

SCIENCE AND INVENTION

A SCIENTIFIC FAMILY.

Three Becquerels Achieve Distinction in Physical Science.

The recent death of Antoine Henri Becquerel, the French physicist, at the age of 56, recalls the interesting fact that he is the third of his name in direct succession to achieve eminence in physical science, and that he leaves a son who is also a physicist. Still more interesting is the fact that in certain lines each one of the family has continued and extended the work of those before him. Especially is this the case with the obscure subjects of phosphorescence and fluorescence, which Henri Becquerel cleared up so greatly by his discovery of the phenomena now generally classed together under the name



HENRI BECQUEREL

HENRI BECQUEREL.
The Third of a Brilliant Line of French Physicists, He Leaves a Son Who "Seems Ready to Continue This Fine Tradition."

of radioactivity, and which led directly to the sensational discovery of radium by Prof. and Mme. Curie. In La Nature (Paris) appears a sketch of this remarkable family, and especially of its latest member, by L. de Launay. Says this writer:

"For three generations son has followed father as a member of the Institute (Antoine-Cesar, 1788-1878; Edmond, who died in 1891, and Henri), and a fourth seems ready to continue this fine tradition. . . . Long ago the first of the Becquerels, Antoine, to whom we owe the beginnings of electrochemistry, the electric thermometer, the electromagnetic balance, etc., hit incidentally upon one of those complicated subjects voluntarily neglected by the too methodical and precise investigators who wish to proceed surely and arrive on a fixed day—problems whose very obscurity promises, sooner or later, when their phenomena shall have reached maturity, sensational and suggestive discoveries. He attacked the question of phosphorescence, which he explained from the outset electrically. In this dynasty of scientists investigations have been handed down from father to son, who have used the same substances, preserved in the same laboratory. Later his son Edmond Becquerel, who, we may recall by the way, discovered the first method of color-photography, continued the study of the phosphorescent rays, and thought that he had been able to show their identity with light-rays. At the same time with Niece de St. Victor, he . . . began the examination of the whole series of substances, such as the alkaline earthy sulfates, the diamond, fluorin, and aragonite, that become luminous under the action of the solar rays; and studying fluorescence in the same connection he considered it as produced by the ultraviolet radiations. In 1883 Henri Becquerel took up this question of phosphorescence and studied the absorption of light by the components of uranium.

The work of Becquerel, Curie, etc., has made us acquainted with new forms of substance that transform part of the energy that they receive into chemical reactions. . . . We enter here into the vast field of the unknown, which is so attractive, and the name of Henri Becquerel will remain connected with one of the chief steps accomplished in the nineteenth century toward the acquisition of this domain.

Remains of a Mammoth.

The remains of a prehistoric elephant of mammoth proportions were unearthed recently in the bed of a small creek in Puddingstone canyon, half a mile north of San Dimas, by Prof. A. J. Cook, head of the department of biology of Pomona college, Cal., and Edward P. Perry, a student. The bone frame, which is in a fair state of preservation, measures 26 feet in length, and 16 feet in height, and what remains of each of the enormous tusks is ten feet long. The parts of the huge skeleton that could be safely handled, were removed carefully to Claremont, and are to be placed in the museum of Pomona college. The discovery was accidental. The skeleton lay diagonally across the stream with only six inches of ground over it.

IMPROVED PIPE WRENCH.

With It Firm Grip Can Be Secured on Round Surfaces.

The wrench illustrated herewith is formed with a slidable jaw which enables it to grip round surfaces. No retaining pins or other detachable retaining devices are used and an efficient pipe wrench is thus provided with few loose parts. Formed on the main body A of the wrench is a fixed jaw B. Dovetailed into opposite sides of the body are a pair of detachable racks C, which are adapted to mesh with the thread of the nut D. This nut is fitted in a frame E, which in turn is mounted to slide along the body or shank of the wrench. The frame E is extended at one side, and in the inclined upper face of this extension an undercut guideway is formed adapted to receive the slidable jaw F. A spring-pressed pin in the jaw bears against the shank A, and holds the jaw in its outermost position. In use the nut D is adjusted to close the jaws onto the work, and then when the wrench is operated, the sliding jaw moves inward, jamming the work against the upper jaw. Mr. Harvey N. Rothweiler of Seattle, Wash., says the Scientific American, is the inventor of this improved wrench pipe.

HUGE LENS ON MOUNTAIN TOP.
Most Powerful Telescope in the World Ready for Service in December.

The huge 2,000-pound lens for the Carnegie Solar observatory is at last on top of Mount Wilson after one of the most tedious and nerve-racking tasks of the kind ever undertaken.

The first stage of the undertaking, which was the feat of transporting the immense casting from a little village near Paris, to Pasadena, was concluded three years ago when the cast was turned over to an expert optician to be ground and polished into a state of perfection.

After three years of incessant grinding and polishing, which ended in August, the finished lens was turned over to the chief astronomer of the observatory, and the third and final stage of the undertaking was entered into.

This was to lift the dead weight of a ton, which the touch of a hand might mar, to the height of a mile up a steep, rough mountain side. Mingled with the anticipation which scientific men felt at the outset of the triumphant ascension was a feeling of anxiety lest the ponderous yet delicate problem should fall. There were innumerable chances that disaster would overtake the expedition. If the lens had been broken or cracked, or had the slightest accident caused a flaw to appear upon its surface, though microscopically minute, the undertaking would have been a failure. Such a failure would not have been measured in dollars alone; indeed, the money cost would be classed as trivial compared with the all-important element of time, as five years of incessant labor would be required to replace it.

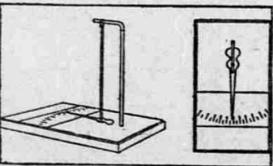
The old trail up Mount Wilson was out of the question. For several miles it is only three feet wide. It was necessary, therefore, to construct a new trail, and a large force of men were put to work on a route which seemed to promise the surest means of transportation. The trail was completed at a great cost, the lens was securely buried in soft packing material, and after an entire day of most tedious work was at last deposited in the observatory.

The finished lens is 60 inches across, 8 inches thick at the point of its extreme fullness, and weighs an even 2,000 pounds. It is so much more powerful than any other lens that it is claimed it will make visible 200,000,000 more stars than can be seen with the most efficient instrument now in place. The atmosphere at the mountain top is particularly suited to astronomical observations and the instrument will have the further advantages of the most complete and modern supplemental equipment.

HOW TO MAKE A HYGROMETER.

Little Instrument Will Tell You the Amount of Moisture in Atmosphere.

Mount a wire on a board, which is used for a base and which should be three-eighths by four by eight inches, as shown in the sketch. A piece of



Simple Hygrometer.

catgut—a string used on a violin will do—is suspended from the bent end of the wire. A hand or pointer is cut from a piece of tin and secured to the catgut string about one-half inch from the base. A small piece of wood and some glue will fasten the pointer to the string. The scale is marked on a piece of cardboard, which is fastened to the base and protected with a piece of glass.

Fish packed in a Danish vegetable paper were in much better condition after 16 days than those packed in ice.

AMERICA'S GREATEST CATHEDRAL

MAGNIFICENT STRUCTURE PLANNED BY CATHOLICS OF ST. LOUIS



EAST FRONT OF NEW CATHEDRAL



THE OLD CATHEDRAL

St. John's cathedral, being erected by the Episcopalians at New York, has been considered the most magnificent attempt at church architecture in America, but within the next six years the Catholic cathedral, now building at St. Louis, bids fair to rival in grandeur and beauty even that temple. The construction of this new Catholic cathedral is being watched with ever-increasing interest. The laying of the corner-stone a short time ago was the occasion of the most splendid ceremonies in which distinguished visitors from afar, a special representative of the pope, and 40,000 Catholics took part.

According to Archbishop Glennon, the Cathedral will be completed within six years. The cost of the exterior will be \$1,500,000, and of the interior, when completed, another million. The cost of the site at Lindell boulevard and Newstead avenue was \$300,000.

The structure will be larger than several of the famous old world cathedrals. Modeled after St. Sophia's at Constantinople, it will overtop the latter 50 feet in height, and will be 111 feet longer. It will be two feet higher than Notre Dame at Paris, and 46 feet wider. It will surpass in both height and width Westminster abbey in London.

The St. Louis cathedral will be 350 feet in length, 216 feet in width and 225 feet in altitude at the dome. Its seating capacity will be 4,500, of whom 2,300 can sit in unobstructed view of the altar and 3,000 in full view of the officiating priest. The floors of the auditorium, aisles and perambulatories will be paved with marble mosaic in harmony with the general color scheme of the interior.

There will be four separate chapels, each as large as the ordinary church in St. Louis, and costing \$100,000 each. A perambulatory, supported by great columns, will surround the entire auditorium.

The Byzantine style of architecture was adopted because of its superior economy over the ornate and elaborate Gothic. It is declared that Gothic buildings cost three times as much as those in the Byzantine style.

This Byzantine warmth and variety of color will mark the interior of the St. Louis cathedral, with its countless columns in rare and beautifully colored marble, its spandrels, band courses, architraves and balustrades of rich mosaic, and its splendid mural decorations on canvas. Indeed, it is the purpose of the designers to make the interior a veritable palace of religious art. The historian in his comments on St. Sophia goes on to say that "the memory of past calamities inspired Justinian with wise resolution that no wood, except for doors, be admitted to the edifice." The structure was of brick, faced with marble, and the furnishings of the interior were of marble, tile and mosaic. The St. Louis cathedral will be even more nearly fireproof, bronze taking the place of wood for the doors and solid stone for the walls, with massive foundations of concrete. The splendid dome will be covered with green mission tile and the heating, ventilation and artificial cooling of the sanctuary and chapels during the summer will be in accordance with the most modern methods. Everything for beauty, comfort and safety has been provided, making the building perfect in all its details. The marbles for the interior are to be of old convent Siena, Alps green, rose Numidian and Pavnazzo, and the mosaics and mural decorations will be wrought by the best craftsmen and artists in the country. As far as possible the work will be of American, preferably St. Louis origin.

One of the loveliest features of the great central body of the church will be the altar, of exquisite white marble, overhung by a baldachin, not of silk or tapestry, of which this canopy is usually made, but of solid silver filagree, supported on four pillars of

delicate tinted onyx. Another beautiful feature will be the entrance to the crypt, approached by a broad stairway of white marble.

For financing the great building an initial fund of \$250,000 was left by the late Archbishop Kain, \$71,000 has been subscribed by the clergy, and \$430,000 more by individual contributors. The archdiocese is engaged in raising another half million for the completion of the superstructure.

With the finishing of the building, the archdiocese will have an official capitol. The old cathedral, at Second and Walnut streets, has been little more than a parish church since Archbishop Kain, ten years ago, planned a new cathedral at Jefferson avenue and Locust street, a site which he afterwards abandoned. The old cathedral was dedicated 74 years ago, and was regarded for decades as a notable structure.

The ceremony incident to the laying of the corner-stone for the old cathedral, for which Bishop Rosati toiled so long and against so many discouragements, was the greatest thing of its nature that the young St. Louis had experienced. It took place on the 1st of August, 1831, and in less than three years the church was completed and almost paid for. Even in its present grimy condition, lost among the time-eaten buildings of the river section of the city, it is still a wonderful structure, with its stately doric columns and its air of quiet grandeur. Long ago it was abandoned by the archbishop, for whom the small chapel at Newstead and Maryland avenues was erected, on the corner of the spacious lot purchased for the grand new cathedral; but the part it played in the early religious life of the city will never be forgotten, cannot be underestimated.

Long before even this early church was called into being there was a great Catholic church in St. Louis, great because of its importance in the community. It was the little structure built of upright posts which occupied the middle of the block between Main and Second streets and surrounded by the best of the early French families that settled St. Louis. Here Father Bernard de Limpoch, following the work of Father Valentin, began the struggle for the erection of a church compatible with the wealth and population of St. Louis. The result was the little wooden building that was dedicated in 1776 and remained standing until 1820. That same struggle was taken up by Bishop Rosati when the city had outgrown all its churches, and again by his grace Archbishop Glennon, when he realized that St. Louis ought to be the seat of a really magnificent cathedral. That the city will ever outgrow this superb building that is about to come into being it is difficult to believe. For centuries to come it will more than likely remain a unique and wonderful example of ecclesiastical architecture, of which any city might well be proud.

WATER SUPPLY AND POWER.

Great Hydro-Electric Project Near Torreon in Mexico.

Following the report of government engineers who have been making surveys and estimates of a projected dam across the Nazas river near Torreon, the federal government of Mexico has agreed to give financial support to the proposition, and the contract for its construction has been awarded. According to the estimates of the engineers the dam will cost about \$6,000,000, and will form one of the largest water storage reservoirs on the continent, affording a water supply to the whole Nazas river cotton-growing district for a period of three years without replenishing.

In connection with this dam, it is also planned to install a hydro-electric plant to supply all of the towns within a radius of 150 miles. There are many large industrial plants in the Nazas valley which will be provided with cheap power from the proposed plant, and it is expected that the establishment of manufacturing enterprises will be greatly stimulated.

The principal cotton-growing region of Mexico lies in this valley, but owing to the uncertainty of rains in the mountains the river cannot be depended upon to give an adequate water supply for irrigation purposes when most needed. By storing the water this difficulty will be overcome. The site of the proposed dam is in the San Fernandez canyon.

There Isn't Any.
Misery loves company, but who ever heard of any company that liked misery?—Detroit Free Press.

GATHERED SMILES

THE PUBLIC EYE.

In a little more we came to an open space, very thronged.

"The Public Eye," shouted the megaphone man of our party.

There were some curious people within the space but even more curious were those just outside.

Of these latter we thought certain women especially interesting; they were busily neglecting their families in order to get into the Public Eye. A pathos attached to another group of women who had been in the Public Eye and could never be happy out of it, though they couldn't in the least tell why.

Positively funny were a few men who kept trying, by a variety of droll devices, to break into the Public Eye. "Vice-presidential candidates!" our megaphone man explained.—Puck.

About the Size of It.
"Preachers are about the only men who can give better satisfaction by doing less work," remarked the thoughtful thinker.

"How do you figure that out?" queried the innocent bystander.

"Short sermons always please," explained the t.—Chicago Daily News.

In the Right Spirit.
"I am 17. How long should I wear my dresses?" wrote a fair lass to the editor of the query department of a leading magazine.

"From your first appearance in the morning until you retire at night," replied the editor.—Judge.

A MEAN MAN'S EXULTATION.



Prosperity has come to us, hooray! I'm so elated I can scarcely speak; Last night the cook got mad and went away. We had to pay her seven plunks a week.—S. E. Kiser, in Chicago Record-Herald.

Improvement.
"It is sad," said the man who uses slang, "to see politicians so busy knocking one another."

"Well," answered Senator Sorghum, "even that program represents an improvement. It's a little more humane to go after a man with a hammer than with an ax."—Washington Star.

Discreet Prophecy.
"Why do you invariably predict the coldest winter we have had in years?"

"Well," answered Prof. Blatherston, "if it comes true people necessarily give me credit for great wisdom. And if it doesn't come true, they are too thankful to hold any grudge."—Washington Star.

A DOUBLE BREAK.



Wife—I saw Mr. Chacer this afternoon and he looks pretty bad. What's the matter with him, do you know?
Hubby—Compound fracture.

Wife—What sort of compound fracture?
Hubby—He's broke; and Miss Doughbag, discovering that fact, broke her engagement.

His Business to Be.
"The insurance man with literary ambitions you took on the staff of the magazine is very much dissatisfied at being one of the subordinate authors."

"I don't see why he should be. Wasn't he always an underwriter?"—Baltimore American.

Rural Habits.
Smith—Hello, Jones, do you still live out at Oyster Bay?
Jones—No—I'm in Brooklyn now.

"How is it that you Long Island people are always moving from village to village?"—Life.

The Cause of Vernal Verdancy.

The kindergarten teacher had been telling her pupils about the seasons and the colors that were characteristic of each.

"Now," said she, "if you were trying to represent spring, which of the colored chalks would you use?"

"Green," responded little Pat, promptly.

"Why?" he was asked.

"Cause St. Patrick's day comes in spring."

TOO BAD.



Adolphus—I say, deah boy, they tell me Cholly caught quite a cold, don't cherknow.

Augustus—Yes, he went without his chrysanthemum one day last week.

Combination.
Complaining Customer—Say, this fly paper is full of holes.

The Grocer—Yes, madam; I know it is. It is the new "combination" fly paper, and is made with the holes so that it can be used for porous plasters after the fly season is over.—Judge.

One Sign.
Said He—Young Smythe and Miss Brown are evidently in love with each other.

Said She—Judging by the way they look at each other?

Said He—No; judging by the way they don't look at anybody else.—Chicago Daily News.

Individual Application.
"I hope you were in favor of the loans."

"Always in favor of loans, dear boy, say, can you spare a V?"—Baltimore American.

A MISTAKE SOMEWHERE.



Myrtle—What's the score?
Evelyn—Eight to four.

Myrtle—You must be mistaken. I'm sure I haven't seen more than three men carried off the field.

The Way She Does It.
"Mrs. Clymer is a model housewife in one way."

"What is that?"
"By dint of giving her dinners, teas and receptions to the reporters, she manages always to keep her house in print."—Baltimore American.

Never Sees It.
Ida—Why haven't you been to see me?
Emily—Just look at the weather we've had!

Ida—I can't. We live in a shaft apartment.—Judge.

STRIKING A BARGAIN.



The Big One—I'll give you a nice apple if you'll stop crying.

The Small One—H—how big is the a—apple, an' how I—long have I got to stop fer?—New York Herald.