SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LV.—No. 11. [NEW SERIES.] NEW YORK, SEPTEMBER 11, 1886. [Price 10 Cents. $3.00 per Year.

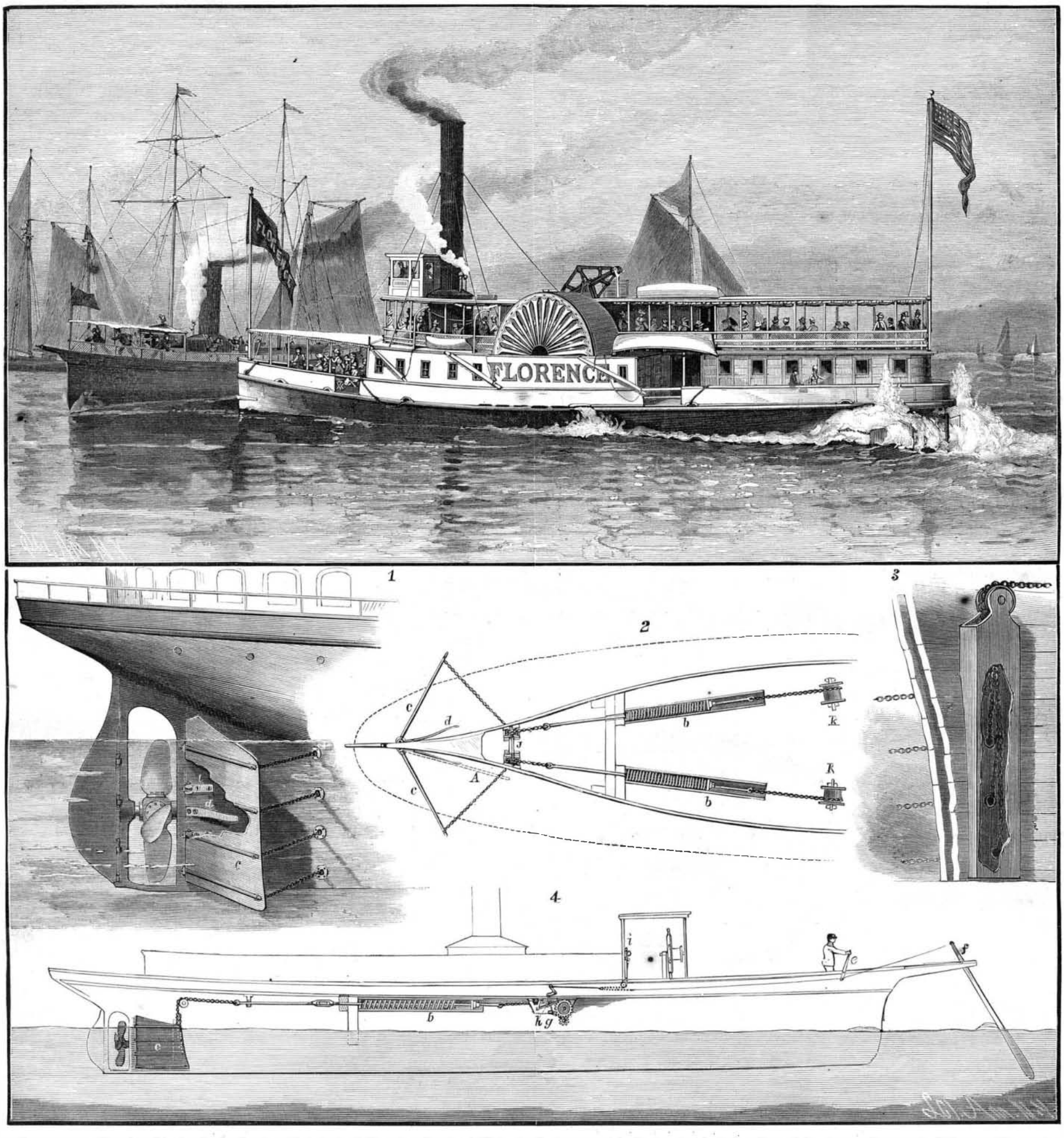
MACADAMSFINS.

A DEVICE FOR INSTANTLY STOPPING VESSELS WHEN UNDER FULL HEADWAY.

For several months past, there has been in daily practical operation in this harbor a remarkable invention, in fact, we may say, one of the greatest inventions of modern times, whether regarded from its humanitarian or its commercial aspect. An invention destined to have an immediate universal adoption, giving a new impulse to commerce, adding new elements of safety to navigation, putting an end, to a very large extent, to those appalling sacrifices of life and property upon the water, which from the earliest times have distressed mankind; to remedy which the most strenuous efforts of the ablest inventors and engineers have, until now, been exerted in vain.

The invention to which we allude is the Macadamsfins, invented by John McAdams, of Brooklyn, N. Y.; a device whereby vessels under full headway may be stopped almost instantly, independent of their motive power; it acts far more quickly and effectively to stop the vessel, than does the most powerful air brake act upon the railway train. Within the past hundred years, sailing ships have been vastly improved in size and rigging; since the art of steam navigation has been discovered, magnificent and powerful vessels, such as

(*Continued on page* 165.)



EXPLANATION.—Fig. 1 is a side elevation of the stern of the boat, and Fig. 2 is a plan view, both showing the fins spread out; Fig. 4 is a longitudinal section, and Fig. 3 shows the eye holes in the side of the vessel through which the chains pass. To the free edges of the fins, *c c*, are attached chains which are led through proper eye holes, and connected with chains extending to the windlasses, *k k*, which are locked by pawls, *h*, which may be released either from the pilot house, *i*, or the bow, *e*, or may be automatically released when the spar, *f*, projecting from the bow of the vessel, touches an obstruction. This spar is intended to be removable, and to be put in position only when approaching a coast or harbor in a fog. When the windlasses are released, the springs, *d*, open the fins sufficiently far to permit the water to gain a hold and force the fins fully open. All jar or concussion that would accompany the opening of the fins is prevented by the springs, *b*, through which pass rods that form part of the chains. The plate, *j*, connects the sides, and serves to resist the outward pull of the chains.

MACADAMSFINS—A DEVICE FOR INSTANTLY STOPPING VESSELS WHEN UNDER FULL HEADWAY.

MACADAMSFINS.

(*Continued from first page.*)

the world never dreamed of, have been produced; life boats have been devised; lights and signals improved; compartments arranged; human ingenuity has been applied in all possible directions, with the object of preventing disaster and of saving life. But the hard fact remains that until this present day all these efforts, all these expenditures, have been fruitless in respect to the discovery of efficient means for averting the greatest of marine disasters, namely, collisions.

When collision is imminent, whether between vessels on the smooth waters of rivers or lakes or on the open sea, in clear weather or in fogs, against icebergs, sands, or rocks, in nine cases out of ten the danger is foreseen by those on board, for a short time, generally for several minutes, for a few seconds at the least. What a blessed thing it would be if every vessel were furnished with a device whereby it could be instantly stopped, when going at full speed, or say within a space of a dozen seconds of time! Such a device would be of unspeakable value in preventing disaster, and would wrest from the sea some of its greatest terrors.

It is this invention we to-day illustrate and describe. As before intimated, it is now in daily practical operation, open to the public and to critical examination by any one who desires.

Our illustration represents the steamer Florence, which is fitted with the invention. Our drawing is from an instantaneous photograph, and shows the water effect produced by the fins at the first moment of operation. The invention consists of a pair of fins or broad rudders, attached one on each side of the vessel, near the stern. By the pull of a trigger or lever, or by the touch of a button, from the pilot in the pilot-house or the look-out man at the bow or other convenient place, the fins are instantly thrown open, the water piles up against them with tremendous force, and the progress of the vessel is almost instantly arrested while the engines are still working.

The following official report lately made at the instance of Commodore Chandler, of the Brooklyn Navy Yard, gives the particulars of the Florence, and well describes the nature and remarkable practical workings of the invention:

NAVY YARD, NEW YORK, August 6, 1886.

SIR: In obedience to your order of July 13, 1886, we have made a careful and thorough test of John McAdams & Sons' patent marine brake, and respectfully report:

The brake in question is attached to the steamer Florence, a sidewheel steamer, 127 ft. in length, 21 ft. 6 in. beam, 6 ft. 6 in. draught at stern, and 171 tons measurement; she has a speed of from 10 to 12 miles per hour.

The brake consists of two plates of iron, 8 ft. 6 in. × 8 ft. 6 in. × $\frac{5}{16}$ in. re-enforced horizontally by four 5 in. wrought T-irons placed equidistant apart. Sheet plates are hinged on their after ends to the stern post and planking, and are carefully fitted to the stern of the vessel; at the forward end of each of these plates, and at the points where they are re-enforced, are attached chains which pass inboard through dead eyes, inserted in the planking of the vessel, upward in a water tight channelway, to and over a sheave placed above the level of the water, and immediately below the main-deck beams. These four chains are united in one, which, passing over the sheave above mentioned, is connected with a rod running through a cylinder containing twenty-three spiral car springs, 8 in. long by 6 in. diameter, placed end on end, each re-enforced by a smaller spiral spring in its center.

The cylinder containing the springs is secured to the deck beams and hull of the vessel. These springs act as a cushion, and receive that portion of the pressure which is transmitted to the chains. Attached to the main chain, before its connection with the spring rod, is another chain leading to a windlass, by means of which the brake is drawn in and secured closely to the side of the vessel.

A spring is fitted between the side of the vessel and the plates to start the latter when required. A hinged pawl holds the plates in place when closed, and can be tripped by means of a wire passing from it to the pilot house.

The operation of the brake is as follows:

The pawl being tripped by means of the bell wire, the windlass relieves the chain, and the spring, acting upon the inside of the brake, forces it slightly outboard, permitting the water to enter between the sides of the vessel and the brake.

The pressure of this water produced by the velocity of the vessel forces the brake open, when it is checked by the four chains attached to its outboard edges, and the force of the blow is cushioned by the spiral springs at the end of the chain. The strong pressure of the water forward of and acting upon the 110 square feet of immersed brake immediately checks the speed of the vessel, and quickly stops her.

Experimenting with the brake, the board found that it was tripped and operated with the greatest facility and safety, the jar being very slight, as the force was cushioned and gradually communicated to the vessel through the springs.

When the engine was stopped at the moment of tripping, the vessel stopped in 22 seconds, and inside of her length. When the engine was backed and the brake sprung at the same moment, the vessel was stopped and moved in the opposite direction in 12 seconds, and in a space of about 35 feet. When the brake was sprung with the engine still going ahead as rapidly as possible, the speed of the vessel through the water was immediately arrested, and her motion so slow that no serious damage could have been effected had the boat collided with another.

Operating one wing of the brake as an aid to the rudder, the vessel was turned in a circle of about 150 yards diameter, and changed her course 90° in 50 sec., making a complete circle in 3 minutes and 47 seconds; whereas without the brake, and with the rudder alone, the circle was about 250 yards diameter—90° change of course obtained in 42 seconds, and the complete circle in 3 minutes and 27 seconds. The velocity of the vessel in the former case was greatly retarded by the brake.

As a means of preventing accidents when a vessel having this brake is in danger of colliding with another, it is unquestionably a success, and if properly fitted, cared for, and kept in order, can be thoroughly relied on to work satisfactorily; but in the evolutions of naval vessels while in action, the brake would never be used, as it would retard, rather than increase, the facility with which the ships could be managed. Inclosed we forward tracings of the brake.

Very respectfully, your obedient servants,

JNO. W. MOORE, *Chief Engineer, U. S. N.*
BIRS C. SAMSON, *Cadet Engineer, U. S. N.*
M. A. ANDERSON, *Cadet Engineer, U. S. N.*

To the Commandant, New York Navy Yard.

COMMANDANT'S OFFICE, NAVY YARD, NEW YORK.
For information of Bureau Steam Engineering.
Forwarded Aug. 7, 1886.

R. CHANDLER, *Commodore Commandant.*

The only comment we have to make on this report is in respect to the conclusions of these officers that the fins would never be used by naval vessels in action. This, we think, must have occurred because the turning qualities were not properly shown to them, and they have not foreseen the other advantages in a naval action. Neither of these examiners, we fancy, would hesitate, in an action, to pull the lever and stop his ship to prevent going ashore or to avoid being rammed; nor would he refrain from steering with them by opening them slightly alternately as needed, if his rudder became disabled, or by striking a torpedo, as in Mobile Bay, when the Union ironclad Tecumseh and over a hundred lives were lost by running on visible torpedoes. In the varying emergencies of an action, there are moments when the judicious use of this invention would be of supreme importance, perhaps decisive of the battle. We think a war vessel should have at least as many advantages as other vessels.

We have had the opportunity of witnessing several trials of the invention on board the Florence. Our observations fully confirm, and, indeed, have given us results even more favorable than those set forth in the above report. The crushing power or principal momentum of the boat seems to be overcome in about ten seconds after the trigger is pulled, and within a distance of about twenty feet; or in other words, she stops in less distance than she travels in one second. We also understand that a 1,400 ton steamer has been just as successfully stopped.

An idea of the vast importance of this invention may be formed by considering some of the published statistics. According to the London *Times*, the record of collisions and wrecks for the five years ending 1881 numbered 8,865, and the number of lives lost was 19,034. Doubtless the majority of these disasters would have been prevented had the vessels been provided with the Macadamsfins. It seems almost certain that such disasters as the sinking of the Oregon, or that of the colliding of the Gijon and the Laxham last year, by which 200 lives were lost, or the collision of the Cimbria and the Sultan, 300 lives lost, could not occur where this invention is employed. The success of the Macadamsfins is an immense gain for humanity. In our opinion, there is no honor too high, no reward too great, for bestowal upon its worthy inventor. It has only been by the exercise of the greatest perseverance, and the expenditure of large sums of money, by himself and his sons, that he has at last succeeded in perfecting it. The value of the service he has rendered to his fellow men in developing this improvement is incalculable.

This invention should have the immediate attention of our own government and of every maritime nation. It is one of those great humane inventions that should, if possible, be made free by governmental purchase if required. At a comparatively small expenditure, every ship, every steamer, every craft that floats, can be fitted with the Macadamsfins; and laws will doubtless be duly passed requiring its adoption. Applied to large vessels, its operation will be even more certain and effective than on small boats, for the deeper the ship, the more powerful will be the action of the fins. Our Navy Department should lose no time in applying the invention to one of its largest vessels, with a view to determine the forms and proportions best adapted for all ships in the service. The Chamber of Commerce will do well to use its influence in calling the attention of owners and masters to the importance of the invention, as indicated in the foregoing report and as exhibited daily on board the Florence. The steamer leaves the Brooklyn Bridge wharf for Staten Island every week day at 10½ A.M., returning at 1 P.M. Further information can be obtained from John McAdams & Sons, 978 Kent Avenue, Brooklyn, New York, U. S. A.

Remarkable Collection of Homing Pigeons.

An enormous flight of pigeons, consisting of some seven hundred or eight hundred birds, took place at Dover, England, on the morning of August 30, for a race from that place to Brussels. The birds were brought over on Saturday night in baskets, which formed part of the deck cargo of the Ostend mail packet. The pigeons belong to different Belgian societies, and were flown in connection with the society Sans Peur, of Laeken, near Brussels. The start was a very interesting sight. The channel being fairly clear, the baskets were placed in tiers on the quay, the flaps on a given signal were let down, and simultaneously the birds rose like a cloud, and, after circling in the air for a moment, headed southward and made off in the direction of Calais, all being well away within the space of two minutes. A similar race is being arranged from London to Brussels. Some five hundred birds, trained to act as messengers in case of war, and belonging to different societies in and around Paris, were also recently flown from Dover to Paris.

As our readers probably know, the training and flying of homing pigeons has become the national sport in Belgium. Almost every family has a pigeon chamber in the upper part of the house. Baseball in the United States is nothing as compared with the homing pigeon sport in Belgium.

The Chevreul Centenary.

On August 31 of the present year, Michel Eugene Chevreul, one of the greatest of the chemists of France, completed his one hundredth year. He has now entered the second century of a life of unselfish labor in his profession. His history is of special import at the present time, when money is by so many considered the criterion of personal worth. For Chevreul in his discoveries had the opportunity of making a colossal fortune, but took no advantage of his abilities, save in the direction of science. The entire stearic acid industry was founded by him, and has yielded millions to its commercial prosecutors. From his earliest years he was a worker in science, a pupil of one of Lavoisier's disciples, a celebrated scientist wedded to his laboratory, so busy in his work that he "had no time to make money." His life, marked by its labor and its utter simplicity and abstemiousness, is a fit model for the scientific worker. He drinks nothing but water, unless his physicians insist on his mixing it with some stimulant, and then he uses beer. A little meat, eggs, and beans constitute his diet. His work, besides the memorable fatty acid investigation, embraces the theory of colors, wherein his researches were classic.

Besides this, he has traversed the whole field of chemistry, leaving his foot-marks everywhere. He discovered the cause of the brightness of Rubens' yellows. The great Dutch painter had empirically hit upon the use of complementary colors as contrasts, and so had brightened his colors. Delacroix seized upon this beautiful discovery and utilized it to such good purpose as to win by his celebrated color effects much of his renown. In 1803 Chevreul began his studies of chemistry, and distinguished himself by original work. In 1882 he convulsed the French Academy by quietly stating that "the experiments he had described were not of very recent origin; he had reported them in outline at a meeting of the Academy in 1812" (*L'Illustration*).

In honor of his centenary, a banquet was given at the Hotel de Ville, in Paris, on August 31, which was participated in by some 350 guests. A festival and torchlight procession on the boulevards followed, and, by some process, the astute General Boulanger, who was present at the banquet and in the procession, seems to have been converted into the lion of the hour, being subsequently serenaded at his residence.

At present, Professor Chevreul spends his days in the laboratory of the Gobelin Tapestry manufactory, where he has been professor of chemistry and director of dyeing since 1824—for 62 years. There seems little reason to apprehend his early death, save for the bare fact that he has passed the century of life that is accorded to so few. Authentic instances of centenarians are extremely rare.

IT is said that the application of a bit of ice, or even cold water, to the lobe of the ear will stop hiccoughing.