THE GORDON BENNETT AUTOMOBILE CUP RACE.

PREPARED SPECIALLY FOR THE SCIENTIFIC AMERICAN BY OUR CORRESPONDENT IN IRELAND.

The great International Motor Car Race of 1903 is the first—and very possibly it may be the last—automobile contest on common roads ever held on British soil. Next year it will have to be held in Germany, but it is quite possible, in view of the tremendous horse power of the modern racing car, and the ever-increasing danger, both to the competitors and to the sightseers when the races are held on public highways, that the races of the future will be run on special tracks.

Motor contests have been of great value in stimulating the automobile industry, but it is doubtful if future races would result in any very important gain to the manufacturers. It used to be said that the racing cars of one year were the touring cars of the next. This was true some years back, but no one can suppose that 60, 80, or 100 horse power cars will be produced for ordinary driving next season.

Before describing the race, a word may be said respecting the history of the "Gordon Bennett Cup."

In 1899, Mr. James Gordon Bennett, the proprietor of the New York Herald, instituted an International Cup which is to the automobile world what the "America" Cup is to the yachting world.

The first race was run in 1900. The course was from Paris to Lyons, 353¾ miles. France, Belgium, and America each competed, and the winner was a Frenchman, M. Charron, who covered the course in 9 hours, 9 minutes, making an average of 32½ miles per hour. He drove a 20 horse power Panhard machine, which weighed 2,100 pounds, and whose highest speed was about 53 miles an hour. The other competitors representing France were Giradot and De Knyff.

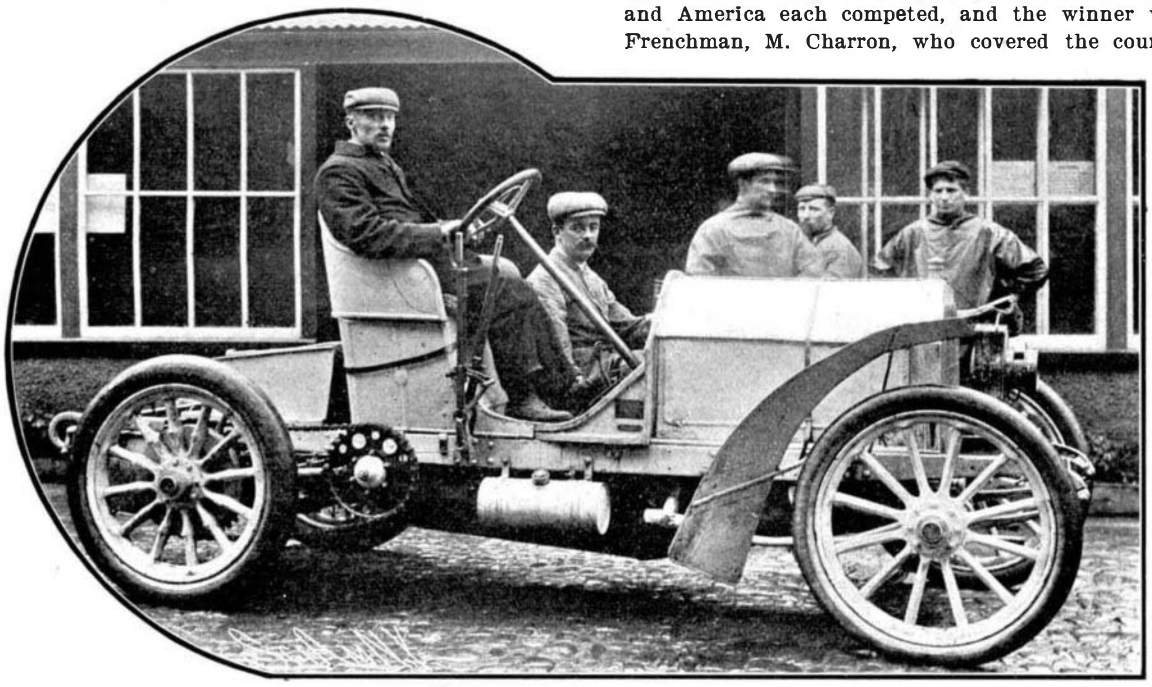
The representative of America was Mr. Winton, who drove a Winton car and abandoned the race at Chevreuse, where he broke one of his front wheels.

Belgium was represented by M. Jenatzy, the winner of the cup on July 2 last, whose car upset near Châteaufort owing to the bursting of a tire.

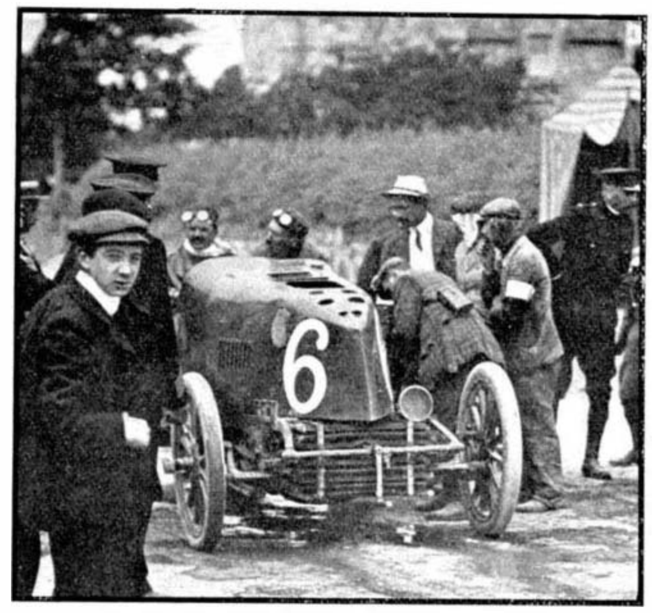
The second contest took place on March 29, 1901, simultaneously with the Paris-Bordeaux race, and over a course 328 miles in length. It was won by M. Giradot, who drove a 40 horse power Panhard with Centaure motor, the highest speed of which on a level road was about 60 miles an hour. M. Giradot covered the distance in 8 hours, 47 minutes, 39 seconds, his average working out at 37 miles an hour. The leather of his clutch became completely worn out at Tours, and here he had to remove the change-speed gear in order to renew it. Although this took 2½ hours, M. Giradot won with ease.

The other Frenchmen were M. Levegh on a 60 horse power Mors, and M. Charron on a Panhard. The former broke his bevel driving gear at Sainte Meure, and the latter broke all his inlet valves.

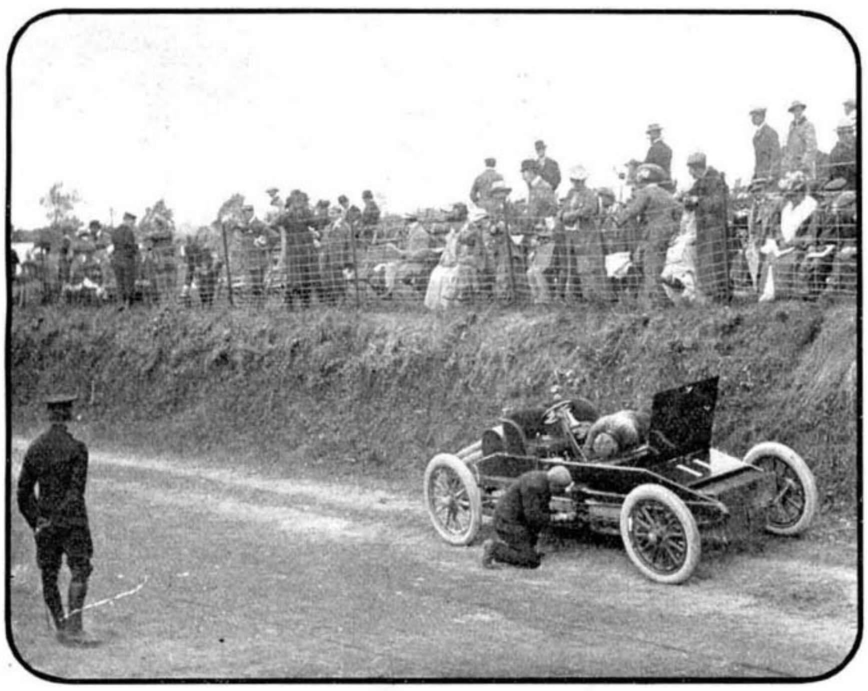
The only other competitor who entered was Mr. S. F. Edge, representing the United Kingdom. He drove a 50 horse power Napier car. He could not race for



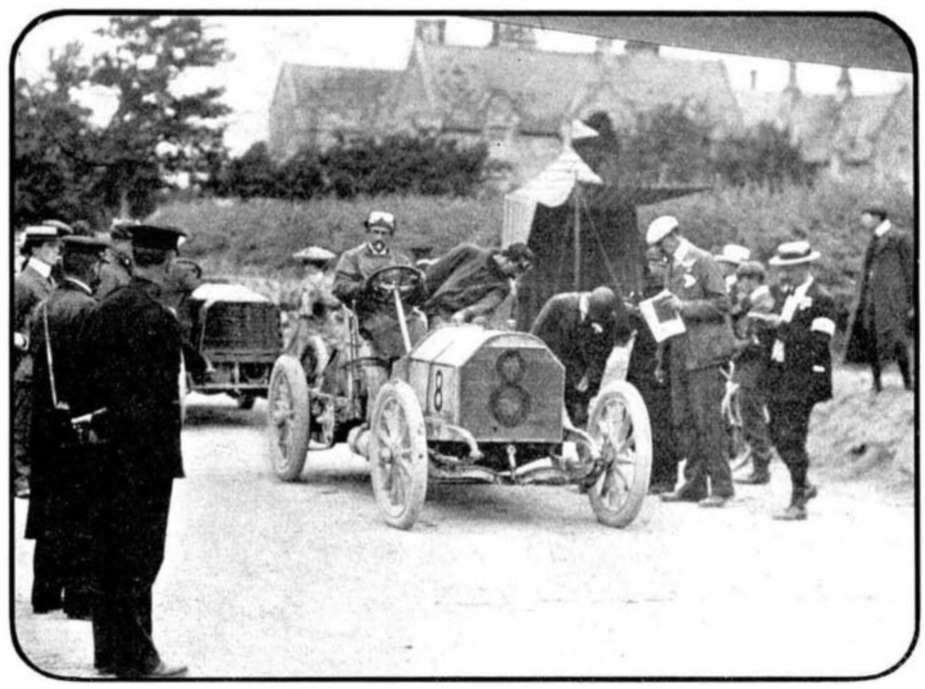
Jenatzy, the Winner, on Mr. Clarence Gray Dinsmore's Mercedes.



Gabriel on a Mors Car at the Athy Control.

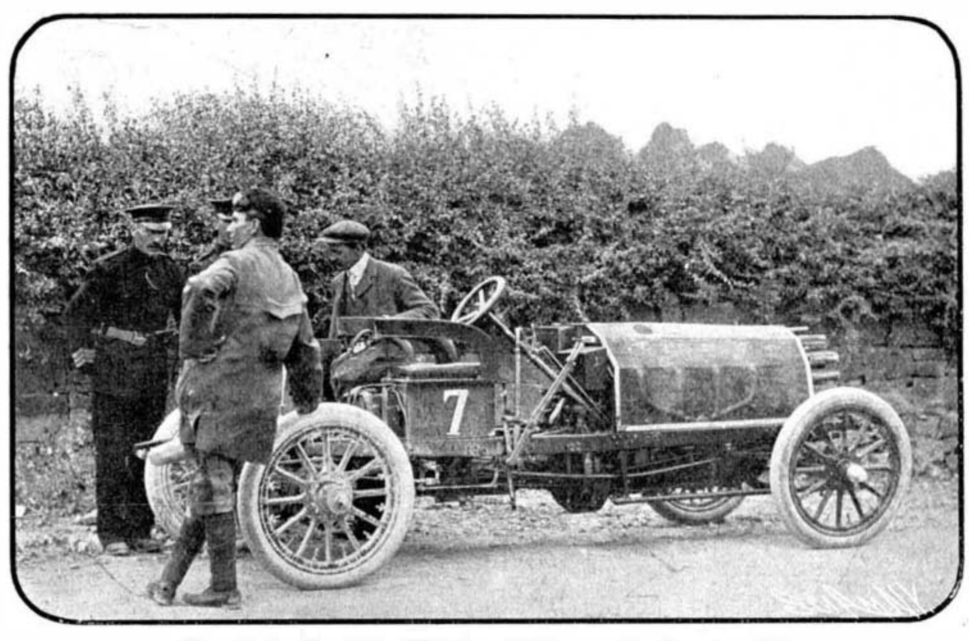


Mr. Winton Repairing His Car, After His Failure to Start.



Baron de Caters at Athy Control.

Foxhall Keene on His Mercedes.



Mr. Mooers in Athy, After the Accident to His Peerless Car.

SOME OF THE CONTESTANTS IN THE RACE FOR THE GORDON BENNETT TROPHY.

the cup, as he could not get a British set of tires in time, his own having failed owing to the heaviness of the car.

By courtesy he was allowed to start first after the Gordon Bennett competitors in the Paris-Bordeaux race.

The third race, in 1902, was run over part of the Paris-Vienna route, between Paris and Innsbruck (387 miles). There were only four starters: Mr. Edge and MM. de Knyff, Giradot, and Fournier.

Mr. Edge, the winner, drove a 30 horse power Napier car and his time was 10 hours, 41 minutes, his average being 36 miles an hour.

M. Giradot drove a 60 horse power Charron, Giradot & Voigt car, but had to abandon the race at Bar-sur-Sâone owing to the leather of his clutch being worn.

Fournier drove an 80 horse power Mors racer, and had to abandon the race thirty miles before reaching Belfort, as his frame became bent and the shaft between the clutch and the gear broke.

M. de Knyff drove a 70 horse power Panhard, and succumbed when almost in sight of the winning post.

Fournier said afterward that he had some terrific racing on his Mors car against M. de Knyff's Panhard. The top speed of his car was about 75 miles an hour, and he made a record, doing one kilometer in 29 seconds.

The course for the race this year was chosen in Ireland on account of its being more sparsely settled than England or Scotland, and a special Act of Parliament was required before the race could be run.

The course chosen was in the shape of two loops, forming roughly a figure eight. The requisite distance—which has to be not more than 416 miles and not less than 344—could not be secured in one stretch, so the competitors had to traverse the course three times, thus allowing the onlookers to see the cars at least thrice from any one point. Those at the start and finish saw the cars pass no less than seven times.

The whole course once round was 103 miles, 740 yards, including the controls, i. e., the areas around villages and towns where the cars had to slow down, as well as at certain dangerous spots. The net racing distance was 92¾ miles. The course was covered three times, in addition to the western or larger circuit, once additional, making in all 368 miles, 780 yards.

There were seven controls in all. At Kilcullen crossroads, each driver was stopped for a moment and told his course; the other controls were at Castledermot, Carlow, Athy, Kildare, Monasterevan, and Stradbally. Here were head marshals, marshals, timekeepers and their assistants, starters, registrars, stewards, etc., making 161 officials in all.

A minimum time was fixed for the passage through the control according to its length, and each car was piloted by a bicyclist whom it was prohibited to pass. During the passage through the controls, the cars took on water, gasoline, and oil, as well as refreshment for the driver and mechanicians.

The first car was started at 7 A. M. on July 2, and this was a 100 horse power special Napier racer, driven by Mr. Edge, an illustration of which we give herewith. Taking the English cars first, it will be remembered that, as the result of the eliminating trials held recently on the Duke of Portland's private racing track at Welbeck, the Napier car proved its superiority over the "Star" car, the only other English car qualified to enter.

Mr. Edge had intended originally to drive one of the regular 1903 pattern, 35 horse power Napier cars. Quite at the last, however, he decided to use a new car with a more powerful motor specially designed by Mr. Napier for the race. This car is of much the same pattern as the other two Napier racers. The engine, however, is built higher, and the bonnet is oval instead of square.

The 35 horse power Napiers, driven by Messrs. Jarrott and Stocks, are of much the same type as those on which Mr. Edge won the cup last year. The machines are gear driven, with a direct drive on the top speed, and are built throughout with the idea of eliminating friction, so as to make excessive horse power unnecessary and at the same time enable the car to climb practically all hills at top speed. The wheels are 34 inches in diameter and the wheel base is 7½ feet. The system of spring suspension used is very simple, all the usual shackles being done away with. The clutch is self-contained, so that no end thrust is thrown on the engine or gear-box, and is of simpler form than before.

The weight limit of the racers was 2,204.6 pounds. The 110 horse power Napier weighed 1,985 pounds, while the 35 horse power cars weighed 1,970 pounds.

Chevalier René de Knyff, on a 70 horse power Panhard, was the second to start. He was sent off at 7:07 A. M., and was followed at 7-minute intervals by Percy Owen, on his Winton machine, and Camille Jenatzy on a Mercedes, representing America and Germany respectively. After them, two other sets consisting of one English, one French, one American, and one German machine were started, and the race was fairly under way. Winton was not able to start till 8:50.

Before the cars got away, the general favorites were Messrs. Edge and Jarrott, and Gabriel, the winner of the Paris-Madrid race. When Edge, after covering the 47 miles of the smaller loop, flashed past the starting point at 8:24, long before Winton had got away, the cheers from British throats were loud and long; but soon after this, trouble with punctures began (he is said to have used seven tires in the course of the day) and it was quite evident he had no chance of victory. With Jarrott and Stocks out of the race from accidents, the hopes of Great Britain were sadly shattered. As the day wore on, it was evident that the struggle would be between Jenatzy, De Knyff, and Henri Farman. Gabriel did not seem at home on his Mors car, and probably the winding roads puzzled him a good deal.

The American competitors had decidedly bad luck. Mr. Winton had trouble with bad gasoline containing paraffine, which stopped up the spraying nozzle of his carbureter, and cost him 48 minutes locating and remedying the trouble at the start. He gave up the race at an early stage. At the Athy control, Mr. Mooers lost a pin out of his change-speed gear and had to abandon the race.

Mr. Owen began well, and his neck-and-neck struggle with Jenatzy early in the day was one of the most exciting incidents of the contest. After this he never became dangerous, and finally quit after going twice around the course.

The close of the race was the most exciting incident of the day. De Knyff passed the winning post first at 5:34 P. M. Then came Jenatzy at 5:36, then Farman at 5:39, and Gabriel at 6:20, while Edge was a very long way behind. Jenatzy was declared the winner, as he started 14 minutes after De Knyff.

The list of accidents and breakdowns was quite a long one, and only five out of twelve machines succeeded in finishing. The rear axle of Baron de Caters' Mercedes racer broke within 12 miles of the finish and he had to give up, while Mr. Foxhall Keene discovered signs of a breaking axle while passing through a control, and determined to retire.

Stocks mistook a turning and ran into a fence. His car was smashed and he was thrown over a wall, but neither he nor his chauffeur was much the worse for the mishap.

Jarrott came off with a broken collar bone; his steering gear went wrong, and his car, becoming uncontrollable, swerved and overturned, breaking in half as it did so. The Chevalier de Knyff took a wrong turn and ran into a fence, but he suffered no damage and lost hardly any time on this account. It was a wonder that the accidents were not more severe than they were, seeing that the cars frequently passed each other on the narrow roads.

The international character of the event lent of course an especial interest to the motor race, and the representatives of the four competing nations present naturally were keenly anxious that their country should bear off the cup.

The French team made the best showing as a whole, for it was the only one all three members of which finished. To it was awarded, therefore, the John Scott Montague prize for the best performance of any entire team.

The victory of the Mercedes car will undoubtedly give a great stimulus to the German automobile industry, though if road races are still to be permitted, it is quite certain that French, English, and American manufacturers will use every effort to turn out cars which shall successfully compete with the German racers.

The International Commission for the Gordon Bennett Cup Race, after sitting all day on July 3, formally awarded the trophy to the German Automobile Club.

The times, after allowing for control deductions, were as follows:

1. Jenatzy, Germany ....6 hrs. 39 min.
2. De Knyff, France......6 hrs. 50 min. 40 sec.
3. Farman, France ....6 hrs. 51 min. 44 sec.
4. Gabriel, France ....7 hrs. 11 min. 33 sec.
5. Edge, United Kingdom. .9 hrs. 18 min. 48 sec.

Jenatzy's average speed for the 368⅛ miles worked out at 56¼ miles an hour.

This is the highest average ever made in any Gordon Bennett Cup Race. In 1900, M. Charron's time was 32½ miles an hour; in 1901, M. Giradot's was 37, and in 1902, Mr. Edge's was 36 miles an hour.

The elaborate arrangements made for the timing of the cars, both through the various controls and at the finish, are of considerable interest. The scheme was originated by Mr. R. E. Phillips, who has himself given the following particulars:

"As the cars were dispatched from the starting-point at a predetermined interval of time, the factors which determined the ultimate winner were (1) the sum total of the periods of time occupied in traversing the various controls, and (2) the periods of time which elapsed between the finish of the first and subsequent cars. The actual time occupied in completing the course, though of interest in showing the speed at which the cars have traveled, may be regarded as a negligible quantity so far as ascertaining the actual winner is concerned.

"Hitherto, in similar races, it has been the practice to time the arrival and departure of each car at and from a control, and arrive at the allowance to be made from the gross running time by a process of deduction; but experience has shown that it is impossible to get a large number of chronographs to synchronize after running for long periods, and that, as a consequence, errors accumulate.

"The system, therefore, which was employed in the Gordon Bennett race this year, provided that the time of each car in a control be checked and recorded on an independent watch, so that the timing of each car through a control should be a separate and independent observation. To do this, it was necessary to have twelve watches at each control, and, as there were seven controls, no less than eighty-four watches were required. To obtain this number of chronographs; with fly-back center-second hands and minute recorders correctly rated, seemed at first an insurmountable difficulty, but the well-known firm of chronograph manufacturers, Messrs. Stauffer, Son & Co., of London and Chaux-de-Fonds (Switzerland), stepped into the breach and loaned to the Club gratuitously, for the purpose of the race, the required number of chronographs.

"The *modus operandi* of timing the controls was as follows: At each control there were twelve watches and twelve small boxes to contain them. The timekeeper at the entrance to the control started one of the chronographs immediately a car arrived at the control and came to a state of rest in the space allowed. He then handed it to the head marshal of the control, who first satisfied himself that the chronograph was started, and then showed the same to the driver of the car and warned him of the time allowed for passing through the control. He then indorsed a duplicate card with the number of the car, and placed both the card and the watch in one of the boxes, and, having locked it with his master key, handed it to the cyclist allotted to pilot the car through the control.

"On reaching the end of the control, the cyclist gave the box containing the watch and the card to the starter, who, having opened it with the master key in his possession, again showed the watch to the driver of the car and told him roughly how much time remained before his time to depart. After having indorsed the duplicate card with the period of time allowed for the control, he placed one part of the card in the box on the car provided to receive such cards, and, at the expiration of the allotted time, gave the driver the signal to depart, at the same time pressing the button of the watch to stop the chronograph mechanism.

"The starter then placed the watch and the other half of the duplicate card in the box, locked the same, and returned it by the cyclist to the timekeeper at the entrance to the control. The timekeeper then examined the watch, and made a record of the period of time occupied in the control as shown by the minute recorder of the chronograph. After this, he set the hands of the chronograph back to zero, ready to be used for another car.

"Should the starter be unable—for official reasons—to get a car started out of his control at the termination of the allowed period, he allowed such additional time as might be necessary in periods of not less than one minute, and indorsed the two parts of the duplicate card with the actual time occupied in the control. At the entrance and exit of each control there was a large dial clock, so that the drivers could approximately ascertain for themselves the time of their arrival and departure. These clocks were all specially rated, so that they synchronized throughout the day.

"By this system it is impossible for errors to accumulate, and as there are no deductions to be made, errors possible in such calculations are also avoided. Further, as the starters at the exits of the controls read off the times for starting, any possible difference in the personal equation of a starter and a timekeeper is eliminated.

"As the time allowed for each control is, under normal conditions, constant, the starters only have to bear in mind one period of time, and, as a reminder, the minute-recording dials of all the watches employed in each control had a red mark on the dial denoting the period of time for that control.

"The start and finish of the race were timed by two independent systems. First, by three or more official timekeepers of the club, assisted by one or more official timekeepers of other competing clubs; and secondly, by my electrical timing apparatus, which was employed to time the arrival of the cars at the finishing point."

The Automobile Club of Great Britain and Ireland is to be congratulated on the precaution it took to insure the safety of the spectators.

Great credit is also due to the efforts of that splendid body of men, the Royal Irish Constabulary, and to the large bodies of police, soldiers, militia, volunteers, and others who guarded the whole of the course.

A New Illuminating Material Discovered.

An important discovery has been made by the well-known German chemist Hermann Blau, of Bavaria. His method is to separate, by a process of rectification, the methane and hydrogen from the other constituents of oil gas, collecting the same in steel receivers subject to a pressure of 40 atmospheres, whereby he converts it into liquid form.

With the liquid gas made according to Blau's method, the cost is reduced to 6.3 pfennigs (1.5 cents), including freight.

This new illuminating material compares very favorably in cost with all others. The ease with which it can be handled and the beauty of its light should make it preferable where a lighting material is wanted as a substitute for petroleum, alcohol, or acetylene.

On the 24th of December, 1902, a test was made for the first time to produce the liquid gas. The trial showed how practical and very simple the process of preparation was. It has since been decided to erect an oil-gas furnace and to reconstruct the rectifying apparatus in accordance with the practical observations obtained by the experiments of last December.

A new test has recently been made and shows a most marked improvement and a remarkable productive power in every respect. It was also found that by the addition of a considerable amount of tar, which is in no wise detrimental, a beautiful yellow color was given to the gas.

A test tube filled with the liquid gas needed only the warmth of the hand to cause it to effervesce. It also effervesced when poured upon a metallic plate and on water. In the latter case a crust of ice was formed.

Its odor is pyroligneous aromatic. The concentration amounted to 537 grammes instead of 550 grammes per liter under a pressure of 40 atmospheres. The specific gravity, when in a gaseous state, was 1.26 (taking air at 1.0); absolute weight, 1.03.

The Approach of Borelly's Comet.

Since the time of its discovery, Borelly's comet has rapidly increased in brightness, until it is now easily visible as a star of the fourth magnitude. It should be easily detected one or two degrees southwest of the bright star Alpha Cygni. Its daily motion is about 5 degrees southwest. Prof. Perrine has computed the orbit of the comet, and finds that its nearest approach to the sun will occur on August 27, at a distance of about 3,000,000 miles. At present its distance from the sun is about 100,000,000 miles, and from the earth 20,000,000 miles. To the naked eye it will appear as a hazy patch of light. Photographs taken at the Lick Observatory indicate two prominent tails several degrees in length.

Prof. Langley's New Aerodrome.

According to newspaper reports, Prof. Langley's new aerodrome is to be tested somewhere on the Potomac River. The machine was recently towed on top of a large houseboat down-stream and anchored at tide water. Several years ago Prof. Langley demonstrated by means of a model the correctness of his principle of soaring flight. Ever since that time he has been ceaselessly engaged in the same work. In his investigations he was compelled to spend an appropriation of $50,000 by Congress, an allotment from the Army Board of Ordnance of $25,000, and a very large sum privately contributed. The successful trials made May 6 and November 28, 1896, have been fully described in the columns of the SCIENTIFIC AMERICAN SUPPLEMENT.

A Prize Offered to Stamp Out Boll Weevil.

Governor Lanham of Texas, on July 11, issued an official proclamation offering a reward of $50,000 to any person who would devise or discover a practical method or remedy for eradicating the cotton-boll weevil. The reward is to be paid out of the State treasury. The cotton belt of Texas has suffered much from the ravages of the boll weevil.

Large quantities of hydrogen being required for certain researches, it occurred to M. d'Arsonval that this hydrogen might be supplied from coal gas, of which hydrogen constitutes usually about 50 per cent, the remainder being principally methane. M. d'Arsonval has separated the hydrogen by condensing the methane by means of liquid air, using a very simple apparatus for the purpose. More recently he has dispensed with the use of liquid air entirely, and simply passes the gas, previously cooled to —80 deg. Centigrade, through a Linde liquid air machine, and in this way is able to obtain 3,500 cubic feet of hydrogen per hour at an expenditure of from 12 to 15 horse power. By a modification of the process, pure methane can be furnished as well as hydrogen. This is accomplished by dividing the process into two stages. In the first stage the gas is cooled to the temperature of solid CO_2, causing the condensation of CO_2, benzine and similar hydrocarbons. In the next stage the methane is condensed, and carries with it in suspension the carbon monoxide, which can be filtered off.

THE STUDY OF GASES AND METALS AT VERY HIGH TEMPERATURES.

BY PROF. JOHN TROWBRIDGE.

The electric furnace has told us much in regard to the behavior of the vapor of metals at extremely high temperatures. Probably these temperatures are much lower than that of the sun. Still, we are learning something of the chemical reactions which occur when such highly refractory substances as carbon and silicon are submitted to the heat of the electric arc in furnaces lined with infusible matter. The information which has been obtained is practically applied in great industries such as the manufacture of acetylene gas and of carborundum. Doubtless many more useful substances will result from the use of the heat of the electric arc. The electrical furnace, however, cannot be used to advantage in studying the reactions which occur, except through the final product. The spectroscope, for instance, cannot be used to study the extremely interesting spectra which arise when the vapor of metals is formed at high temperatures in closed chambers, such as are in commercial use.

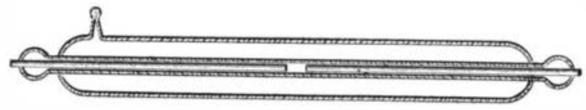


Fig. 1.

A scientific electric furnace, however, can be constructed as follows: Amorphous silica is made according to the method which I described in the SCIENTIFIC AMERICAN of March 28. It is then drawn into capillary tubes of suitable diameter; and electrodes of different metals are inserted in such capillaries. These electrodes, in my experiments, were one-half an inch apart, and, being four inches long, could be luted to the quartz capillary at this distance from the discharge end. The capillaries were then exhausted and filled with rarefied oxygen or hydrogen.

Fig. 1 represents one of these capillary spectrum tubes. The ends of the metallic terminals, between which powerful electric discharges were passed, were separated half an inch and sometimes less. When the discharges occurred between easily volatilized metal terminals, such as cadmium, tin, calcium, the lines which are peculiar to the spectrum of these metals, when the spectrum is obtained between these terminals in air, are in some cases very much broadened. Certain lines are also reversed; that is, they appear dark instead of bright. This darkening is due to a reversal which occurs on the photographic plate, and is not due to any phenomenon in the furnace.

In order to study these spectra a peculiar camera was employed which allowed the spectra produced by successive electric discharges to be obtained on the same photographic plate. This is desirable in order that the photographs can be subjected to the same development. Fig. 2 shows a set of spectra of what are supposed to be the lines peculiar to silicon. The spectra were obtained by electric discharges from a large glass condenser of .3 microfarad capacity charged to 20,000 volts by a storage battery. The discharges run from 1 to 5 and the photographs are seen to increase in brightness progressively, but not proportionally. It is interesting to notice no satisfactory estimate of the intensity of light can be made by photography. A photographic photometer is not reliable. In Fig. 2 we see reversed lines and also bright lines. One of the reversed lines occurs on a broad bright band which extends more in one direction with reference to the dark line than in the other direction, that is, more toward the red end of the spectrum.

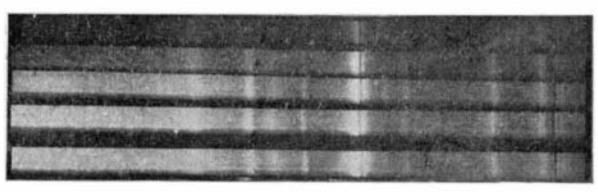


Fig. 2.

When iron terminals were employed in the capillaries no iron lines were obtained, even when the distance between these terminals was only a quarter of an inch. This was the case in rarefied hydrogen and rarefied air. In air at atmospheric pressure a vivid iron spectrum was obtained. This experiment throws doubt on some of the conclusions which have been entertained in regard to types of stars—types which have been supposed to indicate age and composition. The experiment shows that certain metals or gases may be present; but their presence may be masked by the reactions which occur at high temperatures.

The method of taking successive photographs of gases on the same photographic plate with known amounts of electrical energy is, I am convinced, the proper method to be pursued in studying the spectra of gases and of the vapor of metals. By this method one can compare the effect of increasing electromotive force in breaking up combinations of gases and forming new combinations. One of the most striking illustrations of this exhibition of change of combination is to be found in the case of water vapor introduced into a tube containing rarefied air and a trace of carbonic acid. With comparatively feeble amounts of electrical energy the peculiar bands due to hydrocarbons are obtained; as the electrical energy increases, these bands break up, and an entirely new spectrum appears, with no trace of the bands of hydrocarbons, or, indeed, no trace of hydrocarbons, although one knows that hydrocarbons are present.

In this case we have increased the temperature and have masked the presence of a compound. In the previous case we have kept the temperature the same and have brought different substances of different melting or vaporization points together in our scientific furnace. Electro-chemistry will gain much from the study of the spectra of gases and metals obtained with definite amounts of electrical energy.

Harvard University.

The Results of the International Kite-Flying Contest.

The international kite-flying contest arranged under the auspices of the Aeronautical Society of Great Britain was carried out on June 25 upon the Sussex Downs, near Worthing, and was attended with but mediocre success, a result due to the paucity in the number of the competing apparatus and the atmospheric conditions. The primary object of the competition was to encourage the utilization of kites as a means of obtaining meteorological knowledge of the higher regions of the atmosphere, and as a scheme for solving aerial navigation or at any rate the obtaining of some valuable data which might prove useful in achieving flight, and the best type of kites adaptable for this purpose. The Aeronautical Society had prepared a silver medal to be presented to the inventor of the kite which in the opinion of the jury appointed for the purpose, proved the most efficient, the only stipulation being that the kite qualifying for the award must exceed a minimum height of 3,000 feet and remain in the air for one hour. The jury was composed of Dr. William Shaw, F.R.S., secretary to the Royal Meteorological Council of Great Britain, Prof. C. V. Boys, F.R.S., Mr. E. P. Frost, Sir Hiram Maxim, Dr. Hugh Robert Mill, F.R.G.S., secretary to the Royal Meteorological Society, Mr. E. A. Reeves, curator of maps of the Royal Geographical Society, and Mr. Eric Bruce, secretary of the Aeronautical Society, so that the jury was representative of the scientists interested in the problem of flight and the value of kites for scientific investigation and research.

Eight competitors entered for the contest, including Major Baden-Powell, the president of the Aeronautical Society, who has been interested for several years past in the development of a kite capable of lifting a man, Mr. S. F. Cody, and Mr. L. Cody. Owing to a mishap which befell Major Baden-Powell's apparatus upon the ground just prior to the competition, he was unable to compete, while three other competitors failed to enter the contest, so that the number of contestants was reduced to four.

The most interesting apparatus was that of Mr. S. F. Cody, which was identical in design with that which he utilized for his experiments before the officials of the British Admiralty a short while ago.

The atmospheric conditions which reigned at the time were not the best adapted for successful kite flying owing to the capricious nature of the wind. Trouble was experienced in starting the kites, but once they were sent into the air a short distance above the ground, they became steadier in their motion. The heights of the kites during their hour in the air was not only determined by the length of the cable paid out, but they were further observed at their altitudes by means of theodolites. Two of these instruments were placed on the ground at different stations in telephonic communication with one another. One theodolite was in charge of Mr. J. E. Dallas and the other of Mr. N. F. Mackenzie, both of the Royal Engineering College, while the duties of computer were fulfilled by Mr. W. Mason, demonstrator at the engineering laboratory of King's College, London. Four observations were taken by each theodolite during the hour the kites were afloat in the air, and their results were checked by the computer with the length of cable paid out, so that absolute accuracy was assured. The results, however, were rather disappointing, since no remarkable altitudes were attained by the kites. The greatest height reached was only a little above 3,000 feet, notwithstanding that in one case 4,000 feet of cable was paid out. Owing to the fact that only four types of kites were flown the contest was not successful and did not afford much conclusive data as to the best type of kite adapted for the purposes for which the contest was arranged, but certainly the apparatus of Mr. S. F. Cody behaved the most efficiently.

The Swedish government has contributed $20,000 to the publication of Sven Hedin's Asiatic maps and two volumes of travels, to be translated into English.