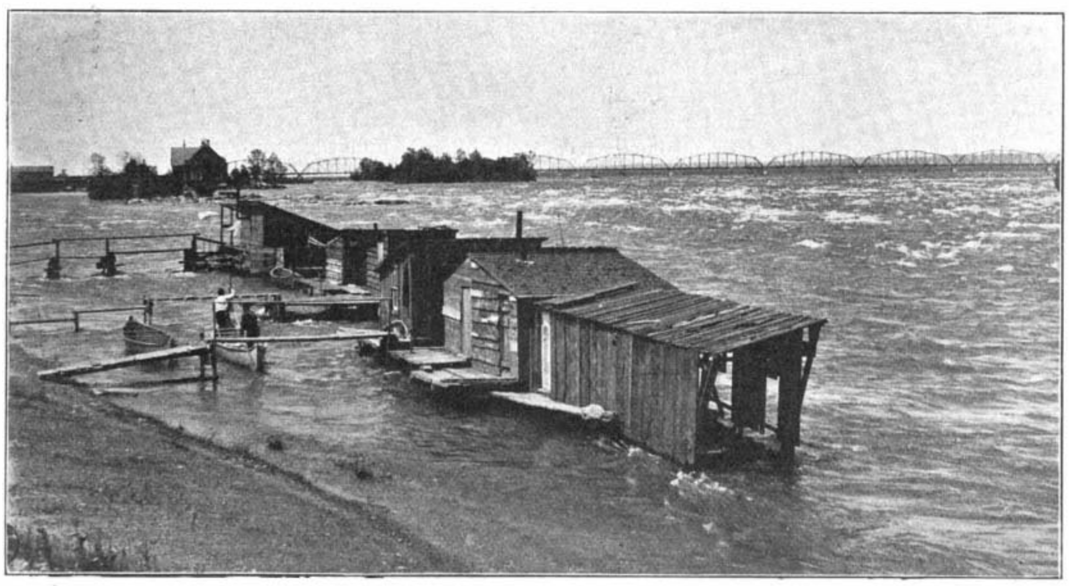
A GLASS MODEL OF A MINE SHOWING UNDERGROUND WORKINGS.

by making the entire model optically homogeneous and avoiding the annoying reflections caused by a series of horizontal polished planes.

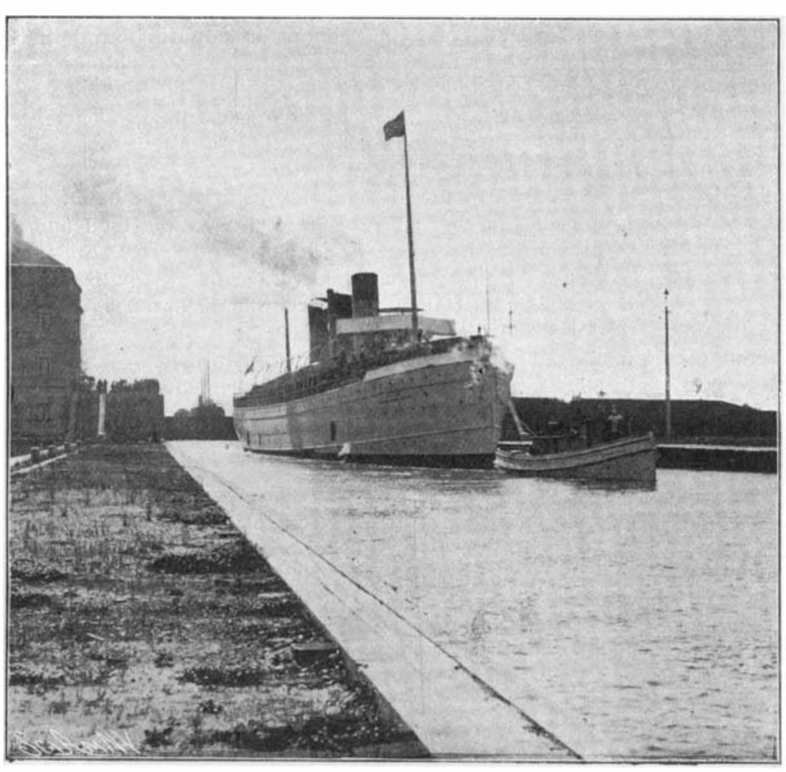
THE "SOO" SHIP CANAL SYSTEM—THE FIFTIETH ANNIVERSARY OF ITS COMMENCEMENT.

BY DAY ALLEN WILLEY.

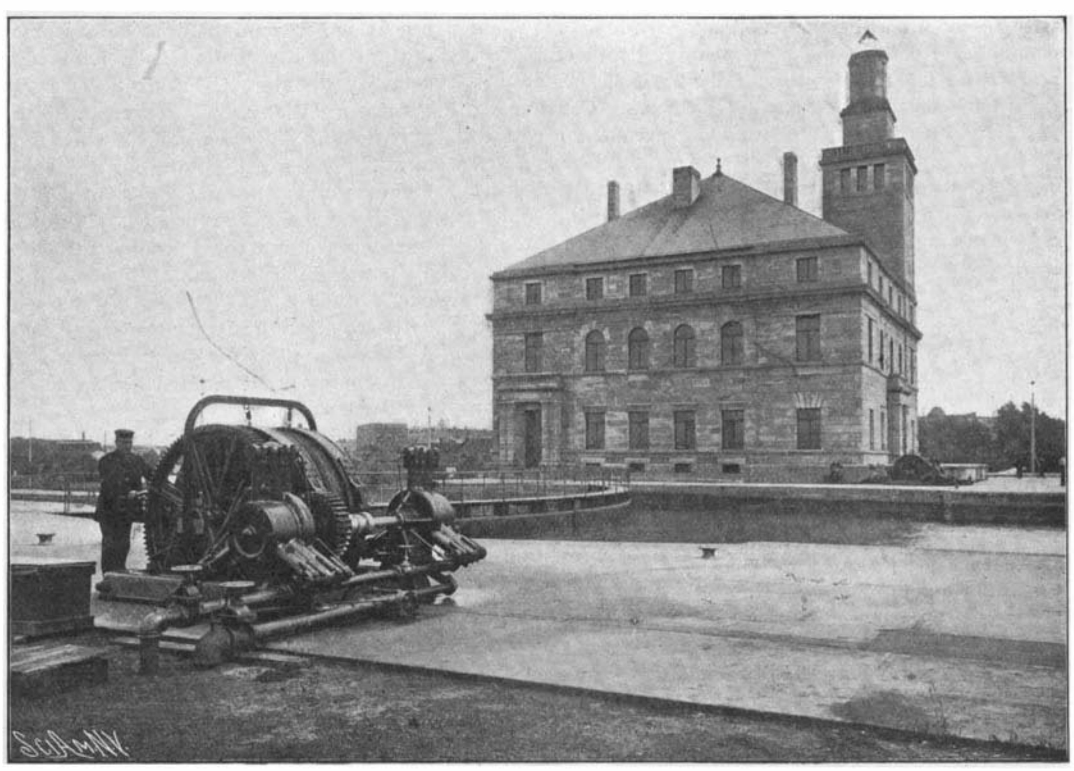
This month marks the fiftieth anniversary of the digging of the Sault Ste. Marie Canal system. On June 4 a celebration, international in its character, commemorated the work begun a half century ago. Representatives of the United States and Canadian governments, in addition to prominent officials of Michigan and other States bordering on the Great Lakes, participated. Their presence was appropriate; for the importance of the canals both to this country and the Dominion is indicated by the traffic which passes through them. Since the gates of the canal locks were first opened, the commerce of the upper lakes has developed to such an extent that during the past year nearly 36,000,000 tons of freight passed into Lakes Huron and Superior. This is an increase of 7,500,000 tons over any previous year in the history of the canals, and, as is well known, is far greater than that of any other artificial waterway in the world. In fact, the "Soo" has been contrasted with such passages as the Suez, which, furnishing a short route between two continents, is perhaps the next in commercial importance. This canal, although it cost $140,000,000 in round numbers, represents an average yearly traffic of less than 10,000,000



THE RAPIDS OF SAULT STE. MARIE.



S. S. "NORTHLAND" AT SAULT STE. MARIE.



GATE-OPERATING MECHANISM AT SAULT STE. MARIE.

tons, so that the business done by the "Soo" is more than three times as great.

The history of the American enterprise is of interest, since it may be called the pioneer engineering work of the Northwest. In 1852 Congress made a land grant of 750,000 acres to the State of Michigan, which enabled the commonwealth to begin work. Excavation was begun on June 4, 1853, and, considering the crude facilities for construction, the canal was completed in a remarkably short period, being opened in June, 1855. The Canadian system or the St. Mary's Falls Canal parallels the north shore of St. Mary's River. It is but 1 1-3 miles in length, and is a comparatively new project, having been completed less than a decade ago. With the completion of these systems began a new era in lake commerce. As the vast natural resources of the country tributary to Lake Superior were afforded an outlet to market by this means, the number of vessels passing through the American canal increased to such an extent that the necessity of enlarging the waterway was made imperative. The passage was widened and deepened to such an extent that it was practically rebuilt. With the greater depth of water, vessel builders on the lakes availed themselves of the opportunity to construct larger craft. It may be said that marine architecture has developed in proportion to the improvements made. Then came the development of the great ore beds in the Mesabi range and vicinity, from which about 220,000,000 tons have thus far been taken. This was a most important factor in further expanding the commerce of the upper lakes passing through the canals, until in 1895 no less than 17,956 vessels were locked through, carrying 16,807,000 tons of freight. It is to be noted, however, that in less than ten years the traffic has more than doubled. This is why the further enlargement of the Michigan canal is under consideration, and it is not unlikely that the government will decide upon plans to be carried out within the next few years. As it is, the famous Poe lock was not opened to navigation until 1896, but in spite of its great capacity blockades are quite frequent.

A comparison with other notable waterways in addition to the Suez gives a clearer idea of the importance of the American Sault. While one of the shortest of canals (its length is only three miles), from 75 to 125 steamships, barges and other craft pass through it every 24 hours, despite of the fact that lake carriers have been so greatly enlarged. The Suez, including the lakes which form a portion of its channel, is 100 miles long, and its tolls annually amount to about $15,000,000. The Kaiser-Wilhelm Canal, which is 61 1-3 miles in length, cost $40,000,000, yet its annual traffic represents only about 2,500,000 tons, while its yearly receipts range from $275,000 to $300,000. The Manchester Canal, which has given the city of this name in Great Britain the advantages of a seaport, is 35½ miles in length and cost in round numbers $75,000,000 including its wharf system. The freight tonnage passing through it annually has increased to about 2,500,000, while its tolls aggregate between $1,000,000 and $1,250,000. Next to the Sault, its locks are among the most extensive in the world, being 600 feet in length. Of the smaller European canals, the North Sea is probably the most important, being 16 miles in length and having a traffic of about 5,000,000 tons of freight yearly. Its cost was $40,000,000. The Elbe and Trave Canal in northern Europe is 41 miles in length, but navigable only by small vessels, as it is but 10 feet in depth. The Cronstadt in Russia, 16 miles in length, has a depth of 20½ feet and cost $10,000,000, the former costing $6,000,000. The waterway which will connect Berlin with the ocean will be one of the most important when completed, as it will have an average depth of 25 feet and will represent an outlay of about $50,000,000 according to the calculations of the engineers. Considering the difficulties involved in its construction, the cost of the Sault canal in its enlarged form is not considered excessive, being less than $10,000,000. It is the deepest fresh-water canal, with one exception, in the world, craft drawing 18 feet of water being able to go through its locks without difficulty.

As already stated, the building of the Sault Canal has proved a stimulus to the development of shipbuilding on the lakes, allowing ore barges and steamships capable of carrying as high as 7,500 tons of cargo to be constructed for the service between the Lake Superior deposits and the receiving ports on Lake Erie. It also led to the building of the Northern Steamship Company's fleet of vessels for passengers exclusively, which are notable for their proportions. Incidentally, it might be added that yearly 60,000 passengers go through the Canadian and American canals. In addition to iron ore, lumber and grain constitute a large proportion of the tonnage, although the bulk of the 27,000,000 tons mined in the Mesabi region and vicinity during 1902 was shipped to the smelters by vessel. In fact, the construction of the canals has led to considerable railroad building in Pennsylvania. It is perhaps unnecessary to refer to the Pittsburg, Bessemer & Lake Erie, completed principally to carry this ore from its lake terminus at Conneaut to the Pittsburg district, representing 233 miles of track and a cost of $10,000,000.

One factor which aided in the construction of the American canal was the comparatively small difference between the level of Lake Superior and that of Lake Huron—20 feet; but it contains the most capacious lock of any waterway in the world—the famous Poe lock, named after the engineer who planned it. This is 800 feet in length, 100 feet in width, and 21 feet in depth. The entire length of its side walls is 1,100 feet, ranging in thickness from 20 feet at the bottom to 10 at the top. The flow of water is controlled by five gates of steel, the upper ones having a height of 26½ feet, the intermediate 43, and the lower 25 feet. Each leaf of the smaller gates weighs 100 tons, the larger representing 190 tons. Two plants are utilized, that for operation being entirely independent of the pumping machinery. The latter consists of twelve engines, of which three are of 350 horse power each, which are held in reserve for emptying the lock in case of accident. They are connected with three 30-inch centrifugal pumps, and it is an actual fact that the lock chamber can be filled and emptied in seven minutes. It is filled by means of lateral sluices. This lock represents more than half of the cost of the canal, as the total outlay for it was $5,000,000. The other lock on the American waterway is but 500 feet in length and 80 feet in width. This is termed the Weitzel, and with its companion furnishes the necessary canal levels.

Reference might be made to the somewhat curious combination of power and ship canals in this locality. Not only are vessels afforded passageways on the American and Canadian sides of the river, but, as is well known, two of the most extensive power canals in the world have been constructed as well, both by the same company. The American canal represents a cost of about $4,000,000, being two miles in length, 30 feet in depth, and having the remarkable width of 200 feet. It supplies power for a series of 320 turbine waterwheels, and is calculated to develop at least 57,000 horse power for generating electrical current and other purposes.

Motor Racing and Motor Records—A Retrospect.

BY OUR LONDON CORRESPONDENT.

In view of the very great interest that is being aroused in the forthcoming race for the Gordon Bennett Cup in the United States, France, Germany, and England, a few notes on the past history of motor-car racing may not be unacceptable. In 1890 Gottlieb Daimler introduced the petrol gas-motor, and in 1894 M. Pierre Giffard, an editor of the Petit Journal, organized a motor race, or rather a trial race, from Paris to Rouen. Handsome prizes were offered, and the competitors started, some using steam, others petrol cars. The winning car (a Panhard-Levassor with a 3½ horse power Daimler engine) reached a trial speed of 13 miles an hour.

In 1895 a race from Paris to Bordeaux and back again to Paris took place. M. Serpollet, who in 1889 had produced a steam-driven tricycle fitted with his own type of boiler; Comte de Bion and M. Bollée entered steam cars. An electric car, the Jeantaud, also took part, but the petrol cars proved their superiority and carried off the prizes, which amounted to £2,500.

The winner was Mr. Levassor, who drove a 3.5 horse power carriage (driven by a Daimler motor) weighing about 12 hundredweight. The total distance was 732 miles, and this was accomplished in just under 48 hours 47 minutes, or at an average speed of nearly 15 miles an hour.

"Prior to this race," said M. Charles Jarrott in a recent paper read before the Automobile Club, "several racing events had been held which had aroused some little interest, but it was not until this really great race that any of us realized the future of the automobile. As a physical feat it was marvelous. . . . The great point, however, which was forced home on our mind was the fact that the possibilities of the motor had been proved. Both the distance that was covered and the average speed of nearly 15 miles an hour which was maintained, seemed to us marvelous."

It was after the Paris-Bordeaux race of 1895 that the Automobile Club of France was formed, the pioneer of the many great motor clubs to be found all over the civilized world.

In 1896 a Paris-Marseilles-Paris race, a distance of 1,061 miles, was organized by the new club. It was won by M. Majade on the first four-cylinder, four horse power Panhard-Levassor car built by the now world-famous firm, in 67 hours 43 minutes, at an average speed of over 16 miles an hour. Of twenty-two starters, only nine finished, as the weather was very unfavorable.

The second car—a Panhard—was driven by the Chevalier René de Knyff—one of the most famous of modern chauffeurs—who can boast the proud distinction of having attained the fastest speed on a car during a contest.

At one stage of the Paris-Vienna race the chevalier was timed to be traveling on a down grade at no less than 98 miles an hour. The third car—also a Panhard—was driven by Mr. Levassor, who experienced a very bad smash-up in trying to avoid a dog and died shortly afterward. His mechanic, however, drove it into third place. Among other competing cars were some made by Delahaye, Peugeot and De Dion-Bouton.

In the Paris-Bordeaux race of 1897 the Chevalier de Knyff came off victor. The distance (573 kilometers = 356 miles) was done in 15 hours, an average of 38 kilometers (24 miles) per hour. In the Paris-Dieppe and Paris-Trouville races of this year an average of 26 miles an hour was maintained.

In July, 1898, the Paris-Amsterdam race, the first of the big inter-country races organized by the Paris Automobile Club, took place. The winner was M. Charron, who did the 152 kilometers on an 8 horse power Panhard in 33 hours 4 minutes—or at an average of 27 miles an hour. In this contest some of the four-cylinder, 8 horse power Panhard cars were seen for the first time.

The two big events of 1899 were the Paris-Bordeaux race and the "Tour de France." The former—351 miles—was won by M. Charron on a 12 horse power Panhard, who came out with an average of 34 miles an hour, the distance being accomplished in 11 hours 43 minutes without a stop. In the Tour de France, the longest motor race ever held, the Chevalier de Knyff, on a 16 horse power Panhard, did the 1,440 miles in 43 hours 33 minutes.

Other races of 1899 were the Paris-St. Malo (200 miles), won by M. Antony on a 16 horse power Mors in 7 hours 32 minutes; the Paris-Ostend (204 miles), in which M. Giradot on a Panhard and M. Levegh on a Mors tied for first place; Paris-Boulogne (143 miles), won by M. Giradot on a Panhard, and the Bordeaux-Biarritz, won by M. Levegh on a 16 horse power Mors.

In June, 1900, came the first Gordon Bennett race. In 1899 Mr. James Gordon Bennett presented the Automobile Club de France with a work of art to be raced for by motor cars and to be held as an international trophy. It is generally known as the "Gordon Bennett Cup," but it is in reality no cup, but a piece of plate in the form of a model of a motor car carrying two figures, "in anything but motor-car costume," as some one has remarked. The "cup" is now to be seen in the drawing-room of the club house of the Automobile Club in Piccadilly.

The rules for the cup include the following: Any recognized club may enter three cars to represent its own country; every car competing must have been constructed *entirely* in the country it represents; the race must be held in the country holding the cup, or failing that, in France.

The first Gordon Bennett race was from Paris to Lyons, a distance of 556 kilometers. It was won by M. Charron, who drove a Panhard-Levassor car; his average worked out at 61 kilometers.

In July, 1900, a Paris-Toulouse-Paris contest took place. The winner was M. Levegh on a 24 horse power Mors, who covered the distance of 836 miles in 26 hours 43 minutes, or at an average of 42.7 miles an hour.

It was in this race that the really big racing car made its appearance for the first time. The 24 horse power Mors beat the Panhard cars, and the fierce rivalry between the two great firms then had its origin. In the Paris-Bayonne race De Knyff attained a mean speed of 43.4 miles an hour; the distance being 208 miles. He drove a 20 horse power Panhard, and during one part of the race he is said to have done 34½ miles in 33½ minutes. The other interesting races of 1900 were the Bordeaux-Perigueux (252 kilometers), won by M. Levegh in 2 hours 40 minutes, or at an average of 51 miles an hour, and the Paris-Rouen—the first alcohol race ever held.

Motor-car racing now became exceedingly popular on the Continent, and space forbids anything but the briefest mention of the most famous contests.

On May 29, 1901, the Paris-Bordeaux race (328 miles, not counting the neutralized sections), was held and was won by M. Fournier on a 60 horse power Mors in 6 hours 11 minutes, at an average of 53¾ miles an hour. His fastest timed piece was 17½ miles in 15 minutes. In this race the 50 horse power Napier made its appearance for the first time.

The Gordon Bennett cup race was run simultaneously over the same course. The only three competitors were all Frenchmen, viz., MM. Charron, Levegh and Giradot. Only the last-named finished.

In June, 1901, came the Paris-Berlin race, when M. Fournier again proved victorious, covering 686 miles in 16 hours 33 minutes, or at a mean velocity of over 44 miles per hour, excluding 63 miles of "controlled" district, through which each competitor had to follow a cyclist at 6 or 8 miles an hour in order to insure the safety of the public and effectually prevent an attempt at racing through crowded places.

The Paris-Vienna and the Gordon Bennett cup races were the most important racing fixtures of 1902. The latter was run over part of the same course (Paris-Innsbrück, 379 miles) as the former, and at the same time. It was won by Mr. S. F. Edge, A. C. G. B. I., the only English representative; France—the only other nation represented— entered three chauffeurs.

"Personally, I shall never forget," writes Mr. Jarrott, "my elation when I saw the great hope of France—Fournier—out of the race on the first day, Giradot having already finished his effort soon after the start, leaving De Knyff the sole champion for France. With Edge in slight trouble, but still going well, England's hopes at the end of the first day were much brighter than at the beginning."

The Paris-Vienna contest was won by M. Marcel Renault on a 16 horse power voiturette. The distance was 615 miles (after deducting the Swiss or neutralized portion of the route), and it was done in 15 hours 47 minutes 43 seconds, or at 40 miles an hour. It is noteworthy that 75 per cent of the starters arrived at Vienna. M. Henri Farmar was second (16 hours 0 minutes 30 seconds), M. Edmond was third (16 hours 10 minutes 16 seconds), and Count Zborowski was fourth (16 hours 13 minutes 29 seconds).

The other most important contests of 1902 were the Circuit du Nord Alcohol race, 571½ miles (865 kilometers), won by M. Farmar on a 40 horse power Panhard in 11 hours 55 minutes, or at an average of 47.69 miles an hour, and the Circuit des Ardennes (318 miles, 512 kilometers), won by Mr. Charles Jarrott in 5 hours 53 minutes 39 seconds, giving an average speed of 54 miles an hour. M. Gabriel was second, and Mr. W. K. Vanderbilt, Jr., third.

The superiority of the petrol car over the steam or electric for racing purposes has been abundantly proved. According to the Hon. C. S. Rolls, steam cars have only gained first place on two occasions, viz., the "Concours du Petit Journal" in 1894, and the Marseilles-Nice-Turbie race in January, 1897, when a De Dion brake covered the rough and hilly route of 145 miles in 7¾ hours.

MOTOR-CAR RECORDS IN LONG DISTANCE RACING.

Year.	Course.	Mean Speed of Winning Car.	H. P. of Winning Car.
		Miles an hour.	
July, 1894	Paris-Rouen (128 km.)	13	3½
June 11, 1895	Paris-Bordeaux-Paris (1,200 km.) (Winner M. Levassor)	15	3.5
Sept. 24, 1896	Paris-Marseilles-Paris (1,700 km.) (Winner M. Mayade.)	16	4
1897	Paris-Bordeaux (Winner Chevalier Rene de Knyff.)	24	..
July 24, 1897	Paris-Dieppe (170 km.)	25	3
July 7, 1898	Paris-Amsterdam-Paris (1520 km.) (Winner M. Charron)	27	8
May 24, 1899	Paris-Bordeaux (565 km.) (Winner M. Charron)	34	12
July 16, 1899	Tour de France (2,219 km.) (Winner Chevalier R. de Knyff.)	29	16
July, 1900	Paris-Toulouse-Paris (Winner M. Levegh)	42	24
May 29, 1901	Paris Bordeaux (527 km.) (Winner M. Fournier)	53¾	60
June 27-30 1901	Paris-Berlin (1,198 km.) (Winner M. Fournier)	44	28
1902	Paris-Vienna (Winner M. Renault)	40	16

THE GORDON BENNETT CUP.

Year.	Course.	Winner.
June, 1900	Paris-Lyons	M. Charron on a Panhard-Levassor
1901	Paris-Bordeaux	M. Giradot on a Panhard
1902	Paris-Innsbruck	Mr. F. S. Edge on a Napier

A Remarkable Surgical Operation by Which Sight Was Restored to a Congenitally Blind Man.

Readers of the SCIENTIFIC AMERICAN have doubtless noticed in the daily press brief accounts of the remarkable case of a man whose sight has been restored after thirty years of blindness. In the current number of the Lancet, Dr. A. Maitland Ramsay, the surgeon by whose skill the unfortunate was enabled to see the world which had been shrouded in blackness to him since his birth, publishes a very complete account of the case.

The patient, aged thirty years, blind from birth, was brought to the Glasgow Ophthalmic Institution on February 24, 1903. He had been allowed to run about as he pleased, no attempt to educate him having ever been made. He became, however, so familiar with the country district (a few miles from Glasgow) in which he resided that he could go about without the slightest fear; and his hearing was so acute that he knew at once if there was anything unusual on a road along which he was walking, and thus he never had any difficulty in keeping himself out of danger. As he passed along a road he could tell a wall from a hedge by the sound of the air coming through the leaves and branches of the latter. He could easily go on an errand to any house in his native village, for the resonance of his footfall—quite different in sound when he was passing a building from what it was when he was opposite an open space—enabled him, perfectly familiar as he was with his surroundings, to count the houses as he passed, and thus to turn corners and finally to stop at the one which he wanted. He distinguished different blossoms partly by touch but chiefly by smell, and by dint of asking questions he got at last to know so much about their form and color that he could arrange them in a bouquet. Occasionally he worked in the harvest field and he could bind the corn and arrange the stooks as well as any of the other laborers.

The patient was quite unable to distinguish objects, although he could tell day from night and could easily perceive a light and locate it accurately; he seemed to have had no perception of bright colors.

As a cataract seemed to be the only obstacle to vision Dr. Ramsay resolved to operate and extracted the lens from the right eye on March 11, and that from the left eye a week later. Both lenses were small and shriveled and the nucleus of the right was calcareous. For about ten days after the operation on the left eye the patient appeared to be quite dazed and could not realize that he was seeing. The first thing he actually perceived was the face of the house surgeon. He said that at first he did not know what it was that he saw, but that when Dr. Stewart asked him to look down, the sense of hearing guided his eye straight to the point whence the sound came, and then, recalling what he knew from having felt his own face, he realized that this must be a mouth, and that he must be looking at a face. Once he properly understood what vision meant he made very rapid progress and his extraordinarily retentive memory enabled him to take full advantage of everything that he was told. He was quite ignorant of color, but learned to distinguish hues very quickly. The first tint that he saw was red. A red blanket lay across the foot of his bed. He asked what it was and was told, and never afterward did he have the slightest hesitation in discriminating red again. He was shown a narcissus, and on being asked to describe it he immediately recognized the flower and knew from his old bouquet-making experience that it was white and yellow, but he now for the first time also became aware of the little red band in the center and at once called attention to it. When he was shown a bunch of daffodils he recognized them by their smell and immediately said that they must be yellow. The color that took him longest to master was green, but he can now name all ordinary tints readily and correctly. His difficulty with green is hard to explain unless it be that with green he has no smell-association such as he had with colored flowers. Unlike Locke's blind man, who imagined that "scarlet was like the sound of a trumpet," he does not seem to connect any distinct ideas with particular colors except that he said that red gave him a feeling of pleasure and that the first time he saw yellow he became so sick that he thought he would vomit. The latter feeling, however, has never recurred.

He rapidly learned the letters of the alphabet and figures and he will soon be able to read and to reckon. From the very first he saw everything in its actual position, showing that the retinal inversion of a picture is interpreted psychically without any education.

He could count accurately after he had looked at objects one by one and seemed to derive much help in his calculations by pointing with his finger. Here again he seemed to translate touch into vision and to arrive at a perception of the whole through the perception of the individual parts. He cannot take things in at a glance. He does not see the passers-by on the opposite side of the street quickly. He looks most intently and moves his head backward and forward and from side to side as if trying to get a view of them all round before he can make up his mind what he is seeing; in a room, however, he can distinguish things much more quickly. With any complex outline, however, or group of outlines, he still has considerable difficulty, though pictures are no longer to him, as they were at first, mere masses of confused color.

He was able to estimate size and distance more readily that might have been anticipated, although he said that he felt that if he were out of doors by himself he would be "wandered." From the time he got out of bed after the operation he could guide himself with ease through a doorway and walk about on the level, but he had considerable difficulty in ascending a stair, because the steps seemed so high that to begin with he raised his foot much farther than was necessary and without meaning to do so went up two steps at a time. Whenever he discovered his mistake he began to pay attention to the rise of each and he has now no difficulty in estimating their height. This, of course, was part of his difficulty in judging distance, though when he first looked out of a window on to the street and saw the pavement below he said that he felt that if he had a stick he should be able to touch it. Before the operation he could guide himself fearlessly through a ward without coming in contact with the beds or any other obstacle that might be in the way, but since he has been able to see he says that he has lost all that feeling of confidence and when his eyes are shut he is afraid to move and is impelled to open them to ascertain where he is going—so much so that he does not know what he would do if he again became blind.

When he is requested to look in any particular direction he is unable to cause the ocular muscles to do what he wishes, and the balls oscillate and one or other turns inward to such an extent that a portion of the cornea is hidden by the inner canthus. This want of control renders it very difficult to make a satisfactory ophthalmoscopic examination, but as far as can be made out the fundus oculi is normal; indeed, the functional activity of the optic nerve since the cataracts were removed is very remarkable and is in striking contrast to the purposeless muscular movements. Disuse has crippled the function of the latter, but seems to have had but little effect on the activity of the former. The eye is a receptive organ and the light that gained access to the retina through the opaque lens proved stimulus sufficient to maintain the optic nerve in health, while the want of visual power deprived the co-ordinating center in the brain of all stimulus to develop and hence the ocular muscles are not trained to obey the dictates of the will.

New Motor Cycle Records.

On the Empire City track new records were made for motor cycles on May 27, 1903. B. Oldfield made a three-mile trial with the following result: One mile, 1 minute 6¾ seconds; two miles, 2 minutes 12 seconds; three miles, 3 minutes 19 seconds. The second mile was made in 1 minute 5¼ seconds. The record for the track was 1 minute 6 4-5 seconds, made by Fournier on October 9, 1901.

Albert Champion made a five-mile trial with his four-cylinder motor cycle. His times were: One minute 14 seconds, 2 minutes 24 seconds, 3 minutes 57 seconds, 5 minutes 9 seconds, 6 minutes 16½ seconds. Then he went for a mile with a flying start. He made the half in 35½ seconds and the mile in 1 minute 6½ seconds.

This time for the mile is lower than the new record established by Fred Chase, the English motor cyclist. Chase made the mile with a flying start in 1 minute 6 3-5 seconds at Canning Town. The previous American record was 1 minute 10 2-5 seconds, made on the Vailsburg track by Champion last year. The timing was done by three competent horsemen, but the figures cannot be accepted as a record.

The Current Supplement.

The Paris correspondent of the SCIENTIFIC AMERICAN opens the current SUPPLEMENT, No. 1431, with an article on the Paris-Versailles road, illustrated by many striking pictures. Sir Oliver Lodge continues his admirable discussion of electrons. Count Arco, who in conjunction with Prof. Slaby invented the Slaby-Arco system of wireless telegraphy, contributes a paper on a new process for tuning spark telegraph stations. Something about the preparation and use of decalcomania papers will doubtless be welcomed. "Restorations and 'Fakes'" is the title of an entertaining archæological article which deals with the skill of the modern craftsman in repairing and remodeling ancient statuary. John D. Rees tells much of interest about domestic life in India. Mr. A. F. Yarrow has made some instructive experiments to ascertain the best design of screw propulsion for shallow-draft boats. His conclusions are published in the current SUPPLEMENT. Mr. William J. Hammer discusses the treatment of diseases by ultra-violet rays.

Third rail troubles from sleet adhering to the rail have been overcome on the line of the Aurora, Elgin & Chicago Railway. A solution of brine, stored in a tank on the front platform of the car, is fed upon the rail through a ¼-inch rubber tube. It is applied 5 feet to 10 feet in front of the first contact shoe, and acts so quickly that the first shoe, it is said, will get current, this treatment apparently rendering the ice a good conductor. Eight gallons of brine suffices, so it is reported, for a run of 24 miles.

Harvey T. Woodman, of Mount Vernon, N. Y., died on May 25. For more than forty years he was engaged in the collection of shells, corals, and prehistoric relics and fossils for museums, colleges, and private collectors. It was he who remodeled Castle Garden into its present Aquarium. He likewise helped to build college museums of natural history for Harvard, Princeton, Columbia, Cornell, and other universities.

Thomas A. Edison has been appointed one of the Board of Technical Directors of the Marconi Wireless Telegraph Company. He has formally transferred to the Marconi Wireless Telegraph Company several patents having a bearing on the transmission of wireless messages. It is rumored that Prof. Michael I. Pupin, of Columbia University, will likewise join the company as a technical adviser.