AN ALLEGED PERPETUAL MOTION.

Perpetual motion is, to many inventors, what the "will o' the wisp" is to the traveler. It is always in sight, but never quite within reach. One of the favorite schemes for securing the desired end involves the use of permanent magnets, and the only impediment to the realization of a machine for creating power is an insulator of magnetism. With inventors of this class of machines it has always been a great "if;" but now, if we are to believe certain reports, the great "if" has been annihilated, and the force of permanent magnets has been rendered available by the discovery of an insulator of magnetism, which, as we are told, consists of "chemical and mineral substances," but regarding the nature of these substances we are uninformed.

We have secured a picture of the machine, in which an insulating septum of the "substances" is employed to cut off the attraction of a permanent magnet, and thus secure the rotation of a wheel arranged within the field of force of a permanent magnet. This machine is the invention of Mr. H. S. Pullman, of Rockville, Conn., who has exhibited it in the city of Hartford to crowds who have been enabled to witness the wonderful performances of the machine at the expense of ten cents per head.

The simple fact of the machine being exhibited under such circumstances would seem to cast a shadow on its genuineness, for, if it is really a power-creating machine, the inventor might realize millions from patents for his invention where he receives only mills in the dime show business; however, the machine has the credit of moving apparently by power created within itself. It has been seen in motion by Mr. W. H. Goldsmith, city editor of the *Hartford Times*, to whom we are indebted for several points in regard to it; and Prof. Luther, of Trinity College, was promised the opportunity of testing the machine, but the inventor, with his machine, like the Arab, "folded his tent, and as silently stole away."

The machine is a wonderfully solid-looking affair for the amount of power produced by it, the thickness of the base and the diameter of the columns supporting the main wheel being apparently altogether out of proportion to the other parts. To an incredulous person these features might be suggestive of a spring motor contained in the base, and mechanism for conveying the power from the base through one of the columns to the motor wheel; and, further, one of the most salient features of the apparent deception is the legend upon the base, which is also suggestive of hidden parts.

To the base are secured two standards provided with centers, upon which are mounted the main shaft of the machine, carrying the motor wheel, A. The wheel is made of sheet iron, with teeth formed in its periphery, and bent alternately in opposite directions. Upon the shaft are also mounted a star wheel and a propeller wheel. The star wheel is arranged to tilt a lever, which carries at its extremity a plate, B, of brass coated with the "chemical and mineral substances" which make it an insulator of magnetism. The permanent magnet is supported by a U-shaped bar, with its poles near the wheel, A, and opposite the path of the insulating plate, B. The propeller wheel, turning in a cup of water, serves to equalize the motion, and thus prevent the machine from running away with itself and committing self-destruction.

We have never seen, nor have we before heard, of an insulator of magnetism, but, supposing it to be an entity, the machine illustrated seems to be poorly adapted for its application.

When one of the projections of the motor wheel approaches the horseshoe magnet, the insulating plate, B, is pushed up between the magnet and the wheel by the action of the star wheel, and as soon as the projection passes the magnet, the lever slips off from one of the points of the star wheel, allowing the insulator to drop, when the magnet will attract the next projection in order, and when near the magnet the insulator will be pushed up as before, and again dropped down, and thus the rotation of the wheel, A, is supposed to continue forever.

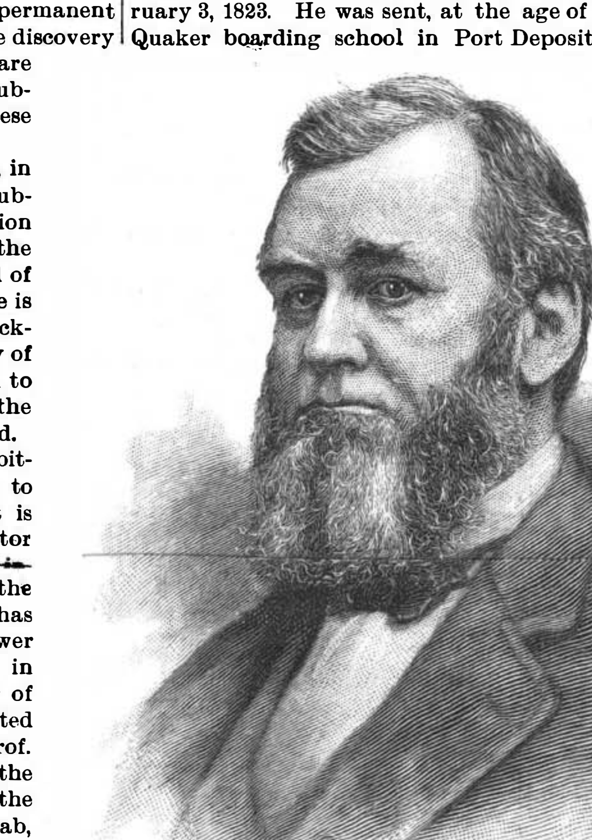
IN breaking the ground in a place near Kincardine, Ont., the other day, a skeleton, which to all appearance is that of a wild boar, was found. All the bones, including the tusks and teeth, were in splendid condition, though it is thought they have been lying there for one or two hundred years.

SPENCER FULLERTON BAIRD.*

BY MARCUS BENJAMIN.

The high rank among living naturalists so long held by the distinguished secretary of the Smithsonian Institution makes it eminently proper that he should receive a place in our gallery of American scientists, and at present the time is most opportune, for within a few days the news of his death has flashed through the country.

Spencer F. Baird was born in Reading, Pa., on February 3, 1823. He was sent, at the age of eleven, to a Quaker boarding school in Port Deposit, Md., and a year later to the Reading Grammar School, after which he entered Dickinson College, Carlisle, Pa., where he was graduated in 1840.



For several years afterward he devoted his attention to studies in general natural history, making long pedestrian excursions for the purpose of observing animals and plants. In 1841 he made an ornithological excursion through the mountains of Pennsylvania, walking four hundred miles in twenty-one days, and doing sixty miles between daybreak and rest on the last day. During the following year his pedestrian trips covered more than 2,200 miles. The specimens collected at this time for his private cabinet of natural history became later the nucleus of the museum connected with the Smithsonian Institution.

Meanwhile he studied medicine, and in 1842 attended a course of lectures at the College of Physicians and Surgeons in New York, but, did not graduate. He received, however, the degree of M.D. *honoris causa* in 1848 from the Philadelphia Medical College. In 1845 he returned to Dickinson College as professor of natural history, and a few years later became also professor of chemistry. His lectures included physiology to the seniors, geometry to the sophomores, and zoology to the freshmen.

He accepted the appointment of Assistant Secretary of the Smithsonian Institution in July, 1850, on the urgent recommendation of George P. Marsh, and thenceforth continued as its principal executive officer, becoming in May, 1878, on the death of Joseph Henry, its secretary and official head.

His duties in this connection were exceedingly arduous, and nearly all of the scientific development of the Institution was under his immediate charge. Indeed, his genius for organization made itself apparent from the outset.

The Department of Exploration was placed under his authority from the beginning, and his annual reports constitute the only systematic record of the government explorations ever prepared. During the decade of 1850-60 he devoted much time to enlisting the sympathies of the leaders of government expeditions in the objects of the Institution, supplying them with all the appliances for collecting, as well as with instructions for their use. In many instances he organized the natural history parties, named the collectors, employed and supervised the artists in preparing the plates, and frequently editing the zoological portions of the reports. The specimens brought back to Washington were intrusted to his care. These with his own collection and those of the Wilkes exploring expedition, brought to the Smithsonian in 1842, formed the beginning of the National Museum, now the finest in this country.

It has been no slight task to organize a museum such as that now in existence in Washington, and the brain that planned its details was that of Professor Baird.

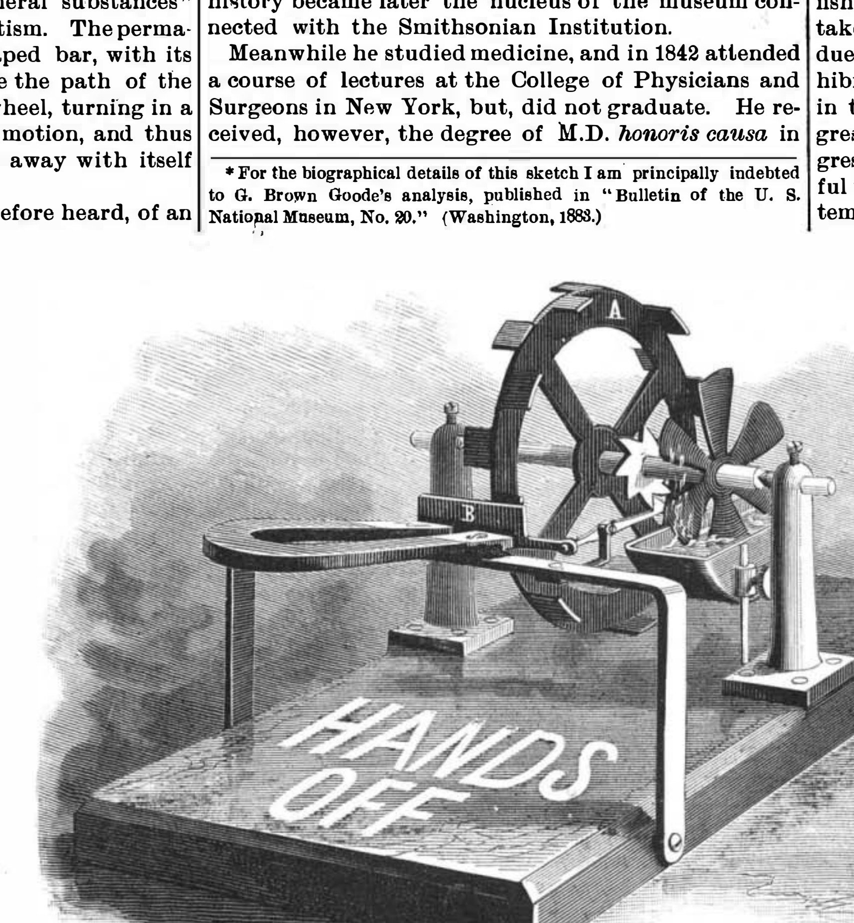
According to G. Brown Goode, its assistant director, and since January 1, 1887, in full charge of the museum, "there have been three periods in the history of the museum. At first, it was a cabinet of the results of research. When, in 1857, the Smithsonian assumed its custody, it became also a museum of records. Since 1876, the idea of public education has been predominant."* Besides the usual routine work incidental to the office of assistant secretary, Professor Baird organized the system of international exchanges which has since become one of the leading features of the Institution.

The most conspicuous, and perhaps the most valuable, of Professor Baird's scientific work dates from his appointment in 1871, by President Grant, as Commissioner of Fish and Fisheries. The duties of this office, as originally defined by Congress, were "to prosecute investigations on the subject, *i. e.*, of the diminution of valuable fishes, with the view of ascertaining whether any and what diminution in the number of the food fishes of the coast and lakes of the United States had taken place, and, if so, to what causes the same is due; and also whether any and what protective, prohibitory, or precautionary measures should be adopted in the premises, and to report upon the same to Congress." But the undertaking expanded as the work progressed, until it is now tenfold more extensive and useful than at first. At present, it includes: 1. The systematic investigation of the waters of the United States, and the biological and physical problems which they present. 2. The investigation of the method of fisheries, past and present, and the statistics of production and commerce of fishery products. 3. The introduction and multiplication of useful food-fishes throughout the country, especially in waters under the jurisdiction of the general government, or those common to several States, none of which might feel willing to make expenditures for the benefit of others.

His work in this department has received universal recognition. At the request of the United States government, he was present as advisory counsel at the Halifax Fishery Commission, held in 1877, and at that time prepared an essay on fish culture, into which he threw all of the wealth of his vast knowledge and experience on this subject. The manuscript has recently been put in the printer's hands, and is now in course of preparation for publication.

* For the biographical details of this sketch I am principally indebted to G. Brown Goode's analysis, published in "Bulletin of the U. S. National Museum, No. 20." (Washington, 1883.)

* The story has been well told by Ernest Ingersoll, in the *Century* for January, 1885, under title of "The Making of a Museum."



AN ALLEGED PERPETUAL MOTION.

In 1878 he received the silver medal of the Acclimatization Society of Melbourne, in 1879 the gold medal of the Société d'Acclimation of France, and in 1880 the first honor prize of the International Fish Exhibition, held in Berlin, it being the special gift of the Emperor of Germany. He also received, in 1875, the decoration of Knight of the Royal Norwegian Order of Saint Olaf, from the King of Norway and Sweden.

Professor Baird received the degree of Doctor of Physical Science in 1856 from Dickinson College, and that of Doctor of Laws in 1875 from Columbian University, being for many years a trustee of the latter institution. Since 1878 he was a trustee of the Corcoran Gallery of Art, and was the president of the Cosmos Club.

He was one of the government Board of Commissioners to the Word's Fair held in Philadelphia in 1876, and member of the international jury on Fish and Fish Products.

He was permanent secretary of the American Association for the Advancement of Science in 1850–51, editing the proceedings of the fourth, fifth, and sixth meetings, and was one of the early members of the National Academy of Sciences, serving as a member of its council almost since its organization.

Besides being a member of the leading scientific societies in the United States, he held foreign or honorary membership in many of the prominent scientific societies in Europe and in the British colonies.

The nomenclature of zoology contains many memorials of his connection with its history. Professor Theodore N. Gill has given his name to one genus of fish and over twenty-five species of mammals, birds, fishes, mollusks, and other forms of life bear his name, together with several fossil or extinct forms of life.

Professor Baird's literary work was something enormous. It included down to January 1, 1882, 1,063 titles.* Of this number, 775 are brief notices and critical reviews contributed to the "American Record of Science and Industry" while under his editorial charge, 31 are reports relating to the work of the Smithsonian Institution, 7 are reports upon the American fisheries, 25 are schedules and circulars officially issued, 25 are volumes or papers edited, while of the remaining 200, the majority are formal contributions to scientific literature.

Dr. Goode states further that, "of the total number of papers enumerated in the list, 73 relate to mammals, 43 to reptiles, 431 to fishes, 61 to invertebrates, 16 to plants, 88 to geographical distribution, 46 to geology, mineralogy, and paleontology, 45 to anthropology, 31 to industry and art, and 109 to exploration and travel."

From 1870 till 1878 he was the scientific editor of Harper & Brothers' periodicals, and likewise the annual volumes of the "Record of Science and Industry" from 1871 till 1879 were edited by him, "with the assistance of eminent men of science." The various reports and annual volumes of the United States Commission of Fish and Fisheries were prepared by him, and also the annual "Reports of the Board of Regents of the Smithsonian Institution."

His other works include the translating and editing of the "Iconographic Encyclopedia" (4 vols., New York, 1852); "Catalogue of North American Reptiles" (Washington, 1853); "Mammals of North America" (Philadelphia, 1859); "The Birds of North America," with John Cassin (Philadelphia, 1860); "Review of American Birds in the Museum of the Smithsonian Institution" (Washington, 1864–66); and "The Distribution and Migrations of North American Birds" (1866). More recently he has been engaged upon a "History of North American Birds," in collaboration with Thomas M. Brewer and Robert Ridgeway (5 vols., Boston, 1874–84). The results of his latest ornithological studies were recently placed by him in the hands of Dr. Ridgeway, and they are now in course of preparation for publication.

In June last, Professor Baird went to Wood's Holl, Mass., the summer headquarters of the U. S. Fish Commission, in greatly impaired health, the result of overwork and anxiety, but it was hoped that, with rest, he would soon be restored to health. For some time he grew better, but early in August he had a serious relapse, from which he rallied with sudden rapidity, and was able to spend part of his time in the laboratory, and even go out of doors. This continued until the day before his death, but on August 19, after a restless night, he became unconscious, and died.

His body was at once taken to Washington and deposited in the receiving vault of the Oak Hill Cemetery, where it will remain until the public funeral, which will occur during the autumn.

It is an unfortunate comment upon the present administration that a partisan clerk was permitted to so "investigate" the office of the U. S. Coast and Geodetic Survey that its superintendent, who had devoted forty years of his lifetime to its work, resigned from his place under threat of exposure of charges, never proved and generally believed incapable of being sustained. Likewise the life of the late secretary of the Smithsonian Institution was "perceptibly shortened," after thirty-seven years of faithful duty, by the careless imputation of the same officer. Although these charges were shown to be without foundation by a Congressional committee, still Professor Baird, "who was extremely sensitive, and who never before heard any imputation against the integrity of his administration, never recovered in spirit from the shock the charges gave him." *

Professor Baird's successor will undoubtedly be the present senior assistant secretary of the Smithsonian Institution, Professor Samuel P. Langley, a sketch of whom appeared in the SCIENTIFIC AMERICAN of August 20, as the president of the American Association for the Advancement of Science during its recent meeting held in New York. The present appointment of Professor Langley was made in January, 1887, at the request of the late secretary, who thus virtually designated him as his successor, and the regents of the Smithsonian Institution, of whom Chief-Justice Waite is chancellor, appointed Professor Langley with that understanding.

*See "The Published Writings of Spencer Fullerton Baird, 1843-1882," by George Brown Goode, "Bulletin of the U. S. National Museum, No. 20."

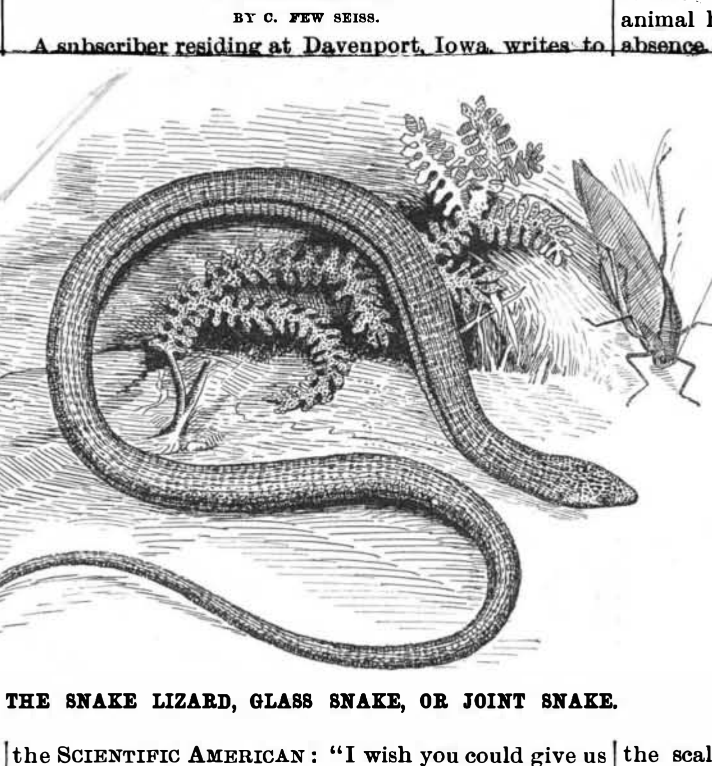
* *Evening Post*, August 22, 1887.

THE SNAKE LIZARD, GLASS SNAKE, OR JOINT SNAKE.

(*Ophisaurus ventralis.*)

BY C. FEW SEISS.

A subscriber residing at Davenport, Iowa, writes to the SCIENTIFIC AMERICAN: "I wish you could give us some information through your paper upon the so-called 'joint snake.' I have been permitted to see and kill several of them. They were about two to two and a half feet in length, and were quite pretty, being striped in brown and silver. I once threw a small loamy clod of earth upon one of them, which broke it into eight or ten pieces. Each piece was comparatively square at the ends, and the pieces were all about the same size. I have heard that the broken portions will reunite if left alone, should the head be uninjured. Have I been misinformed?"



THE SNAKE LIZARD, GLASS SNAKE, OR JOINT SNAKE.

The snake lizard, or "joint snake" as it is called in some localities, is a peculiar reptile, and has seemingly puzzled the earlier naturalists as to its proper classification, some placing it among the serpents (*ophidia*), and others with the lizards (*lacertilia*). It is serpent-like in form, being destitute of limbs, but a mere glance at its anatomy proves it to be a true lizard. The lower jaw bone is not disjointed as in the snakes, and the eyes of the snake lizard have movable lids, and its ears are visible externally—characters which never appear in serpents. Its tongue is not slender, forked and sheathed as in the serpents, but is somewhat arrow-shaped, notched in front and covered before with granular, and posteriorily with filiform papillæ. The scales are quadrangular in shape, arranged in transverse rows, and a fold of skin runs along each side of the body, separating the upper from the lower parts.

The tail of a snake or lizard is always considered that portion posterior to the anal opening or vent. The portion anterior to the vent is the body proper, as it contains all of the vital organs, while the tail contains nothing important. In the snake lizard the vent is situated far forward, and the tail is often twice the length of the head and body together. When the reptile is struck lightly, the portion which seemingly is voluntarily broken to pieces is *always the tail*, never the body or that portion anterior to the anal opening. "In many of the lizards the caudal vertebræ have a very singular structure, the middle of each being traversed by a thin, unossified transverse septum. The vertebra naturally breaks with great readiness through the plane of the septum, and when such lizards are seized by the tail, that appendage is pretty certain to part at one of these weak points." The muscles of the tail do not pass over these joints, so that the parting of the tail does not cause a tearing apart of the muscular fibers, but simply a separation of one muscular plate from another.

It has been asked, "Why is the tail of certain lizards so brittle?"—a question that cannot be answered satisfactorily, inasmuch as the vertebræ of the tails of some species of lizards are as strongly bound together as in the serpents. To the snake lizard the fragile tail is a benefit rather than a misfortune, for when the defenseless reptile is seized by a rapacious animal it snaps off its tail into several writhing pieces, which it leaves in the possession of its astonished enemy, while the head and body, the vital parts, wriggle away into the grass and escape. But the snake lizard is not doomed after such a misfortune to pass the remainder of its life without a tail, for it has the power to replace the lost member, not by pasting or cementing together the old broken portions, but by rapidly growing a new one.

When the tail has once been broken, it is hardly necessary to say that it is impossible for the reptile to collect and reunite the pieces.

A certain man declares that he beat a "joint snake" into a dozen or more pieces, and left it for over an hour, and when he returned to the spot he found that "the parts of the snake had come together again and crawled away." He would not be convinced that some animal had carried away or devoured it during his absence, which certainly must have been the case.

A traveler who frequently met with the "glass snake" during his botanical rambles, says: "It is as innocent and harmless as an earthworm. When full grown it is about two and a half feet in length, and three-fourths of an inch in thickness. The abdomen or body part is remarkably short, and it seems to be all tail, which, though long, gradually attenuates to its extremity. The color and texture of the whole animal is much like bluish-green glass, which, together with its fragility, almost persuades a stranger that it is in reality that brittle substance. Though quick and nimble in twisting about, yet it cannot run with much rapidity, but quickly secretes itself in the grass or under leaves." He of course contradicts the "vulgar fable" that it is able to repair itself after being broken into pieces.

In life, the head of the snake lizard is mottled black and green, yellowish about the jaws. The body and tail above are marked with lines of black, green, and yellow, corresponding to the position of the scales. The under surface of the whole animal is yellow, most brilliant along the abdomen. Several color varieties have been described from discolored alcoholic specimens, but in the living animal the color is always as given above, varying only in depth and brilliancy.

It has been found in all of the Southern States from Southern Virginia to Texas inclusive; and in the West its range extends as far north as Wisconsin and Iowa. It seems to prefer open fields and dry or sandy localities, and is frequently met with in sweet potato fields in the South. It is said to feed mainly upon insects.

To Color Copper and Nickel Plated Objects.

The *Journal des Applications Electriques* says that eleven different colors may be communicated to well cleaned copper, and eight to nickel plated objects, by means of the following bath:

Acetate of lead	300 grains.
Hyposulphite of soda	600 "
Water	1 quart.

After the salts are dissolved, the solution is heated to ebullition, and the metal is afterward immersed therein. At first, a gray color is obtained, and this, on the immersions being continued, passes to violet, and successively to maroon, red, etc., and finally to blue, which is the last color.

As the substances that enter into the composition of the solution cost but a few cents, the process is a cheap one. It is especially applicable in the manufacture of buttons.

Home-made Ice.

Take a cylindrical earthen vessel and pour 3¼ ounces of commercial sulphuric acid and 1¾ ounces of water into it and then add 1 ounce of powdered sulphate of soda. In the center of this mixture, place a smaller vessel containing the water to be frozen; then cover the vessel, and, if possible, revolve the whole with a gentle motion. In a few minutes, the water in the small vessel will be converted into ice. The same mixture can be used a second or third time for making a block of ice. The operation should, if possible, be performed in a cool place, in a cellar, for example.—*La Science en Famille.*