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PRACTICAL APPLICATION OF LEIDENFROST'S DROPS.

The following elegant process in chemical analysis is in the line of the suggestions contained in an article translated from *La Nature*, and published in one of our recent issues. In a preceding issue the phenomena of the spheroidal state, as exemplified by Leidenfrost's drops, were described, with an illustration of the same. This will be found of interest in connection with the translation below.*

Water, placed upon a red hot metallic plate, springs into the form of a drop, and evaporates without coming in contact with the plate, as is known to all. It is equally well known that by using a concave vessel the drop continually rotates. To Bohlrig belongs the credit of suggesting the practical use of the Leidenfrost experiment, more especially in water analysis for determining the solid residue of natural water.

Where hitherto this determination has been effected by evaporating the water to dryness without boiling, in a platinum dish on a sand or water bath, and afterward weighing the already tared dish, Bohlrig proceeds as follows: He brings a shallow platinum dish to a bright red heat over a gas lamp, measures out 50 c. c. of the water to be analyzed, and by means of a pipette lets single drops of it fall into the capsule, where they gather into a fluid globule or spheroid, which begins to rotate. The evaporation proceeds quietly, without any spurting, and new quantities of water are added drop by drop, so that the spheroid always preserves a suitable and comparatively unvarying size. The operation can be carried out successfully with little practice, and is extremely elegant and precise. It is only necessary to be sure that the vessel is kept at a red heat, and that too many drops are not added nor in too rapid succession, as otherwise the sudden cooling would cause a spurting of the fluid. Too rapid a rotation of the globule is prevented by letting the next drops, when it is time to add them, fall in a direction opposed to that of its rotation, so as to keep its movement in check. When the 50 c. cm. of water are in the capsule, the operation is soon ended, the globule rapidly grows smaller, darker in color, until it resembles a pea, the rotation slackens, and eventually ceases. The flame is then removed.

The globule of residue lies perfectly loose on the capsule, without showing any adhesion. Thus there is obtained the solid residue of 50 c. cm. of water, which has been evaporated without contact with the sides of a vessel, without loss, and without contaminating mixture, in the shape of a little globule, which is exposed for a good while to a temperature of 180° C., until dry, and then is rolled directly upon the scale pan of a chemical balance, and weighed within ⅓ milligramme.

The advantages of Bohlrig's method may be thus summarized. The residue is in the shape of a little bead, with so small a superficies that, even if it contains chloride of calcium or chloride of magnesium, the absorption of water from the air is almost nothing, especially as the time of exposure is soon over on account of the small weight to be weighed. Moreover, there is nothing to prevent the weighing of the globule in an air-tight, closed tube, well dried beforehand.

It is unquestionable that this new method can be adopted for the evaporation of all sorts of fluids to dryness, without loss and for a large class of cases, if one includes different modifications of the method. For example, the platinum may be replaced with equal or greater advantage by silver, copper, or even pure nickel, and the method is not limited merely to solutions in water. There is no true contact of the fluid to be evaporated with the sides of the vessel, so that no chemical action can affect them. Hence aqua regia, sulphur compounds, etc., can be treated in red hot silver vessels without the latter being at all attacked. —*Rundschau für Pharmacie, from Ph. Centralhalle.*

OUT OF WORK.

Doing nothing and doing evil are sometimes almost synonymous. A man whose habit is work finds idling at home a very distasteful method of passing the time, and he gravitates to the social knot of acquaintances, whether they are on the street corner, in the grocery, or in the saloon. He may be a member of some trades union, and his obligations to the society prohibit him from working at his trade; but if he is a family man, he can find work that will be unprohibited and useful, without going from his own door. No allusion is made to the more laborious portions of the housewife's work, although there is opportunity here for grateful and proper assistance.

But an observant eye can find a number of little jobs to do that will make home pleasanter and increase the conveniences of housework. To illustrate from fact. A worker found himself suddenly shut off from his daily earnings, but he did not seek other involuntary idlers like himself to bewail the ill fortune. He looked at home for something to do, and

found it. Several of the mortise locks on the doors refused to catch their bolts. He took them out, and found broken wire spiral springs. For these he substituted bits of rubber, and made the locks better than before. He washed the knobs of the doors that had a rattling play whenever handled. He put new thresholds and storm guards to outer doors which had admitted a flood to the front hall and to the kitchen whenever the rain was from east or south. He tightened rattling windows, and where the upper and lower sashes met he placed flat strips of wood covered with woolen cloth on one side and edge; this kept out a deal of cold wind. The stove top was not large enough to hold utensils in cooking in addition to others just lifted off. He went to a building in process of erection, and was given four pressed bricks. He made a frame to hold these side by side, and placed it alongside the stove. His wife considered it a great convenience. Several shelves were placed where they would do the most good. He fixed a piece, holding a number of pivoted arms, to the wall back of the stove, and the good woman had a handy drying horse for dish wipers, towels, and other small articles, and the bars, when empty, could be swung against the wall out of the way. The little girl had dolls and other playthings to be mended, there were chairs with broken backs and loose rungs which required dowel and glue, and a table with rickety legs, and one with a leaf hinge rotted through by rust. Tubs and pails were in danger of coming to pieces for want of hoops. He made better hoops of wire than the original ones of paper-thin iron. As cold weather was coming, he hung a door to the pig's sleeping place, a door double hinged with leather at the top, so as to swing both ways, and when released to hang vertical.

There was scant closet room in the house, but in the kitchen was a space between a corner and a window where a good sized cupboard could be placed. The idle mechanic, but busy man of family, constructed a "dresser," as he called it, which, after a year's use, his wife said was the handiest piece of furniture in the house. It was 5 feet long by 3 feet wide, having a table of these dimensions, directly under which were two drawers, running on strips furnished with rolls, for the drawers were nearly 3 feet by 2 feet 6 inches and 8 inches deep. Under these drawers were two cupboards, side by side, one furnished with shelves. The sides of the dresser extended above the table, at the back, of a width of about 8 inches, and high enough to receive 3 shelves. The contents of these shelves could be covered by curtains sliding by rings on a brass wire. Apart from labor, this piece of furniture cost less than two dollars.

This instance of useful home employment in a case of enforced idleness is cited merely as a suggestion; but many of these little jobs need not await a strike or other compulsory withdrawal from ordinary work; they are appropriate for evenings and otherwise unused holidays. There is usually someone thing or another "out of kilter" in the house, and this fact has been so far recognized that in a Western city there has been organized a jack-at-all-trades industry that makes contracts to keep houses in repair, and does all sorts of household call jobs, from mending a leaky roof to setting a pane of glass, from hanging a new door to repairing a broken lock, and it is said that the hands are never out of employment.

A Bell Five Hundred Years Old.

The city of Breslau lately celebrated the 500th anniversary of an occurrence which was memorable in the history of the town, and is known wherever German poetry finds a home. The bell which hangs in the southern tower of St. Mary Magdalen's church, and is named "St. Mary's bell," but is usually known as "the poor sinners' bell," rang out morning and evening on the 17th of July to remind all who heard it that it was cast on that day 500 years ago. Next day, Sunday, the preacher reminded his congregation of the pathetic story which has made it singular among bells—how, when all was ready for the casting, the bell founder withdrew for a few moments, leaving a boy in charge of the furnace, warning him not to meddle with the catch that secured the seething metal in the caldron. But the boy disregarded the caution, and then, terrified on seeing the molten metal beginning to flow into the mould, called to the bell founder for help. Rushing in and seeing what he had intended to be his masterpiece ruined, as he thought, angered to madness, he slew the boy on the spot. When the metal had cooled and the mould was opened, the bell was found to be an exquisite work, perfect in finish, and of marvelous sweetness of tone. Coming to his senses, he recognized his bloody work, and straightway gave himself up to the magistrates. "Blood for blood" was the law; he was condemned to die, and he went to his doom while his beautiful bell pealed an invitation to all to pray for "the poor sinner," whence its name. W. Muller has enshrined the sad story in a ballad of touching simplicity:

"War einst ein Glockengieszer
Zu Breslau in der Stadt."

* See SCIENTIFIC AMERICAN, vol. liiv., No. 26, p. 404, and vol. lv., No. 2, p. 16.