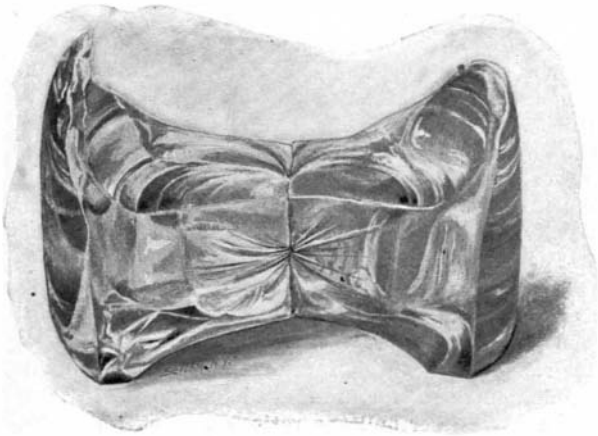


THE SPONTANEOUS BREAKING OF AN INKWELL.

If a mass of molten metal or of glass be allowed to cool suddenly, the outer portions will be chilled while the inner portions are still hot, and the thinner portions will be cooled more quickly than the thicker portions. The arrangement of molecules which results from this unequal cooling leaves parts of the mass under a tension so great that a very slight shock



SPONTANEOUS FRACTURE OF AN IMPERFECTLY ANNEALED INKWELL.

or even a change of temperature may cause fractures. That is why lamp-chimneys often break so mysteriously, and that is why the inkwell of which Mr. George L. Minnott, the postmaster of Worcester, Mass., sent us the picture herewith reproduced, cracked so curiously when ink was poured into it.

Glass vessels not properly annealed may be kept for years before they break; for it is only under certain conditions that such accidents occur. Every boy has seen those curious "Prince Rupert's drops"—made of molten glass which has been dropped into water and thus suddenly chilled—the heads of which are so hard that they resist sharp blows, but the long tails of which, when broken, suddenly destroy the unequal strains and reduce the drops to mere dust. Another singular instance of unequal strain is to be found in the Bologna flask, the body of which is capable of withstanding severe blows, but the thick bottom of which is under so great a tension that it is shattered by a slight scratch.

The post office inkwell is merely a modified Prince Rupert drop or Bologna flask, imperfectly annealed and easily broken by a sudden change of temperature or by a blow properly delivered.

THE SUBWAY OF THE CITY OF BERLIN.

The building of the elevated railway of the city of Berlin has so far progressed that the major portion of the structure is now almost completed. The subway system which, together with this elevated railway, will relieve the congestion of Berlin's traffic, is also in the course of construction, and is now, according to the *Illustrierte Zeitung*, in its most interesting stage.

From the main road of the system, extending from east to west (from the Warsaw Bridge to the Zoological Gardens), a branch line, about 1,200 yards in length, runs to the Potsdamer Platz and ends there in an underground terminal. From the junction of this branch line with the main line, the road descends 4.2 meters (13.7 feet) below the surface of the Potsdamer Platz, passing first over a bridge which spans the Landwehrkanal and then running down a ramp between Köthenerstrasse and the Potsdamer Ringbahnhof toward the Droschkenplatz (cab-stand) of the Potsdam Station. The down grade or ramp carries the road beneath the street level, from the Droschkenplatz to the Potsdamer Platz, a distance of about 300 meters (984 feet). This part of the road under the Droschkenplatz is so far advanced that the form which the subway will assume can easily be seen. Here the subway is to be made wide enough to accommodate four tracks. Excavations to a depth of 3.5 meters (11.5 feet) were first made. Then, in the line of the walls of the tunnel, trenches were dug down to the lowest level of the tunnel excavation. In these trenches a water-

tight asphalt-felt sheathing and concrete side walls were built.

Before the roof is placed upon these side walls, the earth and rock still remaining is excavated and carried away by open box-cars either to those places where it can be utilized or to the Landwehrkanal, where it is loaded on scows. When the excavation for the tunnel has been carried to the full depth, concrete is laid to receive a water-tight sheathing, consisting of three layers of asphalt, which are connected with the asphalt-felt of the side wall sheathing. The tunnel is therefore embedded as it were in a continuous water-tight trough. The floor of the tunnel consists of concrete three and one-quarter feet thick. The roof is formed by extending steel beams, spaced 5 feet apart, from wall to wall of the tunnel and filling in the spaces with arched concrete, which is finished off flush with the tops of the beams. Over the entire surface, thus formed, a water-tight sheathing of asphalt-felt is laid. By reason of the exceptional width of this portion of the tunnel, iron pillars will be set up between the tracks, except at those places where switches may be necessary.

The second stretch of this underground road will be constructed in a similar manner. As our first illustration shows, the tunnel is built so that the street traffic is interfered with as little as possible.

In order to drain off the water which is here and there encountered, pipes are laid at each side of the tunnel (as shown in Fig. 2) through which the water is pumped by centrifugal pumps to a main leading to the Landwehrkanal. After the water has been thus removed, excavation can be resumed. To prevent caving in, the sides of the excavation are shored up with boards and cross braces, the shoring being removed as the construction of the side walls progresses.



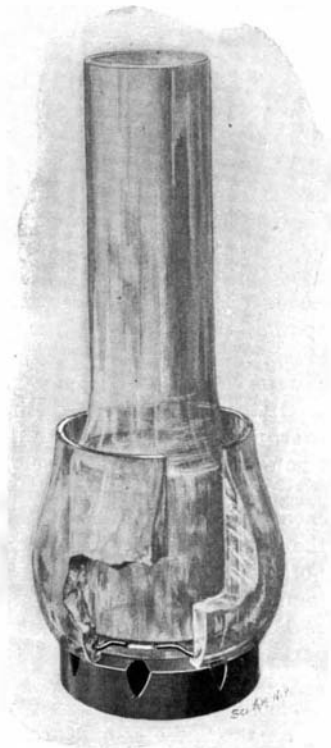
Fig. 1.—THE BERLIN SUBWAY IN TAUENZHENSTRASSE.



Fig. 2.—EXCAVATIONS FOR BERLIN SUBWAY, SHOWING THE WATER PIPES.

A LENS ATTACHMENT FOR LAMPS.

In order to increase the illuminating power of lamps a Cincinnati inventor, John C. Molloy, places a tubular



TUBULAR LENS FOR LAMPS.

lens around the lamp-chimney opposite the flame and holds the lens concentrically with the chimney by means of a retaining and spacing ring, so that an air-space is left. By this arrangement the lens is securely held in place on the lamp and so refracts the light that the illumination of a room is effectually increased.

The Trans-Siberian Railway.

The Trans-Siberian Railway authorities have had a great deal of trouble with Lake Baikal. The lake is about 65 miles wide, very deep, and exceedingly stormy the greater part of the year. The banks are very marshy for a long distance from the water line to the hard surface. At present they have large ice breaking steamers of the American system, with barges attached for transportation of passengers and merchandise. The cars are also conveyed on these barges. This preliminary arrangement was made, as they were in a hurry to make connections, while at the same time they were surveying a line around the lake. It sometimes happens that passengers and cars cannot be landed on the other side, in consequence of the storms on the lake, and are kept on board of the steamers from twenty-five to forty hours at a time.

At present they have finished the surveying of two Kroogo-Baikal lines. The word "kroogo" means "circuit." One of these lines has been selected and will no doubt be built in the near future. This will run by way of Olchy and Toogoontchili, thus avoiding a number of tunnels, so that in the whole distance from Irkutsk to Kooltooga it will only be necessary to build two tunnels, each 1,120 feet long. By this means several million rubles will be saved which were expected to be expended in the construction of the line around the lake. Engineers believe that if the selected line is again carefully looked over even the two tunnels can be avoided, and in this case there will be no underground excavations to be made on this section.

Wireless telegraphy in Honolulu and the various islands of the Hawaiian group is now in practical working order. The stations on the various islands have all been established, and the tests made show that everything is in perfect order. Commercial messages will now be received. The service will include all of the islands except Kauai. One station is at Honolulu, one at Hilo and one on the island of Lanai; the latter is the connecting station between the two others. By means of a cable messages can be sent from Lanai to the island of Maui.