

SOME SCIENTIFIC ASPECTS OF TEA DRINKING.

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An ancient beverage, and one now in more universal use than any other, not even excepting beer, tea has many claims as a wholesome and harmless adjunct to our meals.

Our English cousins, headed by that greatest tea merchant and good sportsman, Sir Thomas Lipton, seem to have come to a better appreciation of "the cup that cheers but not inebriates" than we in America have arrived at. You remember that, in *Pickwick Papers*, Sam Weller tells us that they drank tea until they "swelled wisely." Our English friends at one time would even have compelled us to take to their favorite beverage had not a party of well-meaning, but rather hasty, Yankees dumped the first consignment of raw material into Boston harbor. Since then we seem to have retained a rather illogical prejudice against an excellent beverage.

Among its many virtues, not the least is that it supplies, in a harmless form, an adequate amount of water to the system. Physicians are agreed that most of us habitually take too little liquid. Many functional disturbances arising from this lack of water might be removed by acquiring the habit of tea drinking. Another advantage to be derived from the use of tea is in thereby obtaining water which is free from pathogenic bacteria and which is partly softened by boiling. The sterilization of the water and the removal of its "temporary hardness" are unmistakably advantageous in places where there is any suspicion as to the purity of the drinking water or where it is excessively hard.

To persons of sedentary life, with digestive powers not of the strongest, the simple physical advantage of the heat-content of the cup of tea is probably of material aid in facilitating natural digestion. It also acts as a mild stimulant, on account of the presence of the alkaloid theine. Any reasonable use of tea is unlikely to cause serious reaction from this stimulant, and the benefits upon digestion, of the cheerful state of mind produced by it probably more than compensate for any drain produced by it upon the nervous system. In case of personal idiosyncrasy toward tea it should, of course, not be used.

The chief objection to the use of tea seems to me to arise not from the theine content of the infusion, but from its tannic acid content when not rightly prepared. As ordinarily prepared by estimable old ladies the infusion of tea contains small amounts of more or less volatile oil, a small per cent. of theine, some coloring matter, and loads of tannic acid. Last year my landlady happened to be both estimable and orthodox and prepared my tea in the regulation fashion. In order to convince her of the error of her ways I carried over a test tube of lead acetate solution and, calling her attention to my cup of tea, I precipitated a heavy mass of bulky lead tannate in my cup, much to her surprise. On being informed that the result was due to the presence of tannic acid in the tea she exclaimed, "Why! I didn't think my grocer would do such a thing!" I think she never quite forgave that grocer even although I explained to her that the tannic acid grew in the tea plant and that she herself extracted it by long steeping. I had to get a tea ball and make my own infusion at the table to get well-made tea. It is true they called me "Miss" Wade after that, but I knew that the orthodox tea was fit only to tan hides, and I had too much respect for my interior to continue its use.

A short time ago a friend and I visited a celebrated local Chinese tea shop in order to test the quality of the tea. While the genial proprietor, Mr. Moy Kee, slumbered peacefully in his reclining chair my friend and I spied out the land in the rear of the curtain partition. Upon a lighted gas stove a blue granite ware tea kettle was boiling merrily. The proper amount of tea was put in a vessel, the boiling water poured over it and almost immediately poured off into the china teapot in which it was served to us. I do not, myself, particularly like the flavor of Chinese teas, but this tea was well made and very free from astringency. We noticed upon the menu cards two interesting names of teas—"Before the Rain," and "After the Rain." I was at a loss to understand the derivation of these names until next day at dinner, when, in discussing her method of making tea with my new landlady she told me that her method was just like Moy Kee's and that she found it very economical, as you could get an excellent second cup of tea from the grounds by re-extracting them. I knew then that my first cup of tea had been "Before the Rain" and my second cup "After the Rain."

In order to show strikingly the difference in the tannic acid content between tea prepared after the Chinese fashion of quick extraction by

boiling water and tea prepared by long steeping I secured ten samples of tea in the open market and extracted 4 grams of each in $\frac{1}{2}$ liter of water by both methods. (See table and photographs.) In the quick extraction process the half liter of boiling water was poured over the 4 grams of tea, allowed to remain 1 minute and then the infusion was quickly strained into a clean flask. In the slow steeping process the half liter of boiling water was poured over the 4 grams of tea and kept at boiling temperature for about 5 minutes, then strained into a clean flask. To each of the twenty infusions excess of lead acetate solution containing a few drops of acetic acid was added. In the ten flasks containing quickly extracted tea scarcely any precipitate was found, while in the ten flasks containing the same kinds of tea extracted by the longer method very voluminous precipitates formed without exception. In other words the tea made by the orthodox method of long steeping contained vastly greater amounts of astringent material of the nature of tannic acid than the other.

Many people habitually drink tea of this description and, having become accustomed to it, do not like tea unless it is "strong enough to float a flat iron." That they enjoy a fair measure of health is only another tribute to the enormous resistive powers of the cells of the stomach lining. That many people are unable to drink tea of this type, and so do not drink any, is, I believe, due to its tannic acid content, not to its content of theine.

While most teas contain a slightly larger per cent. of theine than coffee does of its alkaloid (caffeine), yet, when we consider the weight per cup of dry material employed in making the two beverages, we see at once that the alkaloid content of the cup of tea is really considerably smaller than that of the cup of coffee. A teaspoonful of tea is liberal for one cup. The ordinary amount of coffee per cup is a tablespoonful. The coffee is denser than the tea, so the relative weights of coffee and tea per cup are about in the proportion of 5 for the coffee to 1 for the tea. Three per cent. is a fair average for the theine in tea and 1 per cent. for the caffeine in coffee, so the amount of alkaloid in the cup of coffee is really greater than in the cup of tea, even if all the alkaloid is extracted in each case. In reality the theine is not as completely extracted by a one-minute exposure to boiling water as the caffeine is by the longer extraction which coffee always receives. So the well made cup of tea is in truth only a delicately flavored and colored cup of hot water.

I think I may then conclude that tea, made by the method of quick extraction with boiling water, affords a wholesome source of fluid to the body while at the same time it gives, on account of its aromatic flavor and slightly stimulating properties, a pleasure to its users which makes it worthy of a far more extended use among us than it has yet reached.

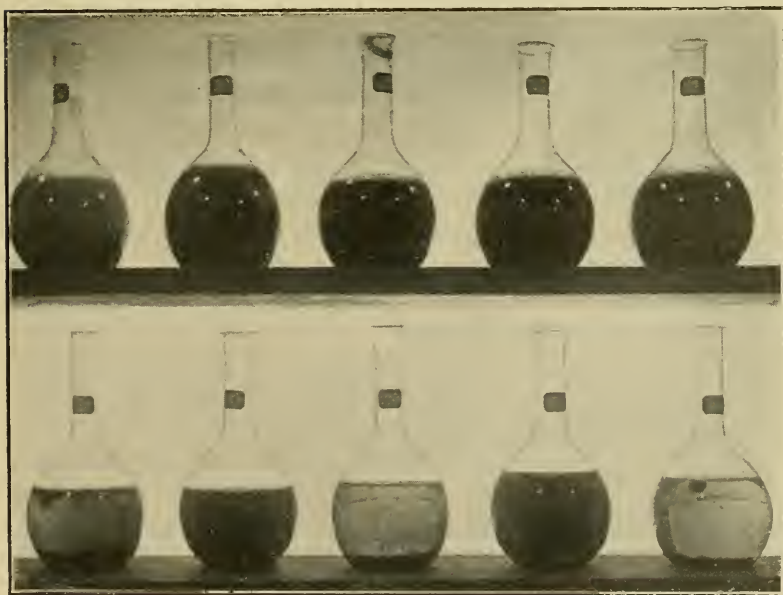
TABLE I.

No.	Name.	Price.	Taste.	Color.
1	Lipton No. 1	\$0 60	Mild and pleasant	Black.
*2	No. 1, once used			
3	Imperial	60	Slightly aromatic, mild	Green.
4	Gunpowder	80	Very aromatic, strong	Green.
5	Needle Japan	80	Flat, astringent	Black.
6	Oolong	80	Slight aroma	Black.
7	Young Hysen	80	Aromatic, mild	Green.
8	Mixed tea		Aromatic, mild	Black and Green.
9	Formosa	90	Slightly aromatic, mild	Black.
10	Uncolored Japan	80	Aromatic, slightly astringent ...	Green.

*No. 2 flask broke. Not shown in photograph.



Numbers 1, 3, 4, 5, reading from left to right.
Upper row in each picture shows result of long boiling.



Numbers 6 to 10, reading from right to left.