### Tinplate Definitions.

From *Tin and Tinplate*, by Joseph D. Weeks. Tinplate, or to speak more accurately tinned plate or tinned sheets, is thin sheets or plates of iron or steel coated with tin.

Terne plate is sheet or plate iron or steel, covered with an alloy of tin and lead, usually two-thirds lead and one-third tin. It is this union of three metals, iron, lead and tin, that gives rise to the name terne plate, terne being the French equivalent of the English adjective tern, meaning threefold. The oft-repeated statement that terne is from a French word meaning dull is incorrect. Terne plate, because of the presence of lead in the coating, is duller than tinplate, which is frequently called bright plate, but it is not this fact that gave rise to the appellation terne, but the union of the three metals.

Taggers tin is a thin tinplate, 30 wire gauge and lighter. This name is not applied, as is often stated, because the iron out of which the plate is made was at one time and is even now used for tags or marks. The term was originally used to designate the very thin sheet iron which ran below the gauge—"tagged on" to the regular gauge—and hence these thin sheets tinned are called "taggers tin."

There is a question as to whether the tin used forms an alloy with the iron or is only a simple coating. It seems to be more firmly attached to the iron than a mere coating would be, rarely, if ever, when the sheet is properly prepared, scaling off, but requiring absolute rubbing away to remove it. It is probable that the tin coating forms an alloy with the iron.

The plates thus coated form the well known tin and terne plates of commerce, the sheets varying greatly in size, from 10 in. by 14 in. to 40 in. by 84 in.; in gauge of plate from 22 to 30 for tin and terne plate and 30 to 38 for taggers; put up in boxes containing 14 to 225 sheets, and varying from 7¼ pounds to 400 pounds a box. The standard size of tinplate is I C coke plate 10 in. by 14 in., with 225 sheets to a box, and weigh nominally 108 pounds to a box.

Tinplate is thin sheets of iron or steel, 22 w. g. to 30 w. g., coated with tin. It is called also bright tin, tinned sheets, tinned plate. The French name is *fer blanc*, or white iron, a name that was at one time used in England.

Taggers tin is very thin tinplate 30 w. g. and lighter.

Terne plate is sheets of iron or steel coated with tin and lead. The proportions of these two metals and the consequent quality of the terne plate vary greatly; the more lead, the inferior the plate. Roofing plates, from their almost exclusive use for this purpose; Canada plates, from their extensive use for roofing in that country, are other names for ternes.

Charcoal plates are tinplates, the iron plates of which were made of charcoal iron. But few charcoal plates are now made.

Coke plates are tin or terne plates made from puddled iron plates.

Bessemer plates, Siemens plates, open hearth plates, indicate the kind of steel out of which the plates are made.

A mender or return is an imperfect plate returned to the tin house to be mended or repaired.

Wasters are imperfect plates, sold as such.

Black plate is the iron or steel plates or sheets as they come from the rolling mill, having been cut to the proper size. They are termed black pickled plates after the first pickling or immersion in dilute acid. Cold rolled plates after cold rolling. White pickled plates after the second pickling, and when they are ready for the tin pot.

### Large Glass Cells.

Hitherto glass cells have been blown, and owing to this their size has been very limited, the largest being only about 22 inches long by about 12 inches or 14 inches deep, and the same in width. By the process now successfully carried out by Armstrong's Glass Company, of Birmingham, tanks and cells of any dimensions can be constructed. The process consists in welding or fusing plates or sheets of glass together, thus forming a solid glass tank, with all the advantages of having the sides straight, the bottoms level, and the angles all square and to accurate measurements, the blown boxes being frequently quite the reverse in these respects. Armstrong's Company show at the Crystal Palace one tank 4 feet 6 inches long, made by their new process, which is briefly as follows:

A mould of iron of the interior dimensions of the tank is placed into a furnace, and upon this mould are fastened the plates of glass. The furnace is gradually heated until red hot. Then an oxyhydrogen blowpipe or an electric arc burner is introduced to heat the edges. A small roller which is attached to the blowpipe is next brought over the junction, and the joint formed. When all the joints have been finished the cell is left to anneal, and when perfectly cold the glass box or tank, thus formed out of five glass plates welded together, is lifted off the iron mould, being a perfect tank, solid throughout, and capable of resisting acids and alkalies. The same company show an underground conduit for electric cables, formed of slabs of glass, grooved with longitudinal parallel grooves. In laying these, after the trench in the ground has been formed, a cement concrete trough is made; inside this trough a layer of pitch or asphalt is run in. Upon this soft pitch the bottom sections of the glass slabs are placed. Upon these the upper sections of the glass slabs are placed, the joints being broken by each section. The whole is then run in with pitch or asphalt, and covered up with the concrete.

### NOVEL TOYS.

On any pleasant day may be found on lower Broadway and other down-town thoroughfares venders who sell almost anything in the way of novelties. Among these may be seen culinary implements, toilet articles, cheap microscopes, magnifying glasses, and various toys. Nothing takes better in the way of articles for this kind of trade than some new toy. Whether a toy

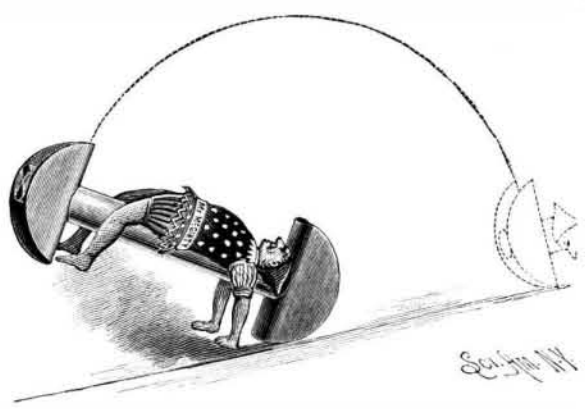

Fig. 1.—ACROBAT WITH MERCURY WEIGHT.

will probably have a good run can be determined by these venders in a very short time. If it takes well, crowds gather around him, and he drives a thriving business, making money for himself as well as for the inventor. If, however, the article is not wanted, the vender very soon finds it out, and looks for other wares.

Some of the toys are scientific, others are not. We give two examples of scientific toys which have sold very well. They are similar in character, and illustrate what shifting the center of gravity can do. They are both acrobats. The one shown in Fig. 1, and designated "McGinty," consists of a paper figure attached to a tube closed at both ends and inserted in paper disks which are bent down on the tube, forming semicircular end pieces on which the device may roll. A drop of mercury placed in the tube completes the toy. When placed on a slightly inclined surface, with the tube parallel with the surface, the mercury rolls to the lower end of the tube, causing that end to preponderate. The lighter end, by its own momentum, moves forward until it strikes the inclined surface, when the mercury again rolls to the lower end and causes another half revolution, and so on. This toy moves down the incline with a slow and stately movement.

The toy shown in Fig. 2 is made upon the principle just described, but the round ends of the figure

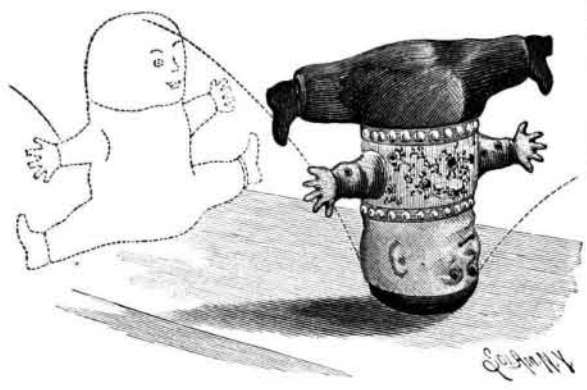

Fig. 2.—TUMBLER.

furnish the rolling surfaces, and a bullet is used for the weight instead of a globule of mercury, the body being simply a straight paper tube with convex ends.

### Yearly Tides.

At a recent meeting of the Engineers' Club of Philadelphia, Mr. W. S. Auchincloss read a paper on yearly tides. The author stated that he proposed to show that confined bodies of fresh water are subject to yearly tides of greater or less magnitude, depending upon the nature of the basin or upon the strata to which they are confined, and upon the effect of evaporation if in an open basin.

In March, 1885, we had occasion to sink a well near Bryn Mawr, Pa. Natural anxiety as to the permanence of the supply led us to observe the depth of the water at intervals of about ten days. It soon became evident that the water was receding. In 1886 there was a gratifying rise of the surface and a total gain of 12 feet. Our curiosity was aroused and we determined to study the law, if such a law existed, of this ebb and flow. These observations have been continued during the past seven years. We found that in normal years the surface of the water reaches its lowest level in December, rises until June, and descends during the autumn.

An examination of the amount of the rainfall shows that while the amount of rainfall was as great or greater during the last half of the year as during the first, the level of the water in the well continually lowered. Atmospheric temperature had practically no effect, as the temperature of the water in the well is practically constant all the year round. The depth of the well prevented evaporation from its surface from having any effect.

The author believes that the true cause is the result of the influences of gravity and of the sun's attraction at different seasons of the year. When the sun reaches its furthest point south of the equator, gravity exerts its maximum influence on the waters of the northern hemisphere. The waters of the earth will be drawn into the minutest crevices and the surfaces lowered, but in June they will, in a measure, be released and, under the influence of adhesion and friction, will be held at a higher level than during any other season of the year.

Data obtained from the government records, showing the depth of water in the great lakes, show that there is a similar rise and fall, the range of yearly ebb and flow being from 12 to 15 inches in our northern lakes. So far as we are aware, no data exist for the small lakes. More extended research will, we believe, secure as complete a recognition of yearly tides as physical geography has always accorded to the phenomenon of daily tides.

The author presented two diagrams, one of which showed the rise and fall of the water in the well covering a period of seven years, and also the northing and southing of the sun for the same period.

### The Poor Children of New York.

Mr. Riis, in an article on the poor children of New York, in the May *Scribner's*, says that "in ten years, during which New York added to her population one-fourth, the homelessness of our streets—taking the returns of the Children's Aid Society's lodging houses as the gauge—instead of increasing proportionately, has decreased nearly one-fifth; and of the Topsy element, it may be set down as a fact there is an end."

"Half the poverty, the ignorance and the helplessness of the cities of the Old World is dumped at our door by immigration," while the procession of the strong and the able move on to the West.

The police census returns show that in 1890 there were in all the tenements of New York City, 160,708 children under five years of age. This does not imply that there were so many really poor children, by a good many thousand. The census taken more than a year ago, for a special purpose, of the Jews in the East Side Sweaters' District, showed a total of 23,405 children under six years and 21,285 between six and fourteen, in a population of something more than 111,000. All of these were foreigners, most of them Russian, Polish and Roumanian Jews.

According to the tenement house census in New York, in the entire mass of nearly a million and a quarter of tenants, only 249 children under fourteen years of age were found at work in living rooms by the sanitary police. This is one of the encouraging facts mentioned by Mr. Riis in his article.

Of the 60,000 Hebrew children in New York, fully one-third go to school. "The poorest Hebrew knows that knowledge is power, and power, as the means of getting on in the world that has spurned him so long, is what he yearns for. He lets no opportunity slip to obtain it. Day and night schools are crowded by his children, who learn rapidly and with ease.

"There are 5,000 children in the twenty-one industrial schools scattered through the poor tenement districts of New York City. A count made last October showed that considerably more than one-third were born in twelve foreign countries where English was not spoken, and that 10,000 knew no word of our language."

Without doubt, the longest step which has yet been taken in the race with poverty in New York City is the establishing of many kindergartens for the poor children, to which access is made easier every day. There they get their earliest notion of order and harmless play.

The lack of small parks and playgrounds in the tenement house district of New York, and the consequent perpetual tussles between the children, at harmless play in the street, and the police, are the chief forces in the development of the "tough." The germ of the gangs, he says, that terrorize whole sections of the city at intervals, and feed our courts and jails, may, without much difficulty, be discovered in these early and rather grotesque struggles of the boys with the police.

Drunkenness is the vice that wrecks about half of the homes of the poor which do not cause it. It is that which, in nine cases out of ten, drives the boy to the street and the girl to a life of shame.