Soap Bubbles

(*Continued from page* 158)

thin enough layers, as is evidenced by ordinary gold leaf.

"In penetrating the reflecting surface to this minute depth certain qualities characteristic of the reflecting material are impressed upon the light, so that by examining the reflected beam, even many miles away from the reflecting body, we can tell something about the material of the reflector. In fact certain scientists have attempted to gain by this means some idea of the different materials composing the surface of the moon. The moon shines by reflected sunlight, and the idea is that the light reflected from different areas of the moon's surface may, by its characteristically altered quality, betray the nature of the material which has reflected it.

"How thin is this black spot in a bubble, and what sets a limit to it? Why cannot a bubble thin out indefinitely? These questions lead to one of the most interesting things which a bubble can teach us. Water is made up of molecules, particles so inconceivably small that a soap bubble when freshly formed may be many molecules thick. But as the film thins out it is gradually reduced to a thickness of but a few molecules; and obviously this process cannot go on forever. The film cannot be less than one molecule thick. Any further thinning out is bound to break it.

"Now it is possible from the colors exhibited by thin films to obtain an idea of their thickness; and the black spot on the bubble cannot be thicker than the value indicated by the last color that made its appearance from this place. If the black spot be but one molecule thick, such a molecule cannot be greater in diameter than this critical thickness. This sets a superior limit to the size of a watery molecule, for if the black spot is two or three molecules thick, the molecules must be still less in size than this limit. Under no circumstances can they be greater.

"Other and different lines of experiment set an inferior limit to the size of a molecule. Jointly such results have led us to the conclusion that if a drop of water were to be magnified to the size of the earth the molecules of which it is composed would be in size between that of a baseball and a piece of small shot.

"Another curious and instructive thing about a bubble is its tendency to contract. If after a bubble be blown the mouth be removed from the pipe, the bubble will contract, even though the pipe be inverted so that

(*Just turn the page*)

DR. PAUL R. HEYL, head of the Sound Laboratory at the U. S. Bureau of Standards, in Washington, who tells of some of the wonders of the soap bubble. Dr. Heyl has also been engaged in a long series of researches to determine the exact force of gravity.

PHYSIOLOGY

Measure Dance Energy

Hostesses should lay in a heavy supply of refreshments, when they expect to entertain guests who like to display their Charleston proficiency. An account of an exhaustive survey of the energy consumed in dancing made by a group of Scandinavian scientists at the Physiological Institute of the University of Helsingfors, sets down in precise figures the number of calories used in different kinds of dances.

The waltz went to the bottom of the list with 3.99 calories used per hour per kilogram of body weight. The schottische, beloved of grandfather and grandmother, scored .02 of a point below the modern foxtrot, using 4.76 calories while the latter required 4.78. The polka, another institution of grandmother's day, needed 7.56 calories an hour, while the mazurka, evidently the fastest dance the learned Scandinavians could get anyone to practice for them, took 10.87 calories. or almost twice the amount of energy consumed by a stonecutter plying his trade.

It obviously remains for some American research worker to find out the number of calories that need to be supplied to devotees of the Charleston and the Black Bottom.

Science News-Letter, March 12, 1927

CHEMISTRY

New Element in Pure Form

Rhenium, the chemical element whose discovery was recently announced by Doctors Walter and Ida Noddack, has now been obtained in pure form. The first discovery was based on the finding of the characteristic lines in the X-ray spectrum as detected by photographic plates, but now the Noddacks have succeeded in obtaining, after long and difficult refining processes, a small quantity of the substance itself. They describe it as a black powder of high melting-point, that unites readily with a number of other elements. In an atmosphere of pure oxygen it ignites, forming a white oxide. The quantity so far obtained is very minute, only two milligrams, or seven one-hundred-thousandths of an ounce, and the experimenters are now at work to elaborate more of it which will permit of exact quantitative chemical examination.

Science News-Letter, March 12, 1927

ENGINEERING

Sweden Uses Peat

A new source of wealth has been found in the peat bogs of Sweden which heretofore have usually been regarded as so much waste land. Unlike the people of Ireland, the Swedish inhabitants have always had plenty of wood to use as household fuel, so that peat has only rarely been used for the purpose. On the other hand, Sweden lacks coal mines and in recent years there have been performed many experiments with peat as substitute and now the head of the Swedish peat industry, Lieutenant Herman Ekelund, declares that a peat powder can be produced by machinery, capable of creating any given degree of heat cheaper than coal, and in more convenient form. With peat as a fuel, he claims that iron ore can be reduced in small electrical ovens. Compared with charcoal, the peat powder costs but one half and if the iron thus produced is not of such high quality, it is better than if made with coke. With peat temperatures as high as 2,200 degrees centigrade have been attained.

An advantage of the new methods of exploiting the peat bogs is that the dugover area is not left flooded, but can be worked as farmland after suitable drainage. Where farming is not advantageous, as in the northern parts of Sweden, where it is too cold, forests can be planted and regular lumber crops raised.

Science News-Letter, March 12, 1927