

ment therewith. There are no ratchets or other mechanism to make a noise, and the boat is especially adapted for hunting purposes, enabling the boatman to quietly approach a desired point.

The Modified Milk Question.*

I have lately had opportunity for studying the remarkable work that has been done in Dresden in preparing a perfect substitute for breast milk.

The superiority of the Dresden modification rests mainly upon the recognition of an essential difference between casein and lactalbumen. Professor Lehmann's analyses of breast milk and cow's milk show that while cow's milk is more than twice as rich in casein, it is much poorer than human milk in lactalbumen, as may be seen in the following tables:

	Cow's milk. 30 per cent.	Human milk. 12 per cent.
Casein.....	03 "	05 "
Albumen.....	35 "	38 "
Fat.....	45 "	60 "
Sugar.....	07 "	02 "
Ash.....	880 "	883 "
Water.....	1000	1000

If, therefore, cow's milk be diluted with water sufficiently to reduce the casein of the mixture to the amount found in human milk, the mixture will contain only one-third enough lactalbumen.

Furthermore, if the milk be sterilized, still further loss is occasioned, as the coagulated albumen is wasted in the scum and by clinging to the sides of the bottle.

We know the disadvantages of too much casein. We rightly dread the cheese curds in the dejections, for such undigested lumps not only show that the infant has not received the needed albuminous nourishment, but has had its intestine irritated by these foreign masses. But if we dilute the cow's milk sufficiently to avoid these cheese curds, we shall be starving the baby, unless we add some soluble albumen.

Three forms of soluble albumen are available: peptonized grain albumen, meat juice, and the white of egg. The last is undoubtedly the best, because of closest resemblance to lactalbumen and of easiest attainment.

THE DRESDEN METHOD.

To the white of one fresh egg slowly add 13 drachms (52 grammes) of milk sugar and vigorously stir, taking care not to beat air into the mixture, forego foam will not mix well with water. To this paste slowly add a pint and a half of water, stirring constantly. This emulsion is then strained through flannel into a pint of milk. Slight stirring or shaking completes the mixture.

The milk should be 9½ per cent richness in fat. The cheap lactometer gives a fairly accurate measurement. When the source of supply is not known to be unquestionable, it is probably better to sterilize the milk. The fresh egg partly compensates for the deadness of sterilized milk. Scurvy is becoming more prevalent in children fed wholly on sterilized milk. The milk sugar ought also to be sterilized in a seal jar if we wish the mixture to keep good for months. Vessels, strainers and cover cloths also sterilized.

It is a common mistake to add lime water or soda to modified cow's milk. Although to litmus cow's milk appears to be acid, it really is not so. The litmus test is deceptive in estimating the acidity or alkalinity of phosphate solutions. Lime water added to an infant's food overtaxes the stomach by wasting just so much gastric juice as is needed to offset the alkali. When the infant's digestion is weak, dilute hydrochloric acid added to the milk mixture is right in theory and of marvelous advantage in actual practice.

Again, as regards the custom of increasing the richness of the infant's food or of prescribing different qualities for different ages, it needs only to be said that it is as nonsensical as to prescribe increasingly richer beef and bread and potatoes for children as their years increase. A mother's breast milk increases in quantity as her baby's stomach grows larger, but there is certainly no such change in its quality as the intricate tables of our text books would lead us to believe.

How to Walk Upstairs.

Usually a person will tread on the ball of his foot in taking each step, springing himself up the next step. This is very tiresome and wearing on the muscles, says Public Opinion, as it throws the entire suspended weight of the body on the muscles of the legs and feet. You should, in walking or climbing stairs, seek for the most equal distribution of the body's weight possible. In walking upstairs your feet should be placed squarely down on the step, heel and all, and then the work should be performed slowly and deliberately. In this way there is no strain upon any particular muscle, but each one is doing its duty in a natural manner. The man who goes upstairs with a springing step you may be sure is no philosopher, or, at least, his reasoning has not been directed to that subject.

* By A. Worcester, A.M., M.D., Waltham, Mass., in Boston Med. and Surg. Journal.

Correspondence.

Roentgen Photography.

To the Editor of the SCIENTIFIC AMERICAN:

In repeating the experiments of Mr. Crumie, described in the Electrical World, I obtained a negative with several images of each of the coins and keys used.

Feeling satisfied that the objects could not have moved while under the influence of the current, I exposed a plate to the action of several keys and coins, but without use of the induction coil or any exterior current whatever.

Now while I have seen numerous accounts of the results obtained by use of metallic objects inside the closed dry plate holder, with the aid of the electric current, I have failed to note any account of the same effect being obtained without the current, or a Crookes tube, or electric lamp, or something external.

Is it possible that the effect of metals on the dry plate has not been noted?

This effect, let it well be understood, is similar to the Roentgen effect, not a reduction under the metal, but the reverse, the reduction taking place around the objects, the film under the objects remaining unchanged and washing out in the hypo, giving the "shadows."

A coin and a piece of cardboard when placed together on the dry plate both gave shadows. Great care was taken to prevent access of light, and the plate and holder remained in the dark room during the whole experiment, thoroughly shielded from light.

If this matter has not been brought to the attention of the public, I would be glad if you will use the data I have sent you.

F. W. TRAPHAGEN.

Montana College of Agriculture and Mechanic Arts, Bozeman, Mont., February 22, 1896.

[The images of the keys and coins in the photographs received from Prof. Traphagen are as clear and distinct as those in any of the radiographs we have published.—Ed.]

The Recent Acetylene Explosion.

To the Editor of the SCIENTIFIC AMERICAN:

The recent explosion at a factory in Connecticut, in which it is said experiments were being made with acetylene, reminds me of an acetylene experiment which I once made unexpectedly. It was in 1880. I was cutting off a small piece from a ball of metallic potassium (under naphtha as usual), when a violent explosion followed. The thick glass bottle was blown to pieces and thirty of the pieces penetrated my hand, some going almost through it. The potassium was soft as usual, and there was only a gentle pressure of the knife. The knife was dry and there was no water in or near the bottle. If there was a flash accompanying the explosion, it could not have been very bright. The lecture room was instantly filled with a dense smoke, consisting in part of potassium oxide or hydrate, but mostly of dark fumes from the naphtha, which appeared to have been all vaporized or decomposed; at least it all disappeared from the place of explosion and there was no flame following. The explosion was very sharp and sudden, after the order of the fulminates, and shook a large building. That the explosion was confined to one of the potassium balls was proved by the fact that the other potassium balls that had been in the bottle were much flattened, but were still so far distinguishable they could be counted.

I immediately made inquiries from a number of chemists, but none of them had ever heard of an explosion of dry metallic potassium. At length Prof. Henry Carmichael, of Bowdoin College, Brunswick, Maine, informed me that he had heard of two similar explosions in Germany, and that German chemists had found that it was due to an acetylene compound formed while the potassium was in process of manufacture under hydrocarbons. In general, the chemists succeeded in freeing the potassium from this compound, but if they did not, it was liable to explode under a moderate pressure.

May not the recent explosion in Connecticut have been due to the same compound or a similar class of compounds?

Obviously if there are acetylene compounds that will fulminate by means of a jar or friction, or from any other cause, it is important to know under what conditions they are formed, in order that proper precautions may be taken. I therefore send you this for publication, in order to call attention to the subject and as a warning to those experimenting with acetylene.

GEORGE H. STONE.

Colorado Springs, Col., February 15, 1896.

Spectrum of Mars.

To the Editor of the SCIENTIFIC AMERICAN:

There is a paragraph in a recent number of the SCIENTIFIC AMERICAN which refers to my observations of the spectrum of Mars, and concludes with the statement, "Now it turns out that M. Janssen has recently informed the French Academy of Sciences that he has determined the existence of water vapor in the planet Mars by means of the spectroscopic."

I fear your note has been very misleading to many of your readers. M. Janssen's observations, to the results of which you refer, were made on Mount Etna in the year 1867, about twenty-nine years ago, and he communicated his results to the French Academy of Sciences in the year 1867, as follows: ". . . I believe I can announce to you the presence of aqueous vapor in the atmospheres of Mars and Saturn." (See Comptes Rendus for 1867, vol. lxiv, p. 1304.)

Further, in my original paper on "The Spectrum of Mars," I called attention to M. Janssen's observations, quoting his results in full. I reviewed all the observations of Mars' spectrum, including M. Janssen's, in the Astrophysical Journal for June, 1895; and in that article I requested that we be given the details of his 1867 observations. In response, M. Janssen published some of the details of his 1867 observations in the Comptes Rendus for July 29, 1895, evidently the publication to which your note refers.

M. Janssen stated that his observations were made May 12 to 15, 1867. Perhaps we may say that at that time the diameter of Mars was less than 6 seconds of arc; that is, about one-fourth the diameter of the planet at a favorable opposition. We are not informed as to the apparatus which was carried up Mount Etna for making the observations, but the telescope was probably comparable with a 6-inch refractor. In brightness and width the spectrum would not be very unlike that of a bright star.

The question of Mars' atmosphere and its constituents has an intensely popular side and an intensely unpopular side. It happens that my observations led me to a middle ground conclusion; but since they did not prove the existence of an atmosphere and water on Mars, they are generally misunderstood to favor the absolute non-existence of those elements. Such, however, is not the case. So far as I know, every astronomer has always held that the planet has some atmosphere. The polar caps are satisfactory evidence on that point. My conclusion was that the Martian atmosphere is not sufficiently extensive to have been detected by the spectroscopic observations thus far made. It may be detected at some future time—I hope it will. If it is, I am confident that it will prove to be not more than one-fourth as extensive as our terrestrial atmosphere: that is, its density at the surface of the planet will not be more than about half the density of the atmosphere at the summit of the Himalaya Mountains. At least such is the conclusion which I drew from my observations when they were made.

At the opposition of Mars next winter I trust that valuable results will be obtained by a photographic study of the spectrum. It is quite possible that photographic methods will reveal traces of aqueous bands in the spectrum which visual observations could not detect.

W. W. CAMPBELL.

Lick Observatory, Mount Hamilton, Cal.

Photographing Window Displays.

One of the greatest difficulties attached to photographing a window display is the reflection in the plate glass front of the buildings on the opposite side of the street and of the passing throng. Many trimmers will thank us for indicating a successful way in which their efforts may be taken by the camera without this annoying feature. If the artist will provide himself with a black curtain, mounted at each end on wooden poles, nothing more will be needed. It must be of sufficient size to screen the largest window, and a center aperture must be cut in order to insert the camera. This curtain, when held in place by assistants, will cut off the undesirable reflection and still admit light sufficient for all purposes from the top and sides. An additional advantage will be that the sensitized plate may be given as long an exposure as desired. When not in use the curtain can be rolled on the standards and thus be easily carried about from place to place.—Chicago Apparel Gazette.

Swiss Wood Preserving.

According to an English contemporary, a simple, effective and cheap way of preserving wood from decay is practiced in Switzerland in the preparation of posts for the telegraph service. A square tank, having a capacity of some 200 gallons, is supported at a height of 20 or 25 feet above the ground by means of a light skeleton tower built of wood. A pipe drops from the bottom of the tank to within 30 inches of the ground, where it is connected with a cluster of flexible branches, each ending with a cap having an orifice in the center. Each cap is clamped on to the larger end of a pole in such a manner that no liquid can escape from the pipe except by passing into the wood. The poles are arranged parallel with one another, sloping downward, and troughs run under both ends to catch drippings. When all is ready, a solution of copper sulphate, which has been prepared in the tank, is allowed to descend the pipe. The pressure produced by the fall is sufficient to drive the solution, gradually, of course, right through the poles from end to end. When the operation is ended and the posts dried, all the fiber of the wood is permeated with the preserving chemical.