Correspondence.

Brooks' Fragmentary Comet.

To the Editor of the Scientific American :

I beg leave to say that the reason why the search for my new fragmentary comet, made at Washington four or five days after discovery, was unsuccessful, is, that it was made during the period of a full moon, which would have rendered so delicate an object invisible even if it had maintained the same brilliancy it had at discovery. It did not, however, but grew rapidly fainter, for in twenty-four hours—at my second observation—it had become, as announced at the time, both fainter and smaller.

The small comet discovered by Prof. Schmidt, at Athens, four degrees southwest of the great comet, for which careful searches had been made, notably the one at Princeton, had as quickly disappeared, and likewise the cometary masses seen by Barnard at Nashville.

The probability is, that all these masses, thrown off from the great comet, were rapidly dissipated or diffused. Although of such short time visibility, the independent discovery by Schmidt, Barnard, and myself of these different cometary masses substantiates and confirms their reality.

WILLIAM R. BROOKS.

Red House Observatory, Phelps, N. Y., Nov. 4, 1882.

Success in Invention.

In view of the great activity that has prevailed in all branches of electrical research for a few years past, it might be thought, and doubtless it is felt by many young men engaged in pursuits connected with electricity, that there is very little of the electrical field left unexplored, and especially that it is useless to try to discover or invent anything in that field in competition with the great resources of capital and laboratories that are at the command of a few prominent electricians and inventors.

It is reassuring to turn to the history of the oldest of the sciences—astronomy—which of all others might be thought to be most completely worked out. Notwithstanding that for centuries many of the greatest minds have been devoted to the study of the heavens, the history of the science of astronomy is replete with instances wherein self-taught observers, with inferior instruments, have done valuable work by patient industry and keen observation. The splendid comet that is now leaving our skies was first discovered on this hemisphere, not by the astronomers who control the great 26 inch telescope at Washington, but by an unknown observer in Colorado, who probably had no instrument at all.

It is noteworthy that some of the most brilliant recent practical applications of electricity have been simply the development, by experiment and study, of familiar and apparently insignificant effects. Every telegraph operator has been familiar, ever since there has been a telegraph, with the phenomenon of the electric spark, and with the fact that a strong current will heat a conductor of high resistance; yet the electric-arc lamp is simply a development of the former, and the incandescent lamp of the latter phenomenon. In the same way, the "polarization" of batteries was known to telegraphists for years, and was regarded by them simply as an impediment to be got rid of; but the Planté and Faure accumulators are only developments of that same principle of "polarization."

There are many phenomena of electricity that are still in the same condition, as regards practical value, that the electric spark and the "polarization" of batteries were in before they were turned to account in the electric lamp and the electrical accumulator. Electricians are trying to get rid of the effects of electrical induction now, just as they formerly tried to get rid of the effects of polarization. Recent experiments of Messrs. Willoughby, Smith, and Dolbear seem to indicate that there may be in this troublesome phenomenon a promising field of research. There are other phenomena, long familiar, which have never been turned to practical account, such as thermo-electricity and diamagnetism, toward the study of which Faraday devoted so much attention, and which remains almost as he left it.

In connection with this subject we may refer to a brief discourse by Mr. Thomas A. Edison, which appears in a little book just published entitled "How to Succeed."

To succeed as an inventor, Mr. Edison says, a young man must have a natural taste for mechanical pursuits; though not necessarily so much as to amount to a genius. It has been his experience that men who have been successful in that line preferred, in boyhood, to work in a little shop, planning and contriving some mechanical device, rather than to engage in sports with boyish playmates.

The inventor must have a good constitution and be able to work long hours at a stretch. Mr. Edison often works from seven o'clock at night until eight or nine the next morning. He does not think anything is wearing that you like.

The power of continuity of thought must be cultivated. By long practice Mr. Edison can now keep his mind for hours on one topic without being distracted with thoughts of other matters.

Above all, patience is needed. There are probably one hundred disappointments to one success, and the things that are valuable seem to be very hard to do. "When I was at Menlo Park," says Mr. Edison, "I was once working with my assistants a long time trying to connect a piece of carbon to a wire; every time it would break. Then we would spend several hours in making another, and that would break. After working a day and two nights in this way, we finally accomplished our purpose. One of my assistants wearily got up and said: 'Well, I think Job got too much reputation on a small capital!'"

Neither a mathematical nor a collegiate education is essential, but Mr. Edison has a high opinion of the technical schools. The Troy Polytechnic School, he thinks, turns out the best men; but the Massachusetts Institute of Technology, the Stevens Institute of Technology, and the Washburn Institute are all good.

He thinks it best for the would-be inventor to confine his reading, study, and experiment to one subject. The domain of science is so broad that it is impossible for one man to master it all. "He can take hold of almost anything; the steam engine, for instance. Probably a million men have already worked at it. That would not deter me in the least; because that which is known, to what is possible to be known, stands, we will say, as one to ten millions. The best method of doing almost anything you can mention in mechanics has not yet been found out. We have not got the most perfect sewing-machine. Fifty years hence the sewing-machine we have now will be laughed at. The mind of man is so almost infinite that the field is unlimited. But the only proper way is to take up one branch; make yourself a specialist."—*The Operator.*

A Successful Artesian Well.

About one year ago several enterprising citizens of Mount Vernon, N. Y., formed a corporation for the purpose of obtaining an adequate supply of pure water. After thoroughly studying the various systems of obtaining water, they decided to sink an artesian well, reasoning from analogy that as wells in similar geological formations yielded bountifully, their chances of striking a water-bearing crevice at a reasonable depth were good. Geologically considered, the structure of Westchester County closely resembles that of Manhattan Island, and with but two or three exceptions, wells sunk on the island have been successful. A contract was made for the sinking of a well eight inches in diameter, and from 300 to 700 feet deep, according to the supply. On the 23d ult. the well was finished at a depth of 502 feet. A wrought iron tube was driven through the surface to a depth of 30 feet, when it struck solid rock. As the water rose above the surface, the well may be considered as a flowing one. The water was found to be soft, clear, and cold. A pump was attached, and when running at the rate of 100,000 gallons a day, was unable to diminish the supply. It is calculated that this is sufficient for 3,000 or 4,000 people. The well is 130 feet above tide water. With an expenditure of not more than $75,000 for pumps, pipe, well, etc., a sufficient supply will be obtained for both domestic and fire purposes.—*Engineering News.*

How Milk is Made.

That the animal organism is capable, under certain conditions, of converting various good elements into milk is one of the most familiar facts of nature. How the milk-producing glands perform their work remains to a great extent a puzzle. The later investigations and theories in this connection are clearly set forth by Dr. G. C. Caldwell in a recent issue of the *Weekly Tribune*, in answer to the question "How is milk made?" He says:

The essential milk-producing part of the udder is made up of a series of ducts or tubes branching out from reservoirs at the heads of the teats, joining one another at little sub-reservoirs, and separating and uniting again, till finally they end within minute organs called vesicles or follicles. Both Dr. Sturtevant, of the New York Experiment Station, and Mr. Arnold, have traced these ducts to their sources. These follicles are the fountain heads whence the milk is collected by the ducts and carried through one reservoir after another to the teat.

The three essential ingredients of the milk, beside the water, are the fat, in the form of minute globules suspended in the liquid; the caseine, partly in solution in the water of the milk and partly in solid grains suspended in the liquid; and the sugar, only in solution. Nearly all authorities agree that the formation of the milk is attended with a rapid production of new cells, very rich in fat, in the follicles; and the most generally adopted view is that these cells drop off and fall to pieces by what is called fatty degeneration, and that their investing membranes or cell-walls become dissolved; thus, especially, the fat of the milk is produced; and some think that all the constituents of the milk are really nothing but cell ruins, taken up by the water that must come directly from the blood even if nothing else does, and conveyed away through the ducts and reservoirs to the teats.

But Dr. Sturtevant maintains that the fat globules of the milk are really the cells themselves that are so rapidly multiplied in the follicles—that each globule began as a bud on a parent cell in the follicle, grew and then dropped off, and was taken up and washed along by the water containing the caseine and the milk sugar in solution, which has been transuded from the tissues; with him Mr. Arnold agrees. This theory requires that each milk globule shall consist of a membranous sac inclosing fat; but the existence of such a membrane or envelope around the fat globule is almost universally disbelieved by microscopists, for nearly all who have given the subject their careful attention failed to find satisfactory evidence thereof; it will be, therefore, a battle of a few against a multitude to establish the fact of such a structure of the milk-fat globule; but in a battle fought with such weapons the victory is not always with the party that is strongest in numbers.

Fleischmann, than whom there is no better authority on matters pertaining to milk, is not entirely satisfied with the theory that the milk is made up of cell ruins alone. He shows that if this were so, in the case of a good milch cow, the dry weight of cell substance broken down every day would be not less than 5·5 pounds, or more than twice the weight of the dry substance of the milk glands of a well developed udder. While allowing that there is much strength in the position of those who argue for milk production by cell destruction, he claims that there must be some secretion, or straining through, as it were, of a part of the substance of the milk, directly from the blood which circulates freely and abundantly through the glands.

But even with this partial acceptance of both explanations we are not yet altogether enlightened as to the manner in which the milk is produced. Unquestionably, however, an important and a peculiar work is done in these glands; there is produced that mixture of the three essential ingredients of food, the albuminoids, the fat, and the carbohydrates, which makes milk the type of a perfect food; and there originate those substances peculiar to butter fat, the butyrine and its associates, which are not found anywhere else in the animal body; they distinguish this fat in a marked manner from any other fat, whether animal or vegetable, and enable the chemist to tell with unerring directness whether a sample called butter is butter or something else.

History of Printing.

In an interesting article on printing in China, the *North China Herald* says that the first great promoter of the art of printing was Feng Ying Wang, who in 932 A. D. advised the Emperor to have the Confucian classics printed with wooden blocks engraved for the purpose. The first books were printed in a regular manner, and in pursuance of a decree in 953. The mariner's compass and rockets were invented about the same time, showing that at this period men's minds were much stirred toward invention. Twenty years after the edict the blocks of the classics were pronounced ready, and were put on sale. Large-sized editions, which were the only ones printed at first, were soon succeeded by pocket editions. The works printed under the Lung emperors at Hangchow were celebrated for their beauty; those of Western China came next, and those of Fokhien last. Movable types of copper and lead were tried about the same time; but it was thought that mistakes were more numerous with them, and therefore the fixed blocks were prepared. Paper made from cotton was tried, but it was found so expensive that the bamboo made paper held its ground. In the Sung dynasty the method was also tried of engraving on soft clay and afterward hardening it by baking. The separate characters were not thicker than ordinary copper coins. Each of them was, in fact, a seal. An iron plate was prepared with a facing of turpentine, wax, and the ashes of burnt paper. Over this was placed an iron frame, in which the clay types were set up until it was full. The whole was then sufficiently heated to melt the wax facing. An iron plate was placed above the types, making them perfectly level, the wax being just soft enough to allow the types to sink into it to the proper depth. This being done it would be possible to print several hundred or thousand copies with great rapidity. Two forms prepared in this way were ready for the pressman's use, so that when he had done with one he would proceed with another without delay. Here is undoubtedly the principle of the printing press of Europe, although western printers can dispense with a soft wax bed for types and can obtain a level surface without this device. Perhaps the need of capital to lay in a stock of types, the want of a good type-metal easily cut and sufficiently hard, and the superior beauty of the Chinese characters when carved in wood have prevented the wide employment of the movable types which are so convenient for all alphabetic writing. The inventor of this mode of printing in movable types five centuries before they were invented in Europe, was named Pi Sheng.

Effects of Liquors.

Cheap brandy and absinthe are the cause of a large proportion of cases of insanity in parts of France. The United States Consul at La Rochelle, in his report on French brandies, points out the fact that no pure brandy is now made in Cognac and the district adjacent. He says that German alcohol, distilled from potatoes, is imported, doctored, and sold for brandy, and that the French artisans and peasants, who formerly used light wines, have of late years used much of this so-called brandy. He says: "Its characteristic effect is to produce an intoxication in which the patient is especially inclined to rage and physical violence, while hopeless insanity is the inevitable consequence of persisting in its use, even for a relatively short period of time." It is at least worth the physician's while to know that there is no such thing as pure Cognac now.

Preservation of Honey.

Honey, according to A. Vogel, contains on an average one per cent of formic acid. Observing that crude honey keeps better than that which has been clarified, E. Mylius has tried the addition of formic acid, and found that it prevents fermentation without impairing the flavor of the honey.

New Formulas for Preparing Gelatine Photographic Emulsions.

Into a ruby-colored hock bottle put the following materials in the order given, shaking after each addition to dissolve:

Water, just warm enough to dissolve.	5 ounces.
Nelson's photographic gelatine	12 grains.
Iodide of ammonium	3 "
Chloride of ammonium	6 "
Bromide of ammonium	20 "
Bromide of potassium	35 "
Hydrobromic acid	3 drops.

After well shaking to thoroughly dissolve, add ninety grains of *dry* nitrate of silver, and continue shaking until dissolved, which will be easily noticed from the absence of the sound of the crystals striking the bottle. The bromide of silver forms gradually as the nitrate dissolves. The above mixture is but the work of a few minutes, and can be done at night. Put the bottle, with its contents, away for three or four days, shaking occasionally, then immerse the bottle in a pan of water and raise to the temperature of the water the boiling point for ten minutes; then add one hundred grains of dry gelatine, shake again until dissolved, which it does quickly. Now pour the emulsion into a dinner plate to set; if done at night, it will be set by morning. Then place the dinner plate with its contents slanting-wise into a large basin of water; the nitrates will dissolve out and fall to the bottom of the vessel. By evening the emulsion will be ready for redissolving, which can be done by warming the dinner plate and filtering into a bottle. Plates may then be coated without being warmed. They should be laid on a level glass or slate slab; an amount of emulsion required to cover the plates should then be poured on, guided to the corners of the plate by a glass rod or a flat piece of glass. After lying on the slab for ten minutes, the film of emulsion on the plate will be set and the plates can then be reared up to dry. They can be dried quickly by being placed in a box through which passes a current of air.

Method of Cold Emulsification, by A. L. Henderson.—If bromide of silver be precipitated in an aqueous solution it only requires time to soften the particles; but if an alkali or acid be introduced this softening effect will take place much quicker. Heat will also help it.

Now, it is well known that gelatine, being a very variable, complex substance (no two samples being alike), great difference must take place when a precipitate of bromide of silver is made in gelatine. If we use a small quantity of gelatine to begin with, more or less of it is decomposed before the desired result is obtained.

I venture to say that boiling or stewing is not only unscientific but uncertain; now, if we add something that will prevent decomposition, one element of failure is got over.

Of the various substances tried, I find alcohol and ammonia the best. Here I have a solution of gelatine of ten grains dissolved in one ounce of water. When the gelatine is dissolved by gentle heat I add:

Carbonate of ammonia (the ammonia causes effervescence)	20 grains.
Bromide of potassium	150 "
Iodide of potassium	2 "
Alcohol	3 ounces.
Ammonia, 0·880	60 minims.

Mix the ammonia and alcohol before adding to the gelatine.

This may be kept in bulk ready for use; it will keep a long time good. When it is quite cold I stir in:

Nitrate of silver	200 grains.
Water	2 ounces.

I occasionally shake it, and in one hour it will be ripe enough for all ordinary purposes; in fact, when finished it will give results twice as rapid as most commercial plates.

The maximum sensitiveness seems to be reached in about ten hours. No further advantage is to be derived by prolonging the emulsification, except that of convenience. It should be apparent that, having a large reservoir of emulsion made in this way to draw from daily or at will, adding fresh to keep up the stock, perfect uniformity must be obtained.

To the above quantities I add four to five drachms of dry gelatine; warm gently to dissolve the same. When the gelatine is thoroughly dissolved I stir in twelve ounces of warm methylated alcohol, 100°. The emulsion, when cool, will be precipitated to the bottom of the vessel. It is to be broken up and well washed in a running stream from two to twelve hours. Make up the bulk to eight or ten ounces.

Gelatine dissolved in alcohol, ammonia, and water will not set so firmly as the same amount of gelatine in water; yet if the salts and ammonia are removed by precipitating with access of alcohol the gelatine recovers its setting powers.—*Br. Jour. of Photo.*

Improved Alkaline Developer for Gelatine Dry Plates.

SOLUTION No. 1.

Distilled, melted ice, rain, or snow water	10 ounces.
Alcohol	2 "
Salicylic acid	160 grains.
Pyrogallic acid	1 ounce.

The salicylic acid should be dissolved first, and the pyrogallic acid next in the alcohol; the resultant solution should then be mixed with the 10 ounces of water warmed to 100° F. and shaken up.

If at the end of 24 hours white needle-like crystals of salicylic acid are formed in the bottom of the bottle, they may be redissolved by immersing the bottle for a few minutes in warm water. This should be done each time the crystals form in order to retain the full preservative qualities of the salicylic acid.

SOLUTION No. 2.

Saturated solution sulphite of soda, in ordinary warm tap water	8 ounces.
Strongest water of ammonia	4 "
Bromide of potassium	1 "

The bromide of potassium should be dissolved in the soda solution, and the ammonia added last.

To develop a 4x5 plate with normal exposure, take 2 ounces of ordinary water and add 30 minims of No. 1 and 20 minims of No. 2. Development will proceed gradually, the shadows remaining clear.

Over-exposure is remedied by an increase of No. 1 and less of No. 2; under exposure by reversing the order. From three to four plates can be developed in the same solution, which, though it turns red, will remain clear.

Two important advantages this developer has over others are, that the pyrogallic acid is perfectly preserved in liquid concentrated form, and the sulphite of soda does not come in contact with the pyro until it and the ammonia are mixed.

The sulphite of soda prevents the yellow stain of the pyro from appearing, and makes the negative possess the brilliant qualities of a wet plate.

The developer combines the well known preservative quality of salicylic acid with the advantages of sulphite of soda.

The solutions being in concentrated form are easily carried about, and are always ready for immediate use.—*Dr. Stolz, in Br. Jour. of Photo.*

Some Important Statistics.

Production of pig iron in 1881, net tons	4,641,564
Production of spiegeleisen in 1881 (included in pig iron), net tons	21,086
Production of all rolled iron, including nails and excluding rails, in 1881, net tons	2,155,346
Production of cut nails and spikes in 1881, included in all rolled iron, kegs of 100 pounds,	5,794,206
Production of Bessemer steel rails in 1881, net tons	1,330,382
Production of open-hearth steel rails in 1881, net tons	25,217
Production of iron and all other rails in 1881, net tons	488,581
Total production of rails in 1881, net tons	1,844,100
Production of crucible steel ingots in 1881, net tons	89,762
Production of open-hearth steel ingots in 1881, net tons	146,946
Production of Bessemer steel ingots in 1881, net tons	1,539,157
Production of all kinds of steel in 1881, net tons	1,728,912
Production of blooms from ore and pig iron in 1881, net tons	84,606
Imports of iron and steel in 1881	$61,555,078
Exports of iron and steel in 1881	$15,782,282
Imports of iron ore in 1881, gross tons	782,887
Production of Lake Superior iron ore in 1881, gross tons	2,336,335
Production of iron ore in New Jersey in 1881, gross tons	737,052
Total production of iron ore in the census year 1880, net tons	7,974,705
Production of anthracite coal in the census year 1880, net tons	28,646,795
Production of bituminous coal in the census year 1880, net tons	42,420,581
Production of anthracite coal in 1881, gross tons,	28,500,016
Miles of railway completed in 1881	9,650
Miles of railway in the United States, December 31, 1881	103,321
Iron ships built in the United States in the fiscal year ended June 30, 1881	42
Net imports of foreign merchandise into the United States in the ten months ended April 30, 1882	$579,462,510
Exports of domestic merchandise, out of the United States, in the ten months ended April 30, 1882	635,867,349
Net imports of specie into the United States, in the ten months ended April 30, 1882	35,895,247
Net exports of specie out of the United States, for the ten months ended April 30, 1882	22,708,081
Immigrants into the United States, in the calendar year 1881	720,045

How Fire Sweeps a Wooden House.

The astonishing rapidity with which fire sweeps off a wooden building is well explained in an article on house-building, by E. C. Gardner, in *Our Continent:*

Let me show you how a wooden house is built. The sills and joists of the first floor are comparatively safe, because they are not boxed in with dry boards, and even with furnace and ash pits in the cellar, there would be little danger from a fire down below, if it were not for the careful provision made for carrying it into the upper part of the structure. This provision, however, is most effectively made by means of the upright studs and furrings that stand all around the outside of the building and reach across it wherever a partition is needed. Accordingly every wooden house has from one hundred to one thousand wooden flues of a highly inflammable character, arranged expressly to carry fire from the bottom to the top, valiantly consuming themselves in the operation. Furthermore, they are frequently charged with shavings and splinters of wood, which, becoming dry as tinder, will respond at once to a spark from a crack in the chimney, an overheated stove or furnace-pipe, or a match in the hands of an inquisitive mouse. They are, likewise, so arranged that no water can be poured inside them till they fall apart and the house collapses, for they reach to the roof, whose sole duty is to keep out water, whether it comes from the clouds or from a hose-pipe, but which, for economical reasons, is made sufficiently open to allow the air to pass through it freely, thus insuring a good draught when the fire begins to burn. To complete the system and prevent the possibility of finding where the fire began, the spaces between the joists of the upper floors communicate with the vertical flues, and these highways and byways for rats and mice, for fire and smoke, for odors from the kitchen, noises from the nursery, and dust from the furnace and coal-bin, are also strewn with builders' rubbish, which carries flame like stubble on a harvest field.

Brick houses, as usually built, are not much better, but that is not the fault of the bricks—*they* are tougher than good intentions; they have been burned once and fire agrees with them. In fact, there is no building material so thoroughly reliable, through thick and thin, in prosperity and in adversity, as good, honest, well-burned bricks. But the ordinary brick house is double—a house within a house—a wooden frame in a brick shell. Like logs in a coal-pit, the inner house is well protected from outside attacks, but the flames, once kindled within, will run about as freely as in a wooden building, and laugh at cold water, which, however abundantly it is poured out, can never reach the heart of the fire till its destructive work is accomplished. Thrown upon the outer walls, it runs down the plastering, washes off the paper, soaks the carpets, ruins the merchandise, and spoils everything that water can spoil, while the fire itself roars behind the wainscot, climbs to the rafters, and rages among the old papers, cobwebs, and heirlooms in the attic, till the roof falls in, the floors go down with a crash and an upward shower of sparks, and only the tottering walls, with their eyeless window sockets, or the ragged, blackened chimneys, remain.

But one thing is needful to retard the progress of hidden fire even in a wooden building, long enough at least for one to go up the hill and fetch a pail of water. This remedy consists simply in choking the flues and stopping the draught, which can easily be done by filling in with bricks and mortar between all the studs of both outer walls and inner partitions at or near the level of each floor. A cut-off half way up is an additional safeguard. The horizontal passages between the floor joists should also be closed in a similar manner. These occasional dampers are a partial remedy, and if carefully fitted in the right places will save many tons of coal and greatly diminish the chances of total destruction in case of fire. The complete remedy is to leave no spaces that can possibly be filled. One of the best and most available materials known for filling spaces is "mineral wool," a product of iron slag. If the open spaces between the studs and rafters of a wooden building, or in a brick building between the furrings, are filled with this substance, houses might possibly be burned, but the inmates would have ample time to fold their night-gowns, pack their trunks, take up the carpets, and count the spoons before vacating the premises.

[The inventor who has genius enough to study out an economical way of partitioning an ordinary dwelling so as to avoid the spread of fire, will deserve well of his fellow-men.—ED. S. A.]

Traffic on the Elevated Roads.

A statement of the number of passengers carried and the fares received by the elevated railways from January 1, 1872, to September 30, 1882, has just been issued. The following table is for the New York Road only from January 1, 1872, to September 30, 1877, as follows:

Period.	Passengers.	Cash Receipts.
Jan. 1, 1872, to Sept. 30, 1872	137,446	$13,744 60
Oct. 1, 1872, to Sept. 30, 1873	644,025	64,602 55
Oct. 1, 1873, to Sept. 30, 1874	796,072	81,047 25
Oct. 1, 1874, to Sept. 30, 1875	920,571	93,631 16
Oct. 1, 1875, to Sept. 30, 1876	2,012,953	202,675 35
Oct. 1, 1876, to Sept. 30, 1877	3,011,862	308,208 51

The figures for the New York Road all the year, and the Metropolitan four months only of the year, beginning October 1, 1877, and ending September 30, 1878. are: Passengers carried, 9,291,319, and cash received, $779,353 37. The following table is for both roads:

Period.	Passengers.	Cash Receipts.
Oct. 1, 1878, to Sept. 30, 1879	46,045,181	$3,526,825 26
Oct. 1, 1879, to Sept. 30, 1880	60,831,757	4,612,975 56
Oct. 1, 1880, to Sept. 30, 1881	75,585,778	5,311,075 85
Oct. 1, 1881, to Sept. 30, 1882	86,361,029	5,973,633 41

Aerial Navigation.

M. De Comberousse, in a discourse pronounced at the funeral of the late Henri Giffard, made this significant admission: "An intimate friend of Giffard told me yesterday that he carried to the tomb the secret which he had long sought for, and which had revealed itself to his eyes during his last years. He added that our colleague shrank back from his own discovery, and, filled with horror, put an end to his existence." In other words, he saw at length that aerial navigation must prove the suicide of civilization.