

tain two substances, one of which is active, the other not. Usually the activity is confined to the darker and inner layers. The concentric layers of the axis of the pineapple vary greatly in activity. Almond shells are totally inactive.

What is the cause of these various phenomena? Evidently it is not radioactivity, for the action is entirely prevented by the interposition of a sheet of glass or mica between the object and the photographic plate. Dr. Russel conjectures that the effect is caused by hydrogen dioxide. A solution of one part of hydrogen dioxide in one million parts of water produces an appreciable effect on a photographic plate in 24 hours in darkness, even when the layer of liquid is $\frac{1}{8}$ inch distant from the plate. According to Usher, Priestley and many other investigators, hydrogen dioxide and formaldehyde are the first products of the growth of plants. These facts explain the action of growing plants on the photographic plate. Furthermore, hydrogen dioxide is generated by turpentine and other resins, which occur in many plants. The subject, however, requires further investigation.

A FEW FACTS ABOUT FAKES.

BY J. F. SPRINGER.

About 1769 Baron Kempelen of Hungary began to astonish the civilized world of Europe with his chess player. This was apparently a figure controlled by mechanical devices, and which was able, notwithstanding the fact that apparently no intelligence was concerned in its movements and decisions, generally to beat its human antagonists. The cabinet connected with the automaton appeared entirely too small to contain a hidden operator. And yet it did conceal a man who was an expert chess player. He was a Polish patriot who had lost both of his legs—perhaps in the recent war over Poland. This man, Woronsky by name, was an expert player. With him hidden in the cabinet and yet really on the spot, the rest was easy.

The career of George Psalmanazar—as he called himself—was one of the most astonishing on record. This man was born in Switzerland or France, but during the time of his "fame" claimed to be a native of the island of Formosa. He had acquired a moderate education, but seemed indisposed to employ himself in any regular occupation. Instead, he roamed over Europe, serving with the Dutch and with the German army. At one time he pretended to be an Irishman, at another an unconverted Japanese, at a third time as a converted Japanese. In the last capacity he deceived the colonel of a British regiment at Sluys. The chaplain of the regiment—a man named Innes—however, did not seem to have been deceived. He and Psalmanazar proceeded to England, and there began a marvelous career. Psalmanazar masqueraded as a genuine native of Formosa converted to Christianity. The clergy received him with open arms. He had an interview with the Archbishop of Canterbury, who, however, was unable to understand his Latin. But then, who would expect a Formosan to speak Latin with perfection? He published an invented Formosan alphabet, together with forged examples of the native language, accompanying them with translations. The Bishop of London seems to have believed implicitly in his claim to know the language of Formosa, for he employed Psalmanazar to translate the Church catechism into it. He was sent to the University of Oxford to finish his education. There he is said to have employed his waking hours in an idle way, but to have left a candle burning while he slept to bear witness of his zeal in scholastic pursuits. He wrote a treatise upon Formosa in Latin. When this was translated into English, it had a very large success. To corroborate his claim of being a native Formosan, he would eat raw meat, roots, and herbs. He was lionized, and was immensely successful. Although he carried on the deception with the greatest ingenuity, deceiving great and small, he tripped at last. In an unwary moment he joined with someone in exploiting a "white Formosan ware." This led to his downfall. Detection being imminent, he confessed. This is no account. Another has it that he became conscience-stricken, and voluntarily withdrew from the public gaze.

A self-educated man of humble origin of the name of Vrain Lucas, ignorant of both Greek and Latin, became the perpetrator of a fraud involving the preparation of 27,000 odd forged documents, many of them purporting to be letters written by celebrated historical personages. Although written in French, they purported to be letters from Sappho, Thales, Dante, Petrarch, Julius Caesar, Alexander the Great, St. Luke, Shakespeare, Lazarus, Newton, Pascal, Cleopatra, and others. M. Charles, the great mathematician, was apparently ready to believe that all the ancients were proficient in this language, for he was completely fooled by Lucas. In 1867, among other documents Lucas communicated to the Académie through Charles two letters and four notes purporting to have been written by the celebrated French mathematician and thinker, Blaise Pascal (1623-1662). If these letters had been genuine, they would have

proved him to have anticipated Newton (1642-1727) in his great discovery of the law of gravitation. Charles was attacked, but stood his ground, even producing other letters to bear him out—from Pascal to the boy Newton. The discussion lasted for two years. In 1869, the Académie made an official declaration in favor of the genuineness of the letters. France went wild. The people in the street cheered the name of Pascal. But shortly afterward an official of the Observatory pointed out that sixteen of the Pascal letters were to be found in Saverien's "History of Modern Philosophers," which had appeared a century before. But M. Charles claimed that Saverien had used them without acknowledging his source. And so it went. But Le Verrier demolished the whole fabric of the fraud. Lucas was finally brought to trial, convicted, and sent to prison for two years. He had realized, however, about \$30,000 from his activities.

Simonides was a past master in the art of literary forgery. His performances belong to approximately the same period, but were accomplished on different soil. His greatest achievement was the forgery of a history of ancient Egypt written in Greek by Uranios. This he proposed to sell to the Germans for a great sum. In order to understand just what a marvelous piece of work he produced, it will be necessary to understand some of the difficulties. He undertook to produce a palimpsest—that is, an old parchment manuscript which has been used again for a more modern work. He took a manuscript of about the twelfth century, and wrote his history on the same parchment. As this new writing was to masquerade as the older, he had to avoid getting a single line of the new upon any part of the old. This required wonderful care, as there was really but very little space. In addition, he had to make the Greek letters he used agree with the style of the century they were supposed to represent. Of course, the history itself and the character of the language had to correspond with the supposed period of composition. As Prof. Max Müller tells us, he followed Bunsen's "Egypt" and Lepsius's "Chronology." And so the finished fraud captivated Lepsius, great scholar that he was, for the dates were all correct, that was plain to be seen! However, the manuscript had to undergo a very searching investigation, which included chemical and microscopic tests. Dindorf, the great classical editor, was to edit it for publication, and the Clarendon Press of Oxford was to publish first specimens. In fact, the fraud had almost been accomplished, when unfavorable news began to be received in Germany—probably accounts of Simonides's previous doings. At any rate, a re-examination was made, and inconsistencies in connection with the Greek letter M were found. In addition, a single passage was discovered where the supposed older ink was in reality seen to have run across the twelfth century writing. This was conclusive.

One of the most astonishing examples of genius devoting itself to forgery was that of the Italian Bastianini. Born in 1830 in the midst of abject poverty, he had, properly speaking, no systematic education, either literary or artistic. But he had real genius. An antiquarian of the name of Freppa employed him for two francs per day to produce "antiques" which might be sold at a good profit. So this became Bastianini's life-work—the production of forgeries. One of his most celebrated works is the bust of Savonarola. Persuaded that here was a real fifteenth century bust, two public-spirited gentlemen collected 10,000 francs, and purchased it from Freppa to prevent its sale and exportation. One critic, Dupré, declared that he must assign it to Michelangelo for its force and to Robbia for the exquisiteness of its treatment, regarding it as a wonderfully beautiful work of art. Sir Frederick Leighton, the noted English painter, having received a photograph, placed it, "like a sacred image, at the head of his bed." It is said that the Grand-duchess Marie of Russia and Lippart seriously thought of building a temple to house this wonderful bit of art. But, notwithstanding the plaudits of those who "knew," the bust was a fake. Rumors having become current that the piece of terra cotta was not what it purported to be, one of the purchasers abruptly demanded of Bastianini one day at his workshop whether he was the creator of the bust. And he admitted that he was. But this was not the only great "success" of Bastianini. A terra-cotta bust of Benvenuto, a sixteenth-century poet of Florence, was regarded as a contemporary work of art, and purchased by the Louvre for 13,000 francs, and installed in a room containing work of Michelangelo himself. But it was a fake for all that.

In the late nineties an English magazine was founded with the avowed object of printing true tales of adventure and the like. One day a man calling himself Louis de Rougemont handed a letter of introduction from a member of Parliament to the editor. The stranger told a harrowing tale of a life spent in Australia with cannibals in an unexplored region of that continent. Rougemont was proof against the most merciless cross-ex-

amination. He never contradicted himself. His narrative was taken down in shorthand, and published serially in the magazine. The editor introduced Rougemont to scientists, confident that the experiences of the man were of value to geography and anthropology. Two eminent geographical experts heard his story, tested it from their wide and accurate knowledge, and risked their reputations by giving it full credit. They too were of opinion that it contained matter of especial importance to science. The British Association for the Advancement of Science began to be officially interested. Arrangements were entered into for the appearance of the hero before it at the Bristol meeting.

Rougemont told a truly staggering tale. He enriched it with lively details of a fight with an octopus; of a wreck from which he was saved by a swimming dog to whose tail he clung, of an island on which he landed and where he lived on turtle meat and roach on turtles as if they were horses, of a visit of four starving blacks, one of whom, a woman, he married and to whom he even dedicated his astonishing narrative, and of his leaving the island to become the ruler of an Australian cannibal tribe for thirty years.

Long before the magazine had completed the story, Rougemont was found to be a faker. His biography was fiction. He had, however, deceived for a considerable time a great mass of people, many of whom knew Australia, and some of whom were experts in the branches of knowledge having to do with the alleged facts.

The Louvre in Paris is both the largest and the finest collection of examples of art that exists anywhere in the world. And yet this great museum of art has been made within recent years the victim of a striking piece of forgery. There was submitted to its inspection and approval a wonderful example of the goldsmith's art. This was claimed to be the tiara of Saitapharnes, and to have been dug up in southern Russia. The Louvre paid £4,000 for the headpiece. Henri Rochefort, the noted editor of *L'Intransigeant*, branded the headpiece as a forgery. It is possible that he did not act entirely independently, although he was an expert in art matters. To support the allegation of fraud, there was brought to Paris a certain M. Koukhomovski, a goldsmith of Odessa. Arrived in Paris, he demonstrated that he could indeed execute work the equal of the tiara. The upshot of it all seems to be that the tiara was partly genuine, but otherwise to have been the work of the accomplished M. Koukhomovski.

THE CURRENT SUPPLEMENT.

A new system of ship construction has been devised by J. W. Isherwood, which gives a freight-carrying vessel greater capacity than has been possible under the old construction. The system is painstakingly described and illustrated by the English correspondent of the *SCIENTIFIC AMERICAN* in the current SUPPLEMENT, No. 1707. Dr. Louis Bell reviews recent American work in power transmission. A. Troller contributes an article on the Armengaud system of electrical vision at a distance. Our Berlin correspondent describes an air-driven typewriter. The dredging equipment on the Panama Canal is a subject discussed by F. B. Maltby. A new type of automobile road-roller is described and illustrated by the Paris correspondent of the *SCIENTIFIC AMERICAN*. How Prof. Onnes of Leyden liquefied helium is excellently set forth by Francis Hyndman. Prof. D. Finlayson, the well-known English agricultural authority, writes on barley and its cultivation. "What is the good of astronomy?" is no doubt a question which the layman frequently asks himself. That question is very fully answered by Prof. Harold Jacoby. The Commissioner of Fisheries contributes a simply-worded article on the transplanting of fish.

THE MOREHOUSE COMET OBSERVED.

The new comet discovered upon a photographic plate by Mr. Morehouse at the Yerkes Observatory on September 1 has been observed visually with the 10-inch refractor at Smith Observatory by W. R. Brooks. On September 5, 14h. 20m. standard mean time, the position of the comet was right ascension 3 hours 20 minutes; declination north, 68 deg. 30 min. On September 7, 15 hours 30 minutes, the comet's position was R. A. 3 hours 00 minutes; declination north, 69 deg. 30 min.

The discovery place on September 1, 361 G. M. T., was R. A. 3 hours 20 min.; declination north, 66 deg. 15 min. These several places show a slow motion of the comet in a northwest direction.

The comet is visible in a small telescope, being an easy object in the 3-inch finder of the equatorial, and promises to become an interesting object as it comes nearer.

The comet is now just under the back of Cassiopeia's Chair, and being circumpolar is observable all night when the moon is absent.