

of \$100,000, has been organized, and are now taking the initiative in the erection of a cotton mill at the dam,

COMPARATIVE STATEMENT OF COST PER LIGHT IN CITIES HAVING PUBLIC AND PRIVATE PLANTS.

PUBLIC PLANTS.		
Cities.	Population.	Cost per Light.
Ashtabula.....	8,000	\$77.00
Little Rock.....	25,000	70.00
Elgin.....	22,000	62.00
West Troy.....	13,000	60.00
Marquette.....	9,000	60.00
Frederick.....	8,000	60.00
Aurora.....	20,000	58.00
Madison.....	9,000	58.00
Alexandria.....	14,000	55.00
Lewiston.....	22,000	55.00
Bloomington.....	20,000	51.00
Decatur.....	17,000	50.00
Hannibal.....	13,000	50.00
Bay City.....	28,000	49.00
Jamestown.....	18,000	44.00

PRIVATE PLANTS.		
Cities.	Population.	Cost per Light.
Kalamazoo.....	24,000	\$170.52
Houston.....	27,500	150.00
Springfield, Ill.....	25,000	137.00
Peublo.....	34,000	132.00
Waterbury.....	24,000	121.00
Springfield, Mo.....	22,000	114.00
Wichita.....	24,000	108.00
Joliet.....	25,000	100.00
Cleveland.....	340,000	88.00
Auburn.....	26,000	87.50

and similar enterprises are likely to follow, until all the remaining surplus water power is utilized.

The author of this article is largely indebted to Mr. John T. Smith, a civil engineer, of Austin, for facts, figures and pictures.

The Psychology of Crowd Panics.

The recent crowd panic on the Hodynsky Plain, in Russia, with its frightful loss of life, emphasizes the danger in all large gatherings of sudden explosions of fear and demonstrates the impossibility of controlling a thoroughly frightened multitude, says the Medical Record. It is the history of every crowd under like circumstances, although the damage done in the present instance outweighs that of any similar occurrence in history. The latest estimate of the number of the dead is three thousand six hundred, that of the wounded being over twelve hundred. It is also stated that over five hundred thousand peasants were gathered on the plain in question, with a very inadequate police force and with all the elements which might tend to make the mass of humanity irritable and excitable. The lesson of results is one which the world at large will not easily forget. The horror of the situation passes the power of description, even by the alert and graphic newspaper correspondents. It was a tidal wave of unreasoning brutality forced against the comparatively weak barrier of human resistance. To such as look upon a crowd as an aggregation of human force, a multiplication of personal energy, and an ever-present consciousness of individual weakness, it is surprising that such calamities are not of more frequent occurrence, and that the law of accidents does not swell its statistics to frightful proportions.

If we study a crowd as we would an individual, there are many interesting phenomena to note which may serve to explain the reasons for panics and the most rational means for their prevention. The very gathering of a large number of people implies a concentration of interest in a given and definite direction. There is an individual as well as a general aspect of the condition. The individual is so small a part of the whole that he becomes overawed by the impression of the latent and implied power of accumulated mental and bodily interests. It means stage fright to the one who faces it on the one hand, and on the other hand becoming respect by the one who merely forms a part of it. There is always a something about a crowd which manifests a strained and tense degree of mental activity, a hyperexcitability to casual impressions and a corresponding lack of control of ordinary individual emotions. Thus the flattest joke oftentimes produces an applause which is proportionate to the size of the audience rather than to its supposed intelligence. Contrariwise, the most trivial mishap awakens the most foolish terror. Excitement, irritability and then fear rapidly follow each other on the slightest provocation. What would be trivial to an individual is terrible to a crowd. It is a question of degree merely, and is proportionate to the power behind. The mental tension, stupendous and formidable at best, is apt to give way with a sudden and dreadful snap. It is the spark to the magazine. The slightest exciting cause may start the train of the most unreasonable apprehension, which become intensified in proportion to the demonstrated difficulty of escape.

The insanity of fear is both individual and general. The instinct of self preservation becomes the one and only factor in the equation of desperate chances. It gathers strength from resistance, until its own exhaustion and despair strike the balance with death.

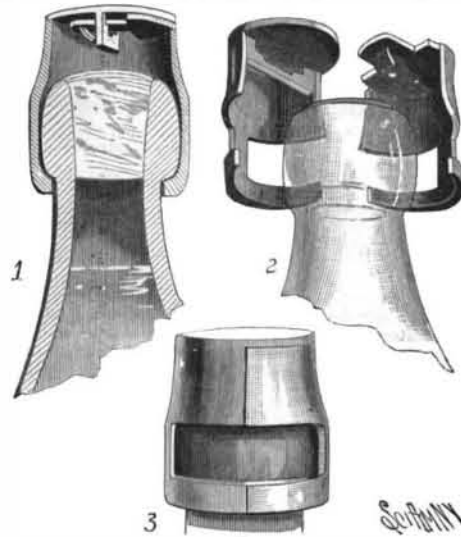
All these factors were present in the recent lamenta-

ble disaster. The crowd was worn out by excitement, irritated by strained expectation, ignorant of possible danger, hungry, tired and impatient; every selfish interest was intensified by the promise of food and gifts, the struggle for preferment was pronounced, and threatening, the terrible combination of lower human interests was charged to the full and awaited the signal for the inevitable explosion.

It is lamentable to think, in view of subsequent facts, that much might have been done to lessen the magnitude of the disaster, if not to prevent it altogether. As a large crowd is always a dangerous one, the gathering should not have been allowed to attain a magnitude beyond possible control. With sections properly guarded a general and widespread panic would hardly have been possible. There should have been no single point of interest, no distinct focal direction of effort, but rather a judicious distribution of attractions. From all accounts the plain was seemingly large enough to allow space for tables, barbecue fashion, in properly separated places, with a well organized system of rotation feeding and gift distribution, and a consequent prevention of a closely packed and dangerously sensitive mass of struggling humanity. As it is, the deplorable experience in Russia may serve as a useful lesson for the more careful management of all crowds wherever assembled, and not only teach the authorities the urgent necessity for extraordinary alertness in properly preventing panics, but in promptly arresting them by the quickest possible methods of diversion and dispersion.

A NEW NON-REFILLABLE BOTTLE.

A cap designed to be readily placed upon a filled bottle, retaining the cork in such manner that the latter cannot be removed without breaking the cap, is shown in the accompanying illustration, the improvement enabling the manufacturer of a liquor or beverage to protect his bottle from being refilled by others and sold



COLEMAN'S BOTTLE CAP.

again in the original form. A patent has been granted for this invention to Dr. Francis W. Coleman, of Rodney, Miss. Fig. 1 is a view in section and Fig. 3 is a side view of the cap applied to a bottle head, Fig. 2 showing the two parts of the cap before it is applied. The cap is made in two similar parts, each having a flat circular top plate, a pendent semicircular body portion, and jaws or clasps formed on a narrow downward extension of the body. The cap is made of some easily breakable but not readily melted material, and when applied to a bottle head the flat circular top plates overlap each other and lie above the cork, the jaws or clasps embracing the bottle neck just below the head. In order to secure the parts together upon a bottle, one of the parts is made with a downwardly extending thin spring plate, or catch, on the under side of the top plate, adapted to engage a cut out portion of a bar on the under side of the other top plate, by which the parts are locked together automatically on a bottle. This lock is wholly inaccessible from the outside, making it impossible to remove the cork without breaking the cap, and rendering it unfit for further use.

SPITZBERGEN will have a brilliant season this year. The Andree expedition will be followed by a German steamer from Hamburg, which will reach the islands in time to see the balloon start. A Norwegian steamship company will run steamers regularly while the season permits and will put up a temporary hotel on the Eis Fiord. Mr. J. Russell Jeaffreson, of the Geographical Society, will explore the interior of the western island, and if the ice will permit, will try to visit the islands between Spitzbergen and Franz Josef land. Another English expedition, with which went Mr. Trevor Batye, who explored Kolgner, started recently for Spitzbergen. The relieving vessel for the Jackson-Harmsworth expedition, the steam yacht Windward, has just started for Franz Josef land, with provisions and sledges. It will embark live sheep and reindeer in Norway and convey them north. The North Atlantic will be more lively beyond the Arctic circle this year than ever before.

Science Notes.

Earthquake experts propose to establish a number of stations for seismological observations around the earth. Starting from Japan, where is the most complete system for studying earthquakes in the world, the stations will be Shanghai, Hong-Kong, Calcutta, Sydney, Rome, Tacubaya, in Mexico, Port Natal, Cape of Good Hope, Santiago, in Chile, and Rio de Janeiro, all communicating with a central station at Strassburg.

Darwin's suggestion that the composition of subsoils might be ascertained from the examination of the piles of earth brought up by earthworms from their holes is said to have been utilized in Australia by a miner who was led to digging for a coal vein which he found from seeing traces of coal in the accumulations of land crabs: and by another, who, acting upon a hint given him by the wombats, found tin ore in the mountains.

Interviewed on the X rays by a Daily News representative on his return from South Africa, Prof. Crookes said: "The whole of the Roentgen X ray discoveries were made during my absence from England, and although I, owing to my previous work in the same direction, was able to receive the accounts of them without incredulity, yet I assure you that the announcement was as much a surprise to me as to the general public. With regard to the results since published by various British and Continental investigators, you will find that many so-called 'novel effects' and 'discoveries' have been already published by me."

The metallic colored feathers of humming birds and sun birds have been supposed to play some part in the economy of these birds aside from flight; but Miss Newbigin combats this view, pointing out in a paper presented to the Zoological Society of London that in the first place the older view did not apply to all humming birds, as in the metallic feathers of some of them the barbules were often connected by cilia. She held that the very perfection of the flight of humming birds led to correlated variations in feather structure productive of their especially brilliant metallic tints. "The difficulty of the plain colored swifts—possibly near allies of the humming birds—was met by the suggestion that the latter have fewer enemies, and had, therefore, had greater scope of possible color variation."

Dr. Lewy has just made a communication to the Berlin Physiological Society regarding the latest application of the Roentgen rays, says the European editor of the Herald. It has now become possible, he declared, to obtain a complete picture of the internal organs, as regards their situation, size and mechanism. This is accomplished by means of the fluorescent screen. The whole body is lighted up so that the shadow of the various parts and organs is thrown on the screen. Dr. du Bois-Reymond and Prof. Grummach, who had aided Dr. Lewy in his investigations, further reported that they had succeeded in seeing the organs of the throat, the larynx, the tongue and the stomach. Prof. Grummach has further succeeded in making pathological studies of the human body. He examined a man who had formerly suffered from consumption and hemorrhage of the lungs. He noticed that in the part of the body where the lungs lie (the lungs are too transparent to be visible by means of the Roentgen rays) there were a number of opaque spots. These were places where ossification of the tuberculous parts of the lungs had set in. In another case he saw small black lines in the heart of a patient just where the main arteries lie. These showed that the ossification of this part of the heart had set in, although it could not be diagnosed by any of the usual means. The correctness of these observations was confirmed by the fact that the pulse in the wrist was hard to the touch, and signs of ossification could be observed near the elbow and in the forearm.

Some time ago H. Moissan pointed out that zirconium could easily be obtained in the metallic state on reducing zirconia by means of carbon in the electric furnace, and at the same meeting of the Academy of Sciences, Troost described the formation of a carbide of zirconium, ZrC. Later experiments by Moissan and Lengfeld have resulted in the discovery of another compound of the same metal with carbon. This carbide, ZrC, was obtained by heating its components in the now celebrated electric furnace, and is described as crystalline and nondecomposable by the action of water up to 100° C. This great stability is in marked contrast to the behavior when exposed to the action of water, of the metallic carbides previously formed, and seems especially curious when it is considered that carbide of thorium—a metal very near to zirconium in Mendeleeff's classification—decomposes readily when acted upon by cold water, acetylene, ethylene, methane, and hydrogen being evolved. Zirconium carbide has a grayish color and metallic appearance, and remains unaltered in both dry and moist air. It scratches glass and quartz easily, but does not affect the ruby. The hydracids attack it readily—hydrofluoric in the cold, hydrochloric at 250°, hydrobromic at 300°, and hydroiodic near 400°. At a red heat the carbide burns in oxygen, and in the presence of sulphur vapor a small quantity of sulphide is formed. Ammonia and hydrochloric acid are without action on the new compound, but it is decomposed by nitric and sulphuric acids, while strong oxidizing agents attack it energetically.—Comp. Rend.