

# POPULAR SCIENCE.

## EXPERIMENTS AND INVENTIONS INTERESTING TO ALL.

Some Marvelous Strides Recently Made in the Mechanical World—Chemical and Electrical Wonder Workers Revealing Hidden Treasures.



THE MYSTERIOUS TOP.

SCIENTISTS of England have been giving a great deal of serious consideration to the study of a mere toy which they are still unable to satisfactorily explain. It is a top called the "artificial spectrum top," in which were tracings of black and white arcs made to assume colors when in motion. The top as now constructed consists of a revolving disc, half black and half white. On the white half are short, concentric arcs of black. When the top revolves close under a bright lamp these arcs appear, not as gray lines, as might be expected, but as lines of color. To most eyes the effect is as follows: (1) When the revolution is such that the black line is preceded by the black half of the disc and followed by the remainder of the white, it appears red; (2) when the direction of rotation is reversed it appears blue; (3) when the lines are on the central portion of the white (so as to have equal white immediately on each side) the color is green; (4) intermediate positions give approximately the intermediate colors of the spectrum. A few people see the colors differently, and one or two people, by no means color blind, can see no color at all. Curiously enough, a few people who are somewhat color blind can see the colors on the top very well.

**Molasses Pavements.** Perhaps the oddest pavement ever laid is one just completed at Chino, Cal. It is made mostly of molasses, and if it proves all of the success claimed for it, it may point a way for the sugar planters of the South to profitably dispose of the millions of gallons of useless molasses which they are said to have on hand. The head chemist of a sugar factory at Chino, Mr. E. Turke, was led to make certain experiments, of which the new sidewalk, a thousand feet long, from the factory to the main street, is the result. The molasses used is a refuse product, hitherto believed to be of no value. It is simply mixed with a certain kind of sand to about the consistency of asphalt and laid like an asphalt pavement. The composition dries quickly and becomes quite hard, and remains so. The peculiar point of it is that the sun only makes it drier and harder, instead of softening it, as might be expected. A block of the composition, two feet long, a foot wide, and one inch thick, was submitted to severe tests and stood them well. Laid with an inch or so of its edges resting on supports, it withstood repeated blows of a machine hammer without showing any effects of cracking or bending.

**Submarine Photography.** Mr. Louis Boutan has made some interesting experiments in submarine photography. He is an ardent student of zoology, and during the investigations he made on the shores of the Mediterranean he was so impressed with the beauty of the sights offered that he concluded to make some effort to represent them by pictures as well as words. His first experiments were made at a slight distance under the surface of the water, where the intensity of the light is still sufficient for the production of photographs; he constructed a camera and an instantaneous shutter especially adapted for use in water. Finding it desirable to take pictures at greater depths, Mr. Boutan resorted to the employment of artificial light, and employed an apparatus whose construction is shown in the cut.

The apparatus comprises a barrel, T, containing oxygen and carrying a glass globe, C, in which is placed a lamp, A, having a wick impregnated with alcohol.



hol. The operator, by pressing the bulb, P, at the end of the tube, H, may throw some magnesium powder into the flame, or otherwise produce a flash light within the globe, C. The operator puts on a diving suit provided with the usual air supply pipe, S, and places his camera, M, which is watertight, in proximity to the oxygen barrel, T, so that he can readily actuate the shutter and the flash light apparatus.

**Battlefield Cremation.** In view of the terrific slaughter by means of the latest improved munitions of war, it has been suggested that some steps must be taken toward providing for the removal of the dead which would so encumber the ground as to make action and locomotion extremely difficult. It has been proposed that crematories be started for the purpose of disposing of the dead. While it is clearly apparent that something must be done in this direction, it seems an exaggerated form of brutality to dump

the dead into crematory furnaces in this way. There is also the very gravest danger that careless and unfeeling employes may pick up men who are only stunned or who may have fainted and plunge them into the fiery vortex. It is a well-understood fact that men have lain for hours on the battlefield dead to all appearances, and such might easily be gathered up by ignorant or unobserving attendants and consigned to the flames. It would be very much better to prepare temporary receiving hospitals, where all men not absolutely shot to pieces could be removed and examined. Then the crematory might do good work. There is, however, a melancholy satisfaction to surviving friends in the idea that the bodies of their loved ones who have fallen in battle may be brought home to them and buried in the family vault. Battlefield crematories are not likely to come into general favor among people of delicate sensibilities.

**Triplet Glasses.** To perform this pretty experiment you need three old-fashioned champagne glasses and two wooden sticks, say the ordinary pea-holders.



The position of the glasses shown in the illustration almost explains itself. You will have to try it tentatively, so as to get the exact point inside the glasses, where the stick will serve the purpose desired, but it may be done by careful handling. Having succeeded in doing this, see whether you cannot place three glasses upon a fourth in the same way.

**The Vesicating Constituent of Croton Oil.** In a communication made to the Royal Society, Mr. Wyndham R. Dunstan, M.A., F.R.S., and Miss L. E. Roole, lecturer on chemistry in the London School of Medicine for Women, record the results of an experimental inquiry into the nature of the vesicating constituent of croton oil. According to the research of Buchheim, and more recently of Kobert and Hirscheidt, the vesicating action of croton oil is due to an acid closely allied to oleic acid, which has been given the name of crotonoleic acid, and which is now prepared for medical purposes on a large scale in Germany. The process consists, broadly, in the formation first of barium crotonoleate, and the subsequent decomposition of this with dilute sulphuric acid, and extraction of the liberated crotonoleic acid as a viscoid oil with ether. By a process of fractional precipitation, using lead salts, the above investigators were able to separate from this so-called crotonoleic acid a large proportion of inactive oily acids, till at last they were successful in obtaining, by a series of operations in which alcoholic extraction and separation by means of lead oxide were made use of, a resinous substance having extraordinary power as a vesicant. The composition of this resin is expressed by the empirical formula  $C_{17}H_{32}O_4$ . All attempts to crystallize or to obtain crystalline derivatives failed. It is a hard, pale yellow, brittle resin, nearly insoluble in water, light petroleum, and benzene, but readily dissolved in alcohol, ether, and chloroform. In regard to its constitution it is concluded that the vesicating constituent of croton oil is a lactone or an anhydride of complicated structure.

**Electricity on Japanese War Vessels.** The firing of great guns and the explosion of shells appears to have the effect of disarranging some of the electrical devices on war ships. The Japanese legation in Paris has forwarded to the French government a report relating to the recent naval combats. In which it is stated, with regard to the electric installations on board the mikado's warships, that the interruptions of current which took place were not caused, as has been said, by the recoil of the guns, but by the bursting of Chinese shells. The working of the ordnance maneuvered by electricity was not interfered with. The electric wires used for igniting charges were, however, broken by the vibration set up by the firing of the heavy guns.

**Electrical Notes.** It is said that electric lamps run by storage batteries last twice as long as lamps operated directly from dynamos. Any galvanometer having a resistance which is large in proportion to the current to be measured can be used as a voltmeter after calibration. In an arc lamp, supplied with a direct current, the consumption of the positive carbon is in round numbers one inch per hour, and of the negative carbon one-half that amount. Aluminum has the least electrical resistance for a given length and weight and mercury has the greatest; but for a given length and sectional area, annealed silver has the least resistance and bismuth the greatest. Before beginning to charge a storage battery, it should be gone over carefully, and any cell that is not up to the standard should be taken out of the circuit, and put in working condition before being replaced. S. P. Thompson says: "You will get the given amount of magnetism and traction, with the least amount of magnetizing force, when you have the area (of the magnet) as great as possible and the length as small as possible." Catherine de Medici paid about 4 shillings for a pair of gloves.

# IT EXCITES INTEREST.

## THE SUCCESSFUL TRIP OF THE BICYCLE FLYING MACHINE.

How a New York World Reporter Easily and Safely Guided the Ship—The Sensation of Being High Up in the Air.



EXTRAORDINARY interest has been aroused by the recent successful trip of the World's airship, "The World," in New York. In the eastern part of Brooklyn, where the ascent was made, little else has been talked about for weeks past. Ordinarily, a person hears a story about an airship or a flying machine with a good deal of scepticism, but when one is confronted with evidence in the shape of the machine in actual operation, it is difficult not to believe. And that is the sort of evidence that was provided for thousands of persons just two weeks ago Saturday, who were so fortunate as to be on the spot when "The World" rose proudly and intelligently into the air, or who chanced to be somewhere in the line of its flight from Brooklyn to New York city, back to Long Island and thence to Yonkers, says the New York World. The entire trip was made pursuant to a set design of the World reporter, who operated the machine. It was no foolhardy venture, and the outcome could hardly have been



THE AEROCYCLE JUST AS IT ASCENDED.

other than successful, although many who saw the ascent marveled at the aeronaut's daring, and expressed themselves as being satisfied to remain on the earth. The reporter, however, had carefully experimented with the airship before making this ascent in public. He was fully aware, in the first place, that the trip would be just as safe as a ride in a trolley car, and, perhaps, indeed, a good deal safer. And, in the second place, he was perfectly confident that he would be able to guide the machine, though a rather stiff wind was blowing at the time. No claim is made here that the World's airship is a mechanical bird, or a miraculous invention, which can be made to fly rapidly in the teeth of a fierce gale. Any such claim is absurd on its face. But it is asserted with perfect sincerity that a machine has been devised and constructed which is capable of being guided at the will of the operator, when the weather is anything like favorable. Such a machine is the World's airship. Such a machine was that which has solved the problem of aerial navigation. The reporter had become familiar with the manipulation of the airship at the "Balloon Farm" of Prof. Carl E. Myers, the inventor, in Herkimer county, N. Y. Experiments have been continued over a considerable period, the idea being to make the ultimate trial at New York city a success, and to eliminate every possible feature that could contribute to a failure. The reporter had little difficulty in getting the knack of the machine, and it was not long before he could handle it as deftly as the professor himself. It will be remembered, according to the description and illustration printed in the Sunday World, that the airship is propelled by a huge sail propeller, operated by a pair of pedals, quite similar to those used on a bicycle. The main part of the machine is shaped somewhat like a spindle, being a double-pointed bag of cotton material, which is filled with hydrogen. The propeller is situated in front of the operator, who is seated on a bicycle-seat within a concentric ring of steel.

# THE LIONS ROARED.

## They Recognized Their Old Friend and Were Overjoyed.

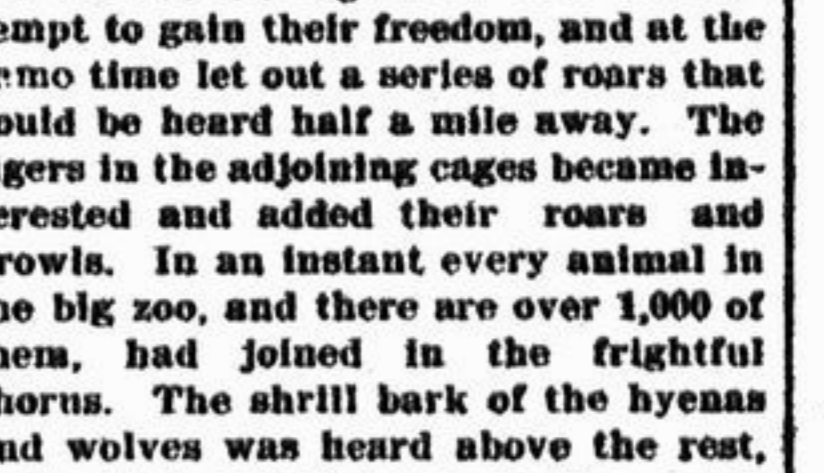
Considerable excitement was caused in the big zoo at Glen Island by an incident which demonstrated the memory and sagacity of a huge African lion, and a lioness. The beasts had been yawning before several thousand people, when something suddenly attracted their attention. They bounded against the bars of the cage as if in a vain attempt to gain their freedom, and at the same time let out a series of roars that could be heard half a mile away. The tigers in the adjoining cages became interested and added their roars and growls. In an instant every animal in the big zoo, and there are over 1,000 of them, had joined in the frightful chorus. The shrill bark of the hyenas and wolves was heard above the rest, and added actual terror to the scene. Finally the huge elephant Slam caught the fever and, holding his trunk high in the air, gave a roar that was plainly heard at the other side of the sound. The fawns and deer and the little baby zebu dashed into the sheds, trembling with fright, while the monkeys groveled with terror at the bottom of their cages. Walter Bannister, the keeper, and half a dozen assistants were at once on the scene to make an investigation. It puzzled them. There was no apparent cause for the excitement, yet the big lions continued their roars and bounded about the cage. "Turn the hose on him; he's got mad," suggested one of the spectators, who said he knew all about lions, as he had read a book on animals in his boyhood. Things were becoming furious, when an elderly man forced his way through the crowd.

During the sixteen or eighteen trips made by the reporter in practice an-

# OUR WIT AND HUMOR.

## FOUNDED PRODUCTIONS OF THE FUNNY WRITERS.

Original and Selected Paragraphs Picked Up Especially for Our Less Readers—Passing Events as Viewed from Humorists' Standpoint.



SEE the little catcher, With mittens on his hands. As, trembling with excitement, Behind the bat he stands; And as he gives his orders, He seems to grow in size. "Come, get some ginger in yer! Two out! Play ball!" he cries. He's slender-built and wiry, With freckles on his nose. Could he throw down to second? Well, hardly! you'd suppose. But see how quick he's snatching The ball from off the bat. The runner's surely beaten—"Hey, Empire, how was dat?" "Dat bluff don't go now, Mugsey!" I hear his angry shout; "Come in, de game is over; De Empire says yer out! Yer in de soup, yose fellows; We's beat yer by tres runs! De Victors always gets dere— We is de cham-pe-uns!" —Detroit Free Press

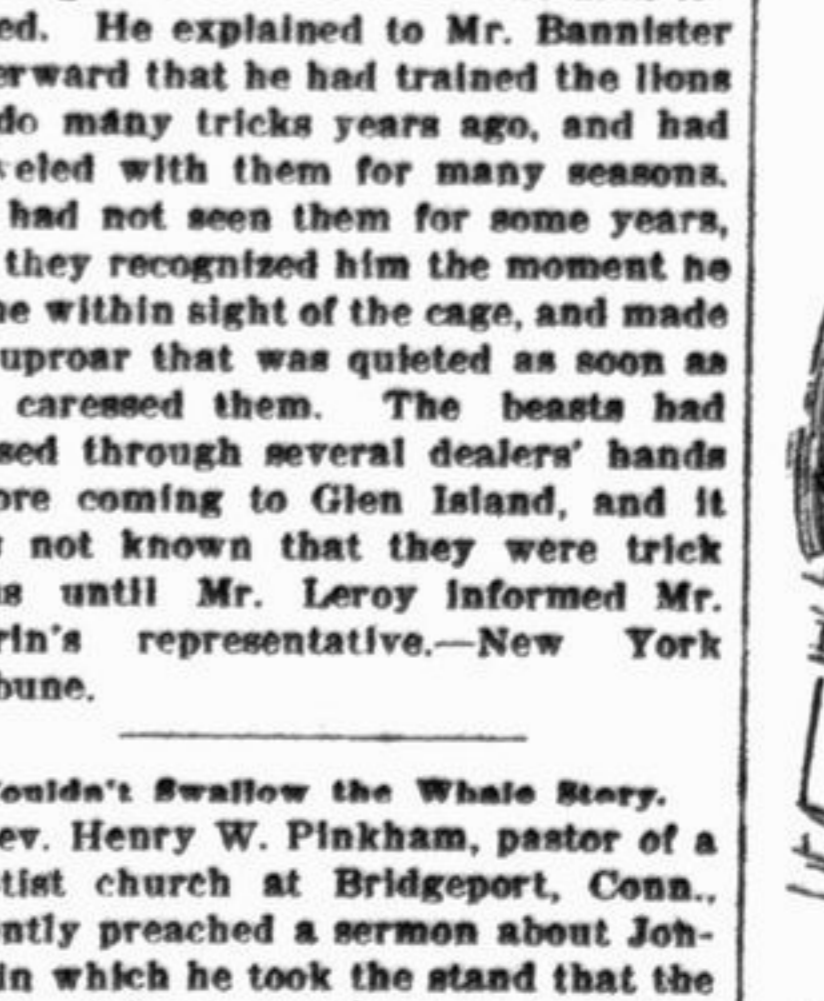
An Unpopular Minister.

It was one of those cozy villages of bonnie Scotland, where gossip is the chief barter and church the chief duty of every "mon" and all the "wee-men." For once gossip and church were traveling the same way, for Donald McSorlie, the minister, had suddenly grown unpopular, and the numbers of his congregation were steadily diminishing. No one knew better than he that something must be done, so he concluded to do a little house to house missionary work, and thus arouse some interest in church affairs. But his enthusiasm was short lived. The first man he accosted was Donald Campbell, a sturdy old Scot of well-known free-thinking tendencies. "Donald," began the minister, "for why were ye no' at the kirk last Sabbath?" "I was at Mr. McShooter's kirk, minister."

A Good Cheese.

How true it is that fame and fortune both hinge on some trivial circumstances. The most successful artist at the annual exhibition of the French Salon one year was a young gentleman named Baldwin Sowers. Mr. Sowers' particular line is the delineation of still life, and so he painted a cheese. After it was hung some malicious person slipped into the gallery the night before the exhibition and cut a round hole in the canvas, completely removing the cheese. When the examining committee were on their rounds they came to the defaced picture and angrily sent for the artist to give an explanation. An ordinary individual would have been overcome with despair at the outrage. Not so Mr. Sowers. When the chairman said, sternly: "Where is the cheese?" he responded calmly: "Alas, gentlemen! I perceive I have painted it with too great fidelity. The mice have eaten it."—Exchange.

Required His Assistance.



School teacher—Your little boy Hans wasn't at school yesterday, Mr. Johnsonberg. Mr. Johnsonberg (of the Bakery)—No, I was makin' der parrel at my kraut, and I wanted Hans to jump down mit his feet.—Texas Siftings. Two Views of It. For a long time they had sat in silence, each engaged in thought. "I have it," he exclaimed, suddenly. "Roginaid." "Yes, I have it at last." With eager trembling hand he wrote the beautiful thought which came to him, while his wife calmly wait to get her basket on before she rushed over to her neighbors' to tell them that she longer the only one of her species in the street.—Detroit Tribune.

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