

SCIENCE IN TOYS.

III.

The toy hygrometer serves to show approximately the hygrometric state of the atmosphere. One of the several forms in which it is made is shown in the annexed engraving. A perforated metal tube, projecting from the back of the figure, contains a short piece of catgut cord, which is fastened in the rear end of the tube by closing the sides of the tube down upon it. The opposite end of the cord projects beyond the front of the figure, and is attached to the arm of the boy. In the hand of the arm thus supported is carried an umbrella. When the air is dry, the catgut cord retains its twist, and the arm holds the umbrella out of the position of use; but when the air becomes moist, the cord swells slightly, and untwists, and in so doing raises the boy's arm and brings the umbrella over his own head and over the head of his companion.

SCAMMY
HYGROMETER.

Another form of the same device consists of a house having two doors and containing two figures—a man with an umbrella and a woman in fair-weather dress; the figures being supported on opposite ends of a bar suspended centrally by a catgut cord. When the cord is untwisted by the action of moisture, the man with the umbrella sallies out; when the cord becomes dry, the man returns indoors and the woman appears.

These simple, pleasing, and instructive toys illustrate the action of moisture on certain porous bodies, and are of interest, if not of actual use, to the meteorological observer.

The action of the sensitive leaf shown in the engraving is also due to expansion by absorption of moisture. The leaf consists of a piece of thin gelatinized paper, or gold beater's skin, or even of gelatine, printed in some fantastic design, that of the mermaid being the favorite.



SENSITIVE LEAF.

When the leaf is laid upon the palm of the hand, the moisture of the hand is absorbed by one side of the leaf, and more in some places than in others, owing to imperfect contact with the hand. The moistened portions rapidly swell, thus warping the leaf, which twists and writhes in every possible direction, as if it were possessed of life. The leaf, being extremely thin, quickly becomes dry, so that the various contortions succeed each other rapidly.

The chemical thermometer is made by sealing in a tube a solution of chloride of cobalt in dilute alcohol. When the tube is subjected to a temperature of 40° to 50° Fah., the solution becomes pink, and as its temperature is raised to 90° or 100°, it passes through various shades of purple, and finally becomes blue.

The same salt applied to an artificial flower, a rose for example, renders it visibly hygroscopic. When the air is humid, the rose is pink; and when the air is warm and dry, the rose will be purple or blue. A solution of the same salt constitutes one of the sympathetic inks.



CHEMICAL THERMOMETER.

The luminous rose shown in the same vase with the hygroscopic rose is a beautiful example of the wonderful property of storing light possessed by some bodies. The light-storing property is given the rose by a coating of luminous paint, the basis of which is sulphide of calcium. This rose, if exposed to a strong light during the day, will be luminous throughout the night.

The exact nature of the change which takes place in the phosphorescent substance while exposed to the light is unknown. It is supposed to be due to some modifying action of the light, rather than chemical action. It has been ascertained that the phosphorescence takes place *in vacuo* as well as in air.



HYGROSCOPIC AND LUMINOUS ROSES.

Prince Rupert's drops, or Dutch tears, show in a striking manner how a body under sufficient internal strain may contain within itself the elements of destruction. These drops have a long, oval form, tapering at one end to a point, which is more or less curved. They are made by dropping melted glass into water, thus suddenly cooling the glass and putting it under great strain.

The larger part of the drop may be struck with a hammer without breaking; but on breaking off the point, thus relieving the strain at one place, the glass instantly flies into pieces. So complete is the destruction, that the fragments are like fine sand.

The Bologna flask is of the same nature as the Prince Rupert's drops. It is an unannealed glass flask, having



PRINCE RUPERT'S DROPS.



BOLOGNA FLASK.

a very thick bottom, which is under great strain. The flask will receive a hard blow without breaking, and a lead bullet may be dropped into it without producing any effect, but on dropping into it a quartz crystal, or in some other way slightly scratching the inner surface of the flask at the bottom, the flask at once goes to pieces. The action may be compared to the destruction of a superstructure of masonry by weakening or destroying the keystone of the arch which supports it.

A common example of action of this kind is met with in lamp chimneys, which break without any apparent cause. Engineers often find glass water-gauge tubes which will readily stand steam pressure, but which, when scratched even imperceptibly on the inner surfaces, will break.

G. M. H.

Iconomatic Writing.

A recent lecture on this subject by Prof. Daniel G. Brinton, A.M., M.D., has been published in pamphlet form, and in view of the recent developments in the deciphering of Mexican inscriptions, possesses peculiar interest. We are mainly familiar with two ways of expressing thought in visible character—one by purely arbitrary signs, the other by pictures representing the objects described. Many of the Egyptian inscriptions are in a character derived and developed from the latter method. Now, if a punning system be used, if for an adjective, or any word, a representation of an object having a similar name be employed, we have an example of the ideographic method. A Cockney desiring to express thus the adjective "high" might draw a human eye. The similarity of sound would make the drawing answer for the expression of the adjective. Again, taking an infinitive case of a verb, the words "to hide" might be expressed by the figure 2 and a picture of a skin or hide.

These instances will recall rebuses or pictorial puzzles to the reader's mind. In them the iconomatic system often appears, though mixed of course with the literal and the picture systems of expressing ideas. Iconomatic writing, it will be observed, occupies an intermediate position, standing in some sense in relation to both letter and picture writing. Both Egyptian and Chinese writing, in all probability, began as picture writing. How complete a system of iconomaticism they passed through is unknown, yet in the Egyptian hieroglyphs examples are found. Thus Dr. Brinton cites the word *nefer*, which in Coptic signifies a number of things—a lute, a colt, a conscript soldier, a door, and the adjective good. The picture of a lute was employed to signify any of these words. Going a step further, a symbolic or arbitrary representation of a familiar object might be used in picture writing. As this developed, this arbitrary figure would acquire new meanings. In the hieroglyphics of Egypt, a three-sided square was used to represent a house, but in the broader sense to signify the sound *per*, which means not only a house, but several other things.

To fix the individual meaning of any of these characters, unpronounced determinative characters were used. Thus, if a lute, *nefer*, was drawn or inscribed to represent a conscript, a picture of a man would be annexed as a determinative. This precluded it from meaning a colt, or a door, or a lute, but fixed its meaning as a conscript.

The probability that all Egyptian writing had this origin is increased by the fact that several signs were used in its highest development to represent the same sound. Four signs exist for the sound of the letter M, four for that of T, three for N, and so on. On the Rosetta stone, the words Alexander and Alexandria in the Egyptian sectors are expressed by rebus-like signs of the Egyptian language.

In heraldry numerous examples of this principle occur; they were mostly used in the older times, before reading and writing were common acquisitions. Now they are considered in bad taste. Of those cited by Dr. Brinton, the Bolton shield may be quoted—a cask, or "tun," transfixed by a crossbow, or "bolt."

The instances taken from the Mexican language are most curious and interesting. Thus a town is cited which was called *Tamneh* in the Huastecan language. In the Aztec tongue it became *Tamnoc*. This in Huastecan means "near the scorpions," but in Aztec has no meaning at all. But the word *tamachina* means to measure, a measuring stick is rendered by *octocatl*, footprints by *xoclli*. Hence the name of the town was indicated by a man holding a measuring stick, which gave the syllable *tam*, from the verb, and *oc*, from the noun, while footprints marked upon the stick reaffirm the syllable *oc*. In Nahuatl, the name of a certain town; Mapachtepec, means badger hill or badger town. The native scribe preferred a punning to a pictorial rendering of the word, and showed a hand, *maill*, giving the syllable *ma*, grasping a bunch of Spanish moss, *pachlli*, giving the syllable *pach*, while *tepec* is denoted by a picture of a hill.

Dr. Brinton cites as an illustration the well known rebus or puzzle [&] _{Mass} meaning Andover, Mass. A similar

"position" meaning was used by the Aztecs. The word *itzmiquilpan* is represented by a stone knife, *itzli*, and a plant, *quilitl*, placed over *pan*, the symbol for cultivated land, *milli*. This gives all the syllables of the name, the final syllable, *pan*, depending on position, like the syllable "over" in the Andover rebus.

Even colors are thus employed in the Nahuatl hieroglyphs. Yellow is translated *cuztic* or *coztic*, and a yellow color in the character is used to denote the syllable *coz*; and parallel cases are cited for other colors.

This gives an idea of this interesting subject, treated even in Dr. Brinton's lecture at comparatively slight length. When Mrs. Zelia Nuttall Pinart attracted so much attention at the Buffalo meeting (1886) of the American Association for the Advancement of Science, it was in this field that her researches lay. The full results of her labors are not yet public, but Dr. Brinton argues a high standing for them when published eventually, from what he has been allowed to see of them. It is to be hoped that he will soon give a more extended treatise on the subject of this most interesting pamphlet.

Asthma in Cage Birds.

Canaries are often troubled with a wheezing in the chest, which, from its resemblance to what is known as asthma in human beings, is given the same name. It is not, however, asthma, but an affection of the lungs. The cause is not far to seek. Canaries can bear great extremes of heat and cold, delicately framed though they be; but they cannot stand sudden transitions from one to the other. When they are kept in a room where the temperature is very variable, perhaps close to a draughty window during the day, with hot, vitiated atmosphere from burning gas in the evening, and later on the other extreme of cold, we must not wonder if the lungs are affected. It is therefore important that care should be taken to prevent such a state of things, and this is best done by hanging the cage below the middle bar of the window, or, what is better, standing it on a table some distance away, and then, when the gas is lit, the cage can be covered over and put on the floor in one corner of the room, as the temperature will be much more equal there than higher up. If such a plan be adopted, the so-called asthma will be prevented; but if it is found, a little tincture of aconite is the best remedy, say a drop to a teaspoonful of water divided into two doses.

A BRIDGEPORT paper says that a detective of that city recently received the following letter: "Will you oblige me by going to some picture gallery and set for my pictures. I will pay you. My children and relations are bothering me to have one took as I am growin' old, and as I am buzzy gitting in crops I can't spare time to come down. I hear you have disgizes so you can do as well as me. Have on red side whiskers and good clothes. Make the picture good lookin' and when you laff show your teeth, as I have a bran new set of false ones. I am 48 years old and a widower."