

situated at a considerable distance, they appear inverted and much smaller.

The following is an interesting extract on this subject from Sir J. Emerson Tennent's recent work on Ceylon:—"A curious phenomenon, to which the name of 'Anthelia' has been given (and which may probably have suggested to the early painters the idea of the 'glory' surrounding the heads of beatified saints) is to be seen in singular beauty at early morning in Ceylon. When the light is intense, and the shadows proportionally dark—when the sun is near the horizon, and the shadow of a person walking is thrown on the dewy grass—each particle furnishes a double reflection from its concave and convex surfaces; and, to the spectator, his own figure (but more particularly the head) appears surrounded by a 'halo' as vivid as if radiated from diamonds. The Buddhists may have taken, from this beautiful object, their idea of the *agni* (an emblem of the sun) with which the head of Buddha is surmounted. But, unable to express a halo in sculpture, they concentrated it into a flame."

#### A NEW AREOMETER FOR DETERMINING THE REAL DENSITY OF LIQUIDS.

If two liquids of different density are in equilibrium in communicating vessels, the heights of the two columns are inversely as the densities. This rule is well known all over the world, and in order to find the specific gravity of a certain liquid, or its density, as compared with that of distilled water, it is only necessary to measure the height of a column of said liquid sustained by a given column of distilled water, and to calculate the relative proportion of the two.

In the first place, however, to measure the columns with the desired correctness requires certain precautions, and to charge a U-shaped tube with different liquids and discharge it again is coupled with such difficulties that the principles mentioned above, notwithstanding their simplicity, has never been turned to any account in practice.

The floating areometers which are in common use are subjected to the serious inconvenience of being very deficient in exactness, and it really is very rare that two instruments of this class correspond exactly with each other, neither do they give the real density nor the volume per pound.

The novel areometer of Mr. Jeannel is based on the equilibrium of two columns of liquid in a U-shaped tube, and notwithstanding this instrument is more difficult to handle than the floating areometers, it is preferable on account of its greater exactness, as it indicates the real density of the liquid, and it allows, at the same time, of making corrections necessary on account of the changing temperature. With alcoholic liquids only it becomes necessary to use tables for correction.

The instrument consists of the tubes A B and C D, which communicate by an intermediate column of mercury contained in the V-shaped vessel, M. The small tube, A B, of a diameter of about  $\frac{1}{4}$  of an inch and about 22 inches long, connects with the vessel, M, being in reality a prolongation of the same, and both the upper part of the vessel and the small tube are filled with distilled water to a height of 20 inches, which is marked 1000 on the scale. The other tube, C D, of a diameter of about  $\frac{5}{8}$  of an inch and a length of about 25 inches, contains also a column of distilled water of the height of 20 inches.

This tube extends down into the mercury contained in the lower part of the vessel, M.

A siphon, S, serves to empty the tube, C D, and if this tube is emptied and filled with a liquid of greater density, it takes a column of less height to cause the column of water in the tube, A B, to rise to a height of 20 inches, and, on the other hand, if liquid of less density is filled into the tube, C D, a higher column is required to raise

the distilled water in the tube, A B, to a height of 20 inches. The heights of the two columns are inversely as the densities.

By proper scales on both tubes the density as well as the volume per pound of different liquids can be determined.

#### POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

(Reported expressly for the Scientific American.)

On Thursday evening, the 15th inst., the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; the president, C. Mason, in the chair; John Johnson, secretary *pro tem*.

#### MISCELLANEOUS BUSINESS.

*Heating by Steam.*—Lewis M. Hills, of New Haven, read a paper presenting the usual arguments for warming buildings by steam. The paper was briefly remarked upon by the president and Messrs. Godwin, Garvey and Fisher. Mr. Fisher believed the largest building, or even a whole block, might be warmed by a single boiler; whereas, a single hot-air furnace would be altogether impracticable for such duty.

*Leather from Whale Skin.*—Mr. Howe read a paper prepared by D. H. Tetu, of Kamarousha, Canada, on the white whale of the St. Lawrence. The Canadians call the fish a porpoise, but works on natural history describe it as a whale; it is found for a distance of 200 miles between St. Roch (60 miles above Quebec) and Father Point; also found abundantly in rivers emptying into Hudson's Bay. Since the discovery of Canada, this fish has been an article of commerce; but the oil was not very good, and little use was found for the skin; lately, however, Mr. Tetu has succeeded in purifying the oil and tanning the skin. The oil is equal to the best sperm, and the leather has excellent qualities. The average price of the animal 10 years ago was \$40, now it is \$150; average weight, 2,500 lbs, and the largest, 5,000 lbs.—worth \$200; average length 22 feet, and 15 feet in circumference. The ear is so small that only well-skilled naturalists can find it, yet the sense of hearing is more acute than in any other whale. Mr. Tetu catches the white whale in nets, near the river Saguenay.

In addition to the above, which is a condensation of the more important statements of the paper, Mr. Tetu, in answer to questions from various members, said that all kinds of leather are made from the skins; but it does not make good sole leather, for the reason that it is too pliable; ordinary tanning process employed, except that the liming is omitted, and the tanning requires more time on account of the closeness of the fiber of the skin. The skin has hair (Dr. Stevens—All mammals have hair); the leather lasts five times longer than any other leather, yet costs the same; the skin of one whale is equal to the skins of 12 to 25 calves; the leather is chiefly used by the British army. Mr. Tetu may be seen at No. 77 Franklin-street, this city.

Specimens of leather were exhibited and passed among the members, and elicited general approval—especially for strength and pliability. The president and a reporter were unable, by pulling against each other, to break a strip a little larger than a shoe string.

*Fry's Revolving Window Sash.*—Mr. Garbanati exhibited a model of a window sash invented by Thomas P. Fry, of Brooklyn. The object of the invention is especially to encourage and facilitate the cleaning of the outside of the window. The sash is pivoted to guides which travel up and down in corresponding grooves of the casing. The window is thus easily turned, and the outside brought in, without detaching from the casing. The sash, also, when turned so as to be horizontal, allows as free ventilation as when the window is entirely removed.

The time allotted to miscellaneous business having expired, the president called up the regular subject—"Adulterated Food."

#### DISCUSSION.

Mr. Treadwell presented for chemical examination a sample of sugar which he had used in his family, but which he believed was not genuine; it contained matter which he thought was not so soluble as sugar.

Dr. Reuben—A gentleman in New Hampshire complained that he had found sand in maple sugar; but it was shown that the sand was a constituent of the sap, and that it was formed and precipitated in the same way as cream-of-tartar is found in wine.

A lively debate here ensued between Drs. Gould, Reuben and Mr. Latson, on the question whether salt should enter into the food of man; but nothing important was brought out, and as the subject was foreign to the purpose of the meeting, we make no report of it.

Professor Hendricks—Some of the gentlemen who have spoken here give their experience as dyspeptics, and advise us to adopt what they found which suited their cases. But dyspeptics' rules are not what healthy men should follow. It is safer to do precisely what dyspeptics forbid. (The professor made a stirring speech, and sat down amid applause and laughter.)

Mr. Seely presented four samples of carbonate of soda procured from respectable grocers, and sold under the name of saleratus or super-carbonate of soda. The powders were dissolved in separate vessels of water, and a solution of bi-chloride of mercury was added to each. The clear solutions immediately changed to a dark, dirty red, and a bulky precipitate soon settled. These tests showed that the super-carbonate of soda commonly sold is little better than common washing soda effloresced or dried. Had the articles been genuine, the precipitate made by the bi-chloride of mercury would have been white.

A gentleman (whose name our reporter did not learn) said:—I was once engaged in manufacturing saleratus, and sent to a baker a lot of genuine super-carbonate of soda. But the baker found that it made his bread yellow, and returned it to us. We then mixed it with 25 per cent of salt, and the baker found it of the best quality.

Mr. Seely—But the baker's bread might not have been any better. Almost any mineral matter makes pure bread whiter; alum was once commonly added to bread to whiten it. In Belgium it is said that sulphate of copper has been used; 1 part in 70,000 of flour answering the purpose. Liebig recommends lime, for the reason that lime is an essential element of the body.

The President—Pure wheat will not make white bread. Whiteness is not a desirable quality of bread; it is generally an evidence of fraud or ignorance.

Mr. Fisher—I found the bread in Florence yellowish, but excellent; better than I have found elsewhere. I do not know how bread is made here, but it is all bad.

Mr. Garbanati commended the French bread, which, he said, may be procured at various places in New York and Brooklyn.

Mr. Latson—The superiority of French bread is due rather to skillful manipulation than to any difference in ingredients used. A French baker will use precisely the same materials as other bakers, and yet invariably make a better bread. His skill consists chiefly in determining the point when the raised loaf should be put in the oven; he does not allow the fermentation to go as far as to make the bread sour or to give it a disagreeable flavor. He never works over his dough after it is once raised, as is evident from the fact that large cavities are always found in his bread.

Dr. Reuben—No substance whatever which is not an element of the body should be taken into the system. The effect of foreign matter constantly taken in is cumulative; and if it does not appear in a day, it surely will during the lifetime. It is only after a considerable time that painters feel the effects of lead.

Dr. Stevens—An impression has gone from this club that cattle are very much damaged by the transport from distant places; this I consider an error. Cattle are brought even from Texas, but they start in the Spring and do not reach here till Fall. On all railroads which carry cattle, there are stations at intervals of 200 or 250 miles where the cattle are taken out and receive every needful attention. If any of them are disabled by disease or accident, they are generally left behind and sold in the neighborhood. (The doctor here named the various railroads which transport cattle towards New York, with all resting stations.) It is my belief that in New York we have the best beef in the world; that no finer cattle can be found in any other market.

Mr. J. Lamb presented samples of pure ground spices prepared in Brooklyn. He said that the manufacturer had come from Europe, where he was engaged in the manufacture of certain kinds of sauce. When he attempted to make his sauce here, he found that he was producing a very different article. The black pepper he bought was largely adulterated with rottenstone and pumice stone. He was obliged, in order to carry on