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COFFEE AND TEA.

COFFEE AND TEA

A LECTURE

GIVEN AT

THE PARKES MUSEUM

ON

DECEMBER 6TH, 1883

WITH A CHART SHOWING THE STATE OF THE COFFEE TRADE FOR THIRTY YEARS.

BY

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48.192



LONDON

H. K. LEWIS, 136 GOWER STREET, W.C.

1883

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COFFEE AND TEA.

IT is not my intention to give a teetotal lecture, and if I occupy your time for the next hour with a discourse on Coffee and Tea, you must not assume that I am therefore not grateful for Grapes, and Barley, and Hops.

Coffee and Tea are undoubtedly the rivals of alcoholic drinks, but my belief is that both have their uses, and that a properly controlled appetite or instinct, is as safe a guide in the matters of diet, as a physiologist or a moralist. The development of our minds and bodies is due in great measure to the food we take. Man's advance from Ape to Philosopher is attributable, in part at least, to the wide-range of his diet, and the ability which he has to obey the strange cravings and appetites which are within him. That men should become slaves to their appetites is to be deprecated, and a man who yields unduly to appetite may merit punishment; but we ought to be very sure of our ground before we attempt to suppress appetite by Dogma. This was done by Mohammed twelve centuries ago, and the result is worthy of a careful study.

Articles of Diet naturally fall into two great classes, Food and Drink.

The main object of Drink is to maintain the proper amount of fluidity of the blood, and what we call thirst is as it were the cry of the blood for water.

For the mere allaying of thirst, water is the best of all drinks, and must be regarded as the typical beverage. The weight, density, or specific gravity of water is taken as a standard. It is, one need not say, heavier than some and lighter than other liquids, and its specific gravity is arbitrarily made the unit, and is conveniently spoken of as 1000. Water taken into the stomach, requires no digestive effort, it is quickly absorbed, and dilutes the blood without delay.

When solid matters are mixed with or dissolved in water, the water becomes a liquid food rather than a pure beverage. Some foods which are taken in the liquid form require considerable digestive effort. Milk is one of these, and there can be no greater mistake than to take milk as if it were a beverage and not a food. This is often done now-a-days with the result that the stomach is over-taxed and the blood overcharged. Milk has a specific gravity of about 1030, and when it reaches the stomach it is first clotted and then slowly digested.

In proportion as the specific gravity of liquids rises so they must be looked upon as liquid foods rather than simple beverages. We might arrange liquid foods in a list having water, the simplest of all, at the bottom, and passing through tea, coffee, wine, beer, milk, and ending with turtle soup, which is little more than a solid in disguise, and is largely composed

of liquid gelatine. When we wish food to produce a rapid effect we give it in a liquid form because as a rule it is more readily digested and absorbed.

Articles of diet may not only be divided into solids and liquids, but they are capable of another division into two great classes of nourishments and luxuries.

Of nourishing food, such as milk, meat, fat, sugar, bread and starch, I have nothing to say this evening, since the bodies which I have chosen for the subject of my lecture, belong distinctly to the class of luxuries; luxuries which the lower animals manage to do without, but for which man has a strange craving, so strange, so universal, that it is difficult to regard these so-called luxuries as other than necessities of life.

To the class of luxuries belong in the first place, wine and other alcoholic drinks. There is a large class, however, of non-alcoholic luxuries, bodies of small nutrient value, but which are in universal use by all nations, in almost every stage of civilization, and in all quarters of the globe.

The non-alcoholic luxuries mostly contain *alkaloids*, crystallisable bodies capable of forming salts with acids, and capable of being separated by suitable means from the plants which contains them. These alkaloids are most potent bodies, and when given in their pure state exercise, even in very small doses, a powerful if not poisonous effect. It may perhaps give point to this remark if I recall to your minds the terribly potent *Strychnine* obtained from the seeds of *Nux Vomica*, *Aconitine* from Monkshood, *Atropine*

from Belladonna, *Morphia* from the Poppy and *Quinine* from Peruvian bark.

These alkaloid-containing luxuries are used universally. *Tea*, *Coffee*, *Cocoa* and *Tobacco*, are employed throughout the civilised world. The use of other bodies of this class is less familiar, but I may remind my hearers that Hashish made from Indian Hemp is consumed by nearly 300,000,000 of the human race as an intoxicant and narcotic. The use of *Opium* is at least as extensive as that of Hashish. *Cuca* and *Guarana* are largely employed in South America, to counteract fatigue. The chewing of Betel Nut is almost universal among oriental nations, and the use of *Maté* or Paraguay tea is daily increasing throughout the Empire of Brazil.

Now although many of these bodies are abused instead of being rationally used, and although we are very apt to become the slaves of one or other of them, it would be rash to conclude that they serve no useful purpose.

The argument is often put forward that as the lower animals do without them so ought we, but to this I would humbly oppose the fact that we are *not* lower animals, that we have *minds* as well as *bodies*, and that since these substances have the property in common of enabling us to forget our worries and fatigues, to make light of misfortunes and generally to bear

“The slings and arrows of outrageous fortune.”

let us accept them, make rational use of them and be thankful.

I have said that most of these bodies contain alkaloids, and I have stated also my belief that human appetites and human instincts tend in the main to guide us rightly. We know how in China millions took instinctively to the use of Tea. How Coffee became established as a daily article of diet in Persia, Arabia, Turkey, Egypt and then in Europe generally. How when Cortes conquered Mexico he found the Emperor Montezuma and his subjects in the full enjoyment of Cocoa. Each of these three bodies, as well as Guarana made from the seeds of the *Paullinia sorbilis*, and Maté Tea made from the leaves of the *Ilex Paraguayensis*, contains an alkaloid which Chemists tell us is absolutely (or almost) identical and which has been variously styled *Thein*, *Caffein*, *Theobromine* or *Guaranin* according to its source of origin. Surely this is a fact calculated to excite our special wonder.

This alkaloid which we will call *caffein* is a powerful stimulant. Its chemical formula is $C_8H_{10}N_4O_2$ and to this alkaloid, in its various disguises, the whole human race has turned for enjoyment and refreshment much as the magnet turns to the pole.

The peculiar effects of Tea and Coffee are due to the alkaloid. These effects are of a *refreshing* character. The circulation of the blood is increased. The elimination of CO_2 by the lungs is heightened. The reflex excitability of the nerve centres is roused, thereby increasing the impressionability of the consumer, and great wakefulness results. It also excites the

peristalsis of the intestines. Tea and Coffee then are *stimulants*, they rouse the tissues to increased action, make us insensible to fatigue, and enable us to do more work than we otherwise could. The differences between these stimulants and alcoholic stimulants are worth noticing. Tea and Coffee keep us awake and attentive, and those who have taken either for the purposes of midnight study will know how under their influence the receptive power of the brain seems to be at its maximum. They cause no mental "elevation" and do not rouse the imaginative faculties as a glass of wine seems to do. They enable a man to work, and often rob him of sleep, and do not, like a glass of wine, tend to increase the power of sleep after the work has been accomplished.

Tea and Coffee both contain the same alkaloid and their action is almost identical. Do they differ in any way, and if so how?

To answer this question I must invite your attention to the following analyses of Tea and Coffee.*

* An analysis of Brazilian coffee by Professor Church, dated May 10th, 1882, gives the following results:—

Water	11·22
Oil and Fat	14·27
Matters soluble in water .	24·87
Albuminoid	6·96
Caffein	1·18
Ash	3·51

	Coffee (Payen).	Tea.
Water	12'000 ...	11'49
Cellulose	34'000 ...	20'30
Caffein	0'800 ...	1'35
Nitrogenous matters excluding caffein	13'000 ...	21'22
Non-nitrogenous matter	15'500 ...	23'88
Tannic acid	5'000 ...	12'36
Fat, &c.	13'000 ...	3'62
Volatile oil	0'003 ...	0'67
Ash	6'697 ...	5'11
	100'000	100'00

Looking at these two analyses there are certain points which at once strike us. First in equal weights there is more alkaloid in Tea than in Coffee, and nearly 2½ times as much tannic acid.

Coffee on the other hand contains four times as much fatty matter as Tea.

The absolute analysis, however, as conducted in a chemical laboratory, is only a partial guide to the Dietetic value of an article. We, as consumers, are mainly interested in those matters which are soluble in water.

Now König* estimates that in an infusion of Coffee we get 25·5 per cent. of the Coffee used, whereas in a infusion of Tea we get 33·64 of the Tea used, and that these per centāges are thus constituted.

	Coffee.	Tea.
Alkaloid	1'74 ...	1'35
Nitrogenous matter		9'44
Non-nitrogenous matter {	Oil { 14'52 } ...	19'20
	5'18 }	
Ash	4'06 ...	3'65
	25'50	33'64

* *Die Menschlichen Nahrungs- und Genussmittel*, Berlin, 1880.

It will be observed that the amount of alkaloid found in the tea infusion represents the total amount in the tea. The amount of alkaloid in the coffee infusion is rather more than double the total given in Payen's analysis. Coffees, however, differ immensely in the amount of contained alkaloid, and this well marked discrepancy between the analyses of two chemists will serve to impress the fact of variability in quality very forcibly on the mind.*

We have not yet exhausted this question of dietetic value as tested by analysis, and the most important question of all remains to be answered. What is the relative dietetic value of a cup of tea as compared with a cup of coffee?

König has attempted to answer this question. For making coffee infusion a much greater weight of material is used than in the case of tea.

König assumes that to make what he calls a "portion" of coffee fifteen grams (a little over half an ounce) of coffee is used, and that of these fifteen grams, 3.82 are dissolved in the water. To make a "portion" of tea 5 grams are used, and of these 5 grams, 1.68 are dissolved in the water.

* According to a statement emanating from Brazil (*Le Brésil à l'Exposition d'Amsterdam*) the Brazilian Coffees are very rich in Caffeine, and from an analysis recently made by Ludwig of Vienna, the amount appears to vary from 1.16 to 1.75 per cent. (See "Church's Analysis," p. 6).

CUP OF COFFEE.		CUP OF TEA.	
Alkaloid	0.26 grams:	Alkaloid	0.07 grams.
Oil	0.78 „	Proteid	0.47 „
Non-nitrogenous matter	2.17 „	Non-nitrogenous matter	0.96 „
Ash	0.61 „	Ash	0.18 „
	<hr/> 3.82 grams.		<hr/> 1.68 grams.

It would be rash to assume that these analyses are absolutely correct, but they are recent and they emanate from Germany which is *par excellence* the land of accuracy.

It follows from these analyses that, supposing all the dissolved matter to be available for the needs of the body, the dietetic value of a cup of coffee is more than twice that of a cup of tea, and if we assume that the stimulating power is due to the contained alkaloid, then *quâ stimulant* the cup of coffee has more than three times the value of the cup of tea.

Further, Binz observes in the 3rd edition of his *Elements of Therapeutics* that “the alkaloid which Tea contains appears to be less easily absorbed than that of Coffee owing to the very large quantity of tannic acid present.”

The tannic acid in Tea is doubtless one of the causes why it is as a drink so attractive. It is slightly astringent and clean in the mouth, and does not “cloy the palate,” an expression for which I can find no scientific equivalent. Tannic acid is also one of the dangers and drawbacks of tea. It is largely present in the common teas used by the poor. Now the rich man who wishes to avoid an excess of tannic acid in the “cup that cheers” does not allow

the water to stand on the tea for more than five, or at most eight minutes, and the resulting beverage is aromatic, not too astringent and wholesome. The poor man or poor woman allows the tea to simmer on the hob for indefinite periods with the result that a highly astringent and unwholesome beverage is obtained. There can be no doubt that the habit of drinking excessive quantities of strong astringent tea is a not uncommon cause of that atonic dyspepsia, which seems to be the rule rather than the exception among poor women of the class of sempstresses.

Tea more nearly approaches to a pure beverage than coffee does. Coffee makes a very slight approach to the class of liquid foods.

The specific gravity of a cup of good tea is about 1003, and of a cup of good coffee about 1009.

Excessive tea-drinkers are more common than excessive coffee-drinkers, because the heavier coffee more easily produces satiety than the lighter tea, and it is not possible for ordinary stomachs to tolerate more than a certain amount of coffee, even when pure, and only a very small amount of the thick, sweet, adulterated stuff which too often passes for coffee in this country.

Coffee then has a slight value as a nutriment, and a very high value as a stimulant; when mixed with boiling milk in the form of *Café au Lait* it forms the ideal of breakfast foods for body workers and brain workers, and a very small quantity of Black Coffee*

* By "Black Coffee" is meant Coffee without milk. Genuine Coffee is not very black. An excessive black colour is given by means of burnt sugar, and is no sure indication of strength.

taken after a full meal, serves to stimulate the stomach to the necessary digestive effort, and to ward off that sleepiness which is often the attendant of satiety.

Coffee should not be taken for the mere quenching of thirst when no food is required, and is too heavy for drinking as a mere luxury between meals; but whenever extra work is demanded of the body, where is the spur at all equal to a cup of good coffee and a bit of bread?

That it is advisable to eat something whenever coffee is taken, seems to be an idea as old as the habit of Coffee-drinking itself, and Dufour a French writer of 1672 says, that there was a proverb among Orientals, to the effect, that "If one had nothing else to eat before drinking Coffee it was advisable to swallow a waistcoat button or else go without the Coffee altogether."

Tea is more of a pure beverage than Coffee, has less dietetic value and is less stimulating; it is more capable of being used as a pure luxury (it is indeed the Tobacco of women), but its great astringency is one reason which makes its excessive use highly undesirable.

So far we have dealt with Coffee and Tea collectively. I propose to devote the rest of the lecture to the consideration of Coffee, mainly because I believe that coffee is not properly understood in this country, and that there is a real need of instruction in the matter of this most valuable article of diet.

I am glad to be honored by the attendance of the Ladies on this occasion, because it is a matter which concerns them. Brillat-Savarin, the witty author of the *Physiologie du Gout*, a work in which mirth and wisdom go hand in hand, lays down the rule in the 19th Aphorism at the beginning of his book, that "the mistress of the house ought always to take care that the Coffee is first rate, while the master should see that the wines are excellent."

Coffee as we know it, is the seed of a plant, the *Coffea Arabica*, belonging to the natural order Rubiaceæ, to which order also belong madder, ipecacuanha, cinchona, and the common weed known as cleavers or goose grass.

The shrub is supposed to be indigenous to the Highlands, which border on the African coast of the Red Sea. Possibly the district called Kaffa to the South of Abyssinia, gives us a hint as to its origin. Hence it was imported into Arabia, to the hilly districts of Yemen or Arabia Felix. This is supposed to have been effected in the 14th century, from which time dates the importance of Mocha as a trading port.

It may be assumed that the Coffee Plantations of Yemen increased until the yield served for export as well as for home consumption. In the 16th century mention is made of the consumption of Coffee by the Turks, and Lord Bacon among other writers alludes to it. The Coffee came by ships from Mocha to Suez and overland by caravans to Damascus and

Aleppo, the total export from Mocha in the middle of the 17th century, being estimated by Dufour at about 16,000 bales, weighing about 300 lbs. each, *i.e.* about 2,150 tons.

It was about 1650 that Coffee found its way to London. Its introduction to London is said to be due to a Mr. Daniel Edwards, a merchant from Smyrna, who brought over with him a Greek servant called Pasqua whom he subsequently established in a Coffee House.

In the 21st volume of the *Philosophical Transactions* (1698), is an account of Coffee, by a Mr. Houghton. He had some Coffee analysed, "I sent to the chymist" he says "one pound of Clean Coffee, one pound of Husked Horse Beans, and one pound of Picked Wheat; and I received back:—

	COFFEE.			HORSE BEANS.				WHEAT.		
	℥	ʒ	ʒ	℥	ʒ	ʒ	gr.	℥	ʒ	ʒ
Spirit (net) . .	vi	vi	o	vi	i	o	xii	viii	ii	i
Oil.	ii	iv	ii	i	iii	o	x	i	o	gr. vi
Cap. Mort .	v	iii	o	v	iii	o	o	iv	vi	

The above is interesting as an early attempt at the quantitative analysis of organic bodies, but its utility is small, and it is not enhanced by the instruction which is given to the reader, that "by spirit is meant the phlegm."

Houghton mentions that the total imports of Coffee in his time was about 100 tuns, of which 70 were for home consumption, and he estimates the average

market value at about £14 per hundredweight, (he says "tun" but that I take it, is an obvious error).

For some time, Yemen in Arabia continued to be the only district in the world, whence Coffee was derived. Attempts to grow it elsewhere failed, and it was believed that the Arabians boiled or roasted the berries, before exportation, in order to prevent the possibility of its germinating elsewhere. Dufour, however, gives no credence to this tale and thinks that those who believe it "do not reflect on the arrangements of Providence, which, having given to each country the peculiar faculty of producing certain things, no human toil or care could avail to alter the order of nature."

Human toil and care have, however, at length overcome obstacles, which were supposed at first to be insurmountable, and Yemen (*i.e.* "Mocha") from being our sole source of Coffee, has now become (in so far as quantity is concerned) the least important.

It was about the year 1700, that the Dutch succeeded in growing Coffee in the island of Java, and hence the cultivation soon spread to the East and West Indies.

In the present day—

Brazil	supplies about	350,000 tons.
Guatemala	} " , 100,000 ,,	
New Grenada		
Caraccas		
Venezuela		
Mexico		
La Guayra		

Java	supplies about	105,000	tons.
St. Domingo	„ „	27,500	„
Ceylon (formerly 45,000).	„ „	17,000	„
British India	„ „	20,000	„
Costa Rica	„ „	14,000	„
Manilla	„ „	9,000	„
Jamaica, Cuba, Porto Rico	„ „	13,500	„
Mocha	„ „	3,500	„
Singapore	}	7,500	„
Madagascar			
West Coast of Africa			

TOTAL (roughly about) 667,000 Tons.

The fruit of the Coffee tree is like a cherry, in which a soft fleshy pulp encloses two plano-convex seeds, placed with their flat sides in apposition.

The pulp is got rid of, partly by fermentation and partly by mechanical means, and the seeds freed from the pulp and dried in the sun form the raw “Coffee” of Commerce.

Coffee varies in colour. A friend of mine in Mining Lane, has kindly supplied me with sixteen varieties of Coffee, and I have endeavoured to classify them according to colour.

PRICE PER
CWT.

- 160/- “Fine brown Java” . . . Light brown, uniform.
- 40/- “West Coast of Africa” . . Light brown, irregular in colour.
- 70/- “Liberian (Ceylon)” . . . Brown with faintest suspicion of green.
- 130/- “Fine long berry Mocha” . Brown with faint tinge of green.

PRICE PER
CWT.

100/-	“ Ordinary Mocha ”	Greenish brown.
52/-	“ Manilla ”	} . . . Dark greeny brown.
54/-	“ Good ordinary Santos ”	
60/-	“ Good ordinary Java ”	} Brown, with more green.
56/-	“ Good ordinary Guatemala ”	
130/-	“ Mysore ”	} . . . Greenish.
93/-	“ Neilgherry ”	
70/-	“ Good La Guayra ”	
92/-	“ Fine Ceylon,” (lighter in colour)	} More distinctly green.
78/-	“ Medium Plantation (Ceylon)”	
70/-	“ Costa Rica ”	
52/-	“ Good average Rio ”	Brownish, greenish, blackish.

Not only do coffee seeds vary in colour, but also in size. We may leave out of consideration Liberian coffee, which is much the biggest, and is the product of a distinct species of plant; the remaining fifteen sorts will fall into the following order, if arranged according to size, the biggest coming first:—

	No. of seeds in a unit measure holding 50 grams of water (about 2½ oz.)		
Fine brown Java	187	...	160/- per cwt.
Fine Mysore	198	...	130/- ,,
Fine Neilgherry	203	...	93/- ,,
Costa Rica	203	...	70/- ,,
Good ordinary Guatemala	207	...	56/- ,,
Good La Guayra	210	...	70/- ,,
Good average Santos	213	...	54/- ,,
*Fine long berry Mocha	217	...	130/- ,,
*Good ordinary Java	223	...	60/- ,,
Fine Ceylon Plantation	225	...	92/- ,,
*Good average Rio	236	...	52/- ,,

No. of seeds in a unit measure
holding 50 grams of water
(about 2½ oz.)

Medium Plantation (Ceylon)	238	...	78/- per cwt.
*Manilla	248	...	52/- ,,
*Ordinary Mocha	270	...	100/- ,,
*West African	313	...	40/- ,,

Those sorts which are marked with an asterisk are irregular in size and colour, and have the appearance of being carelessly prepared; and the reason why Rio, Manilla, and West African fetch the least money seems obvious enough.

The high prices of the Mochas lead one to think that there is something in a name, but the light colour of the seeds indicates probably not only a very complete ripeness when gathered, but considerable age as well, and be it remembered that *Coffee improves with age*, and will continue to improve for fifteen or twenty years. The brown Java priced at 160/- has not only very fine seeds, but it has been six or seven years in the island. If Coffee be kept in a dry place it matures and improves. It loses water, gets lighter, and when roasted develops more aroma. The fact that Coffee can be stored in bulk for household use, and continues to improve with age should recommend it to the careful housewife. C'est l'âge qui fait le bon Café, says the writer of the monograph "Le Brésil à l'Exposition Internationale d'Amsterdam."

We have accounted for the high price of the brown Java and the two Mochas, and for the low price of the Manilla, Rio, and West African. The nine that remain vary in price between 130/- and 54/-, and it is

interesting to enquire why. In the following list they are arranged in order of value :—

	Weight of Unit.	No. of Berries.
Mysore, 130/-	38 grams	198
Neilgherry, 93/-	38 „	203
Fine Ceylon, 92/-	38 „	225
Medium Ceylon, 78/-	36 „	238
Costa Rica, 70/-	36 „	203
La Guayra, 70/-	37 „	210
Java, 60/-	37 „	223
Guatemala, 56/-	35 „	207
Santos, 54/-	33 „	213

In the above list the weight as well as the size of the berry is given. These coffees are all greenish in colour, and it is obvious that the size and weight of the berries are elements in determining the price. Nevertheless, we find that the Mysore and Neilgherry are practically identical in colour, weight, and size, and yet we find that the former is 37/- per cwt. dearer than the latter. This is a puzzle which it is difficult to solve.

It need not be said that Coffees of different growth have qualities which are appreciable to the connoisseur more readily than to the chemist. The nose and the palate will often determine a value which chemists would fail to fix.

Cultivation, climate, mode of preparation, and age, are all factors which help in determining value. There are the same differences in coffees that there are in other kinds of fruit, between the wild crab apple, for instance, and the Newtown pippins; and

by the art of cultivation, the coffees of Java, the East Indies and Ceylon, and some of those from Central and South America, have become more than rivals for Mocha. If you will look at the coffees from Rio and the West Coast of Africa, and compare them with those from Mysore and the Neilgherrys, you will appreciate the value of careful preparation and thorough cleaning.

If a coffee seed be examined more closely it will be observed that it is covered with little scaly particles which adhere to it, pieces of the so-called testa. When cut into, the texture of the seed looks translucent and horny. It is almost without aroma (certainly without pleasant aroma), and it is tough and difficult to cut, pound, or grind. If examined under the microscope it is easy to see the characteristic long cells of the testa, while the body of the seed is composed of angular irregular cells with thick walls, and each cell contains a highly refracting globule of essential oil and some air. It is this essential oil which makes Coffee so popular, and it is from this that its fragranciness is developed. It is the caffeine and the essential oil which give Coffee its value and its popularity; deprived of these the market value of Coffee would sink to the level of that of peas or beans, or indeed below it, for the nutritive as distinguished from the stimulating value of Coffee, is small.

We ought to be thankful to the man who discovered Coffee. This feeling has doubtless given

rise to the myths and tales in which its discovery is enveloped. The most often quoted tale is that which Dufour gives, and which he quotes from an account published in an Italian Journal in 1671, by Fausto Nairone, a Maronite Professor of Chaldæic and Syriac, at the College of Rome.

“A keeper of camels, or according to others, of goats, complained to some neighbouring monks, that occasionally his beasts kept awake and disported themselves the whole night through. The Prior, who suspected the pasturage to be the cause, found that the animals had browsed on a certain shrub. Having made a decoction for himself and drank it, he too was deprived of sleep, and then he bethought himself to give it to the monks in order to keep them awake during the religious services of the night, and this it did effectually; and when,” we are told, “the pious monks partook of it they never failed to pray for Sciadli and Aydrus, their two brethren to whom the happy discovery was attributed.” Poor monks! unhappy Sciadli, martyred Aydrus, they are deserving of our prayers and pity, for it is not recorded that the Coffee of which they partook was previously roasted!

If there be any here who have a desire to taste a decoction of raw coffee, let them “o’er master it as they may,” for they may take my word for it, that it is a peculiarly filthy and nauseating mixture.

Brillat-Savarin very justly observes, that our thanks are due, not so much to the first discoverer of Coffee, but rather to the first roaster of it, for it is the roasting

that causes the development of its attractive qualities.

We are all of us very familiar with the phenomenon of the development of aromatic principles by roasting. The delicious aroma which arises from the leg of mutton or the bit of beef as it twirls before the fire, has stimulated the appetite of millions and the poetic faculties of not a few. England is the land of toast, *i.e.*, of bread made crisp and slightly aromatic by the process of roasting, and therefore the phenomenon of coffee roasting should strike us as "no new thing."

Now when Coffee is roasted what happens to it?

1. It loses water.
2. It loses weight—from 12 to 25 per cent., and this loss of weight is more than can be accounted for by the loss of water.
3. It swells, and therefore the specific gravity of each berry is much lessened. Raw Coffee sinks in water, while roasted Coffee floats.
4. Changes colour, turning from yellowish or greenish-grey to reddish-brown.
5. From being very tough it becomes brittle so that it can easily be broken between the thumb and finger.
6. After roasting the essential oil is no longer visible in the cells. It has become diffused throughout the berry, the cells which originally contained it having been burst by the heat.

Those who watch the process of roasting in an open vessel will notice the gradual change of colour ;

the copious steam which is given off, the sweating of the berries, and the pungent, peculiar, and not pleasant smell which is given off, and which is decidedly irritating to the eyes. The Coffee pops and expands with a crackling noise, and if the roasting berries be blown upon, fine particles of the husk will fly away.

As regards the quantitative changes, Payen obtained the following results:—

Coffee roasted to a pale red lost 15 per cent. of weight, and gained 30 per cent. of bulk.

Coffee roasted to a chestnut brown lost 20 per cent. of weight, and gained 53 per cent. of bulk.

Coffee roasted to a dark brown lost 25 per cent. of weight, and gained (?) of bulk.

My own experiments show that Coffee loses in roasting from 13 to 21 per cent. in weight. Mysore Coffee lost 14·3 per cent. of weight and gained 55 per cent. in bulk.

Opinions differ as to whether the solubility of Coffee is increased by roasting, but the majority seem to think that it is.

Some exact experiments quoted by König show that a particular sample of Coffee lost during roasting 17·77 per cent. of its weight, of which 9·11 was due to loss of organic matter, and 8·66 to loss of water.

The sugary particles of Coffee are turned by roasting into caramel. The caffeine is unchanged. An aromatic body called caffeine is developed as well as methylamine, which is pungent rather than aromatic.

The analyses given by König, of raw and roasted Coffee, are as follows:—

	COFFEE.	
	Raw.	Roasted.
Nitrogenous matter (excluding caffenin)	8·43	12·05
Caffenin	1·18	1·38
Fat	13·23	15·63
Sugar	3·25	1·32
Other non-nitrogenous bodies	31·52	38·41
Cellulose	27·72	24·27
Ash	3·48	3·75
Water	11·19	3·19
	<hr/>	<hr/>
	100·00	100·00
	<hr/>	<hr/>
Soluble matter	27·44	27·45

Practically the roasting of Coffee effects two important changes. (1.) It develops the aroma. (2.) It renders it brittle and pulverizable.

A great mystery is made of the roasting of Coffee. There is no mystery about it at all, and the only requisites are a bright smokeless fire, or gas or spirit flame, a suitable vessel, 15 or 20 minutes of time, and a little care and intelligence. The Coffee must not be slowly dried, and on the other hand must not be burnt. To prevent burning it must be constantly stirred. Coffee is commonly roasted in this country in rotating spheres or cylinders, and very convenient they are. I have made a great many experimental roastings for this lecture in an earthenware pipkin over a gas-flame, the Coffee being prevented from burning by being incessantly stirred with a spoon.* It need hardly be said that there is less risk of burn-

* The Coffee should be picked over before being roasted, and any black berries and foreign substances should be excluded,

ing the Coffee in an earthenware than in a metal vessel, which may get nearly red hot, and that if the vessel be open and the Coffee exposed to view, it is easier to judge of the progress of the process. In Arabia, according to Mr. Palgrave, Coffee is invariably roasted in a large open iron ladle. The sufficiency of the roasting is judged of: (1) by the colour, (2) by the smell, and (3) by the brittleness, it being possible to crush a well roasted coffee seed between the finger and thumb. Just after roasting, Coffee is at its best, and there are few odours so deliciously aromatic as that of fresh roasted Coffee immediately after being powdered.

From the moment of roasting Coffee begins to lose the aroma which the roasting process has developed. The aroma is due to a highly volatile body and this is quickly dissipated.

Those who wish to enjoy really good Coffee must have it fresh roasted. On the continent, in every well regulated household, the daily supply of Coffee is roasted every morning. In England this is rarely done. There should be no difficulty about it, however, and I feel sure that supply would create demand and *vice versâ*. Why should not a dairyman combine coffee-roasting with his business, and leave at our doors with the morning milk a supply of fresh roasted Coffee for the day's consumption. I feel sure it would prove a paying speculation to anyone who would take it up, and I throw out the suggestion to Dairymen generally, and particularly to that great

Dairy Company of which our distinguished chairman (Sir Henry Thompson) is one of the directors.

If roasted Coffee has to be kept, it must be kept in an air-tight vessel. In France, Coffee used to be kept in a wrapper of waxed leather, which was always closely tied over the contained Coffee. In this way the Coffee was kept from contact with any air.

The Viennese say that Coffee should be kept in a glass bottle closed with a bung and that Coffee should on no account be kept in a tin canister.

The Coffee having been roasted it has to be reduced to a coarse powder before the infusion is made. The grinding and powdering of Coffee should be done just before it is wanted, for if the whole coffee seeds quickly lose their aroma, how much more quickly will the aroma be dissipated from Coffee which has been reduced to a fine powder? Nothing need be said in the matter of Coffee mills. They are common enough, varied enough and cheap enough, to suit all tastes. Thomas Garaway, the proprietor of Garaway's Coffee House in Exchange Alley, states in an advertisement towards the end of the 17th century, that "Nicholas Brooke living at the sign of the Frying Pan in St. Tulie's Street (Tooley Street) against the Church is the only man for making of mills for grinding coffee powder, which mills are by him sold from 40 to 45 shillings the mill."

Brillat-Savarin, the prince of epicures, gives some curious facts anent the grinding of Coffee. He says, "the Turks use no mill for grinding Coffee, but pound

it in a mortar with wooden pestles, and a pestle and mortar which has been used for this purpose for a long time becomes valuable and fetches a good price. I have tried to prove whether these two methods of powdering Coffee produce different results and which of these is the best. I carefully roasted a pound of good Mocha and divided it into halves of which one was ground and the other pounded. To equal weights of the resulting powdered Coffee I added equal measures of boiling water treating both lots in identical manners. This Coffee was tasted by myself as well as by many renowned epicures and the unanimous opinion was that the beverage made from the coffee which had been pounded in the mortar was decidedly the best. Anybody may repeat the experiment."

The next point with which we have to deal is most important, *viz.*, the *making of coffee*. To insure a really good cup of Coffee attention must be given to the following points.

1. Be sure that the Coffee is good in quality, fresh roasted and fresh ground.

2. Use sufficient Coffee. I have made some experiments on this point, and I have come to the conclusions, that 1 ounce of Coffee to a pint of water makes poor Coffee, $1\frac{1}{2}$ ounce of Coffee to a pint of water makes fairly good Coffee, 2 ounces of Coffee to a pint of water makes excellent Coffee.

3. As to the form of Coffee pot, I have nothing to say. The varieties of Coffee machines are very numerous and many of them are useless encumbrances. At the best

they cannot be regarded as absolutely necessary. The Brazilians insist that Coffee pots should on no account be made of metal, but that porcelain or earthenware is alone permissible.* I have been in the habit of late of having my Coffee made in a common jug provided with a strainer, and I believe there is nothing better.

4. Warm the jug, put the Coffee into it, boil the water and pour the boiling water on the Coffee and the thing is done.

5. Coffee must not be boiled, or at most it must be allowed just to "come to the boil" as cook says. If violent ebullition takes place the aroma of the Coffee is dissipated and the beverage is spoiled.

The most economical way of making Coffee is to put the Coffee into a jug and pour cold water upon it. This should be done some hours before the Coffee is wanted, overnight for instance, if the Coffee be required for breakfast. The light particles of Coffee will imbibe the water and fall to the bottom of the jug in course of time. When the Coffee is to be used, stand the jug in a saucepan of water or a bain-marie, (*i.e.* is in a water-bath as a chemist would say) and place the outer vessel over the fire till the water con-

* There seems a concurrence of opinion that it is undesirable to allow Coffee and Metal to come in contact. Brillat-Savarin prefers a mortar to a mill for grinding; the Viennese prefer a bottle to a canister for storing; and the Brazilians use an earthenware in preference to a metal pot for making. I have shown that roasting can be effected in an earthenware pipkin and have given some reasons why it is preferable to an iron vessel.

tained in it boils. The coffee in this way is gently brought to the boiling point without violent ebullition and we get the maximum extract without any loss of aroma.

Some writers recommend that in order to get the maximum extract, the grounds of yesterday should be thoroughly boiled and this boiling decoction be poured on fresh Coffee in order to make the beverage of today. This method is cumbersome and has not in my hands yielded results in any way commensurate with the trouble.*

Always make your Coffee *strong*. *Café au Lait* is much better if made with $\frac{1}{4}$ strong coffee and $\frac{3}{4}$ milk, than if made half and half with a weaker Coffee, this is evident. If Coffee is taken "black" after dinner let it be little and good.

* In order to test the value of different methods I have taken the specific gravity of various infusions, with the following results:—

1 oz. of Coffee to a pint of water gives an infusion having a specific gravity of 1005.5 and when the water had been boiled on the grounds of the previous day the specific gravity was scarcely 1006.

When $1\frac{1}{2}$ oz. to a pint were used and the Coffee was made by simple infusion there was a very slight increase of specific gravity although the Coffee was stronger in the mouth. The specific gravity was 1006 only.

When $1\frac{1}{2}$ oz. to a pint were employed and the Coffee was mixed with *cold* water over night the specific gravity of the liquid rose to 1009.

When 2 oz. to the pint were used and the Coffee made as above, the specific gravity was scarcely increased although the Coffee

If the Coffee used be genuine and it be made as I have directed there will be no trouble with the "grounds" and no strainer is *necessary*. Coffee is a hard gritty material and the individual particles of the Coffee powder which at first float on the water fall after a time to the bottom of the pot and leave the infusion clear. It is a mistake to suppose that Coffee cannot be made without a great deal of costly and cumbersome apparatus and it is well that the labouring classes and particularly soldiers and volunteers should remember the following facts.

1. That *raw* Coffee does not deteriorate but *improves* by being kept in a dry place.

2. That it is quite easy to roast Coffee in a small frying pan or a pipkin or any suitable vessel.

3. That it can be powdered perfectly well without a mill.

4. That it can be made perfectly well in any vessel which will hold water.

I remember during the Crimean War an out-cry that our troops were supplied with *raw* Coffee. This was shameful, but it is evident that a little knowledge

was stronger to the taste. It must be remembered that the oil and fat in Coffee has a specific gravity less than water and that an increase of these ingredients would diminish the specific gravity of the resulting liquid just as cream diminishes the specific gravity of Milk.

Café au Lait made with Coffee infusion of 1009 (about half Coffee and half milk) and sweetened with two knobs of sugar to the breakfast cup had a specific gravity of 1035.

of how to use the raw Coffee would have converted a hardship into a blessing and that the troops would have had Coffee of a quality which they could not get at home.

I have nothing to say against Coffee machines, Coffee mills and Coffee roasters. They are undoubted conveniences and save time, and some of the machines for making small quantities of Coffee at short notice are exceedingly handy and convenient. Most of the complicated filters are wholly unnecessary if *pure* Coffee be used. They become indispensable if adulterated Coffee be used. If Coffee be mixed with chicory, dandelion root, roasted acorns, roasted cabbage stumps, roasted figs or dates, or any other form of vegetable offal, which on boiling disintegrates and yields a thick soupy liquid, *then* ingenious filters are in requisition and the cook runs to the mistress for eggs to "fine the Coffee" which in the end is a starchy, albuminous, sugary soup, a very second rate food and in no sense the refreshing beverage which coffee should be.

When I was a student in Vienna my *Café au Lait* in the morning was in striking contrast to the so-called "Coffee" which I had had in students lodgings in London. I certainly had never tasted such good Coffee before and hardly ever since. Its mode of preparation was simple enough, for I asked Frau Kling to let me see her make it, which she did by pouring boiling water on the Coffee contained in a common brown earthenware jug.

In no part of the world, I believe, can one get such good coffee as in Vienna and in Austria generally. The reason for this is not quite clear. The Coffee used, is largely that grown in Ceylon and in the East Indies, and the modes of preparation are simple. Coffee roasting is throughout Austria one of the regular household duties, it need not be said. Perhaps the quality of the water has something to do with the quality of the Coffee.

The reputation of Paris as a city of good Coffee, is on the wane, and "French Coffee" is now often another name for chicory mixture.

Dufour, whom I have quoted more than once before, gives definite directions as to the way of drinking Coffee. He says, "Coffee should not be quaffed but rather sipped as hot as possible. To avoid being scalded, you must not put your tongue in the cup but hold the edge of the cup between the tongue and lower lip below and the upper lip above, and then sip the Coffee swallowing gulp by gulp." He further says, "take care not to use the Coffee for a second infusion, by adding more water to the grounds, as many do through ignorance or stinginess. The Coffee must be used once only, for the first decoction removes all its virtue. It is a mistake to stir the Coffee in the pot, and the grounds are worthless, for in the Levant, it is only the dregs of the people who swallow the dregs of their Coffee."

"How much ought I to give for my Coffee?" is a question which the careful housekeeper very often

puts to herself. I have Coffees on the table which range in price from 160 to 40 shillings per cwt., so we see that in the raw state and in bond, the value of Coffees varies enormously. The cheap Coffees are rank and queer tasted, and scarcely such as one would care to buy, and they often contain bad berries which leaven the whole lump. The very dear Coffees are only for connoisseurs and for mixing. Good Coffee is to be got for the mean price, 80 shillings per cwt., and if Coffee costs 80 shillings raw and in bond, how much will it cost to the consumer roasted and ground. The duty is 14 shillings per cwt., so that the 80 becomes 94 when the duty is paid; next we must allow at least 15 per cent. for loss in roasting, which adds another 12 shillings to the cost, making 106 shillings. In estimating the profits of the various persons through whose hands the Coffee passes, (merchant, broker, dealer, wholesale grocer, and grocer), we are only able to speculate, but I think I am not wrong in saying that the 80 shilling Coffee will cost the consumer about 1s. 2*d.* per lb.

The following figures, which are taken from a printed card issued by a leading firm of Tea and Coffee dealers, show the price per pound for which wholesale grocers are able to sell Coffees, which cost a certain sum raw.

COFFEE.

Raw per cwt.		Roasted per lb, duty (14s. per cwt.) included.	
s.	d.	s.	d.
38	0	0	7½
52	0	0	9
60	0	0	10
69	0	0	11¼
79	0	1	0½
89	0	1	1¾
97	6	1	3
113	0	1	5
120	6	1	6
130	0	1	7¼
139	6	1	8½

At one time and another Coffee has met with a good deal of opposition. "Its peculiar properties" says Mr. James Paton in the *Encyclopædia Britannica*, "of dissipating drowsiness and preventing sleep, was taken advantage of in connection with the prolonged religious services of the Mahometans, and its use as a devotional antisoporific, stirred up a fierce opposition on the part of the strictly orthodox and conservative section of the priests. Coffee was by them held to be an intoxicant beverage, and therefore prohibited by the Koran; and the dreadful penalties of an outraged sacred law, was held over the heads of all who became addicted to its use." Notwithstanding this, its use quickly spread in Arabia, but when the habit of Coffee drinking reached Constantinople in the 16th century, it again caused considerable commotion, among the ecclesiastical public. The

popularity of the Coffee houses had a depressing influence on the attendance at the Mosques, and on that account a fierce hostility was excited amongst the religious orders against the new beverage.

In this country, Charles II. in 1675 attempted to suppress Coffee houses by a royal proclamation, in which it was stated that they were the resorts of disaffected persons; and in 1674 a "Petition against Coffee" was set on foot by persons engaged, in what is now known as the "liquor traffick," in which the dangerous rival drink was spoken of as "a base, black, thick, nasty, bitter, stinking, puddle water."

In spite of opposition, the use of Coffee continued to increase, and at the present time—

Holland	consumes	21·00 lb. of Coffee	per head of population.
Denmark	„	13·89	„ „
Belgium	„	13·48	„ „
Norway	„	9·80	„ „
United States	„	7·61	„ „
Switzerland	„	7·03	„ „
Germany	„	5·00	„ „
France	„	2·73	„ „
Austria	„	2·13	„ „
Greece	„	1·42	„ „
Italy	„	1·00	„ „
United Kingdom	„	0·94	„ „

This is a remarkable table and it will be interesting to enquire why it is that Great Britain, which does the carrying for the world, whose intercourse with the East is daily and hourly, whose tropical

colonies grow Coffee in abundance, and whose opportunities for obtaining good Coffee are unequalled, consumes less Coffee per head of population than any other civilized country in the world ?

A reference to the chart facing the title-page will show that, during the past thirty years the consumption of Coffee has steadily decreased, and that too in spite of a lessening of the duty to one half, and of enormous increase of population, and in spite of the increased demand for non-alcoholic drinks and the opening of so-called Coffee Taverns in great numbers throughout the country. Whereas the consumption of Coffee amounted to 1 lb. 6 oz. of Coffee per head of population in 1854, it is now only 15 oz. per head. On the other hand, the consumption of Tea which was only 2 lb. per head in 1852, is now as much as 4 lb. 9 oz. per head. When we remember that a pound of tea will make about three times as much beverage as a pound of Coffee, we must come to the conclusion that for every cup of Coffee consumed in this country, between fourteen and fifteen cups of Tea are drunk. Tea is the most popular beverage undoubtedly ; but yet the grocers' windows are full of Coffee (mainly in canisters it is true), Coffee is found on the majority of breakfast tables, and at temperance meetings "Coffee" is one of the staples of conversation. It is impossible to believe that the use of Coffee of some kind or another, is on the decrease, and we must stop to enquire, why it is that the customs returns undoubtedly show a diminution in the use of real Coffee.

The true reason, is undoubtedly to be found in the wholesale adulteration of Coffee, which is systematically encouraged by the government.

In the year 1851, when the Lancet started its "Analytical Sanitary Commission," the commissioner being Dr. Arthur Hill Hassall, it was found that out of fifty-four samples of Coffee purchased at various establishments, only three were genuine: and in the year 1882, out of thirty-seven samples of Coffee, analysed by Messrs. Wigner and Harland at the request of Mr. H. Pasteur, only two were genuine. Taking these two results together, we find that five lots of genuine Coffee have been found out of ninety-one samples purchased; so that if you go into a shop and ask for ground Coffee, the odds seem to be 18 to 1 against your getting it. Some samples sold under the name of Coffee, contained as little as 7 per cent. of the genuine article some as much as 50 or 60 per cent., the balance being composed of chicory root, dandelion root, dates, "finings," roasted acorns, roasted corn, beans, potatoes, beet-root, and cabbage stumps.

That is, Coffee which has a retail market value of about 14d. a lb., is habitually adulterated with matter of which the maximum retail price is 3½d. If you give 14d. for a pound of Coffee, the profit per lb. to the grocer is probably about 2d. if the article be genuine, but more than three times as much if it be half chicory. Most grocers prefer a profit of 40 per cent. to a modest 10 per cent., and this is the real reason why

chicory and other "substitutes" are foisted on the public, at the price of Coffee.

During the five years 1872—76, the amount of duty paid at the customs house on chicory amounted to £315,512 and during the five years 1877—81 to £353,193. What was the amount of tax on home grown chicory I do not know, but the figures show that in the second period of five years the increase in the importation of chicory amounted to over 12 per cent., while during the same period the duty paid on Coffee for home consumption showed an increase of only 1 per cent. These figures probably only give a faint idea of the increase of consumption of coffee substitutes, for chicory has become the least of these. The history of the Date Coffee Company is well known and the amount of Date Coffee consumed during the period of its existence must have been enormous. In Jersey, they are said to be making their fine cabbage stalks into Coffee instead of walking sticks, and the other day I heard of a wholesale grocer, a most respectable man, who took his hat off to the dandelion as his best friend.

But, I hear somebody say, "Chicory is not an adulteration, for Mr. Gladstone says so;" and it is quite true that in his Budget Speech for 1882, the following words fell from the lips of that eminent statesman:—

"At present every description of admixture with coffee is permitted, and we have long proceeded on the principle that the admixture of chicory with coffee

was not an adulteration, that it was an admixture rooted in the habits of many countries, and that people would not drink coffee without it. But of late a practice has grown up of producing all kinds of substitutes under the name of coffee, and that, I cannot but think, must in some degree account for the strange and singular state of the figures that I have laid before the Committee. We shall not attempt to interfere with the admixture of chicory with coffee, but we propose that it should not be allowed to introduce other miscellaneous admixtures with coffee."

Accordingly, by Act of Parliament, chicory was as it were called to the Upper House, and coffee and chicory in the eyes of Mr. Gladstone and the Right Hon. Joseph Chamberlain are now convertible terms, so that a new word seems necessary for the brown powders which are sold in shops for breakfast beverages. As for coffee adulterants, other than chicory, they are now obliged to be sold in packets bearing excise labels. They have been raised to the dignity of patent medicines, and always wear a government badge in public.

Now chicory was called to the Upper House on Aug. 14th, 1882, and on the following day a minute was issued by the Board of Customs for the instruction of their officers, in which the following clause occurs :

"As dandelion root is very cognate to, and not easily distinguishable from that of chicory

the officers will not on their own responsibility attempt to distinguish these roots, but will regard them all as chicory.”

So we must imitate our friend the grocer and take off our hats to the dandelion, as he takes rank along side of the old aristocrat Coffee and that Parvenu Chicory. It is very difficult to see what has been the object of the government in these regulations. My own belief is that from every point of view, moral, financial and dietetic, they are a mistake.

I have shown that the dietetic value and the market value of Coffee are due to the alkaloid and the essential oil which give it its refreshing, aromatic and stimulating qualities. Chicory and dandelion contain neither alkaloids nor essential oils. They have none of the qualities of Coffee, but they contain a certain amount of starchy and sugary matter which gives “body” and (when roasted) colour to water. They serve to make hot water black and thick and bitter, and hence give a spurious idea of strength to coffee in the eyes of those who have never had an opportunity of finding out what coffee is. To the uneducated palate chicory and other roasted rubbish may serve as a substitute for coffee. In the stomach it is no substitute; it has no stimulating effect, and will not help to keep a man awake unless it happen to give him the stomachache, which is not unlikely, since chicory and dandelion are both

mildly purgative, and are both apt to cause flatulent dyspepsia.*

I have very little right to speak of the effects of dandelion and chicory because I dislike them, and I am certainly not one of those in whose habits the use of chicory is "deeply rooted." I have the authority of Dr. Pereira for stating that "where the digestive organs are weak, and readily disordered, taraxacum (*i.e.* dandelion) is very apt to occasion dyspepsia, flatulency, pain, and diarrhœa," and with regard to chicory he says, that "its protracted use is said to injure digestion."

But chicory is as much adulterated as Coffee itself. Pereira says (*Materia Medica*, vol. ii., part ii., p. 41) "To colour it, venetian red, and perhaps reddles, are used. The former is sometimes mixed with the lard before this is introduced into the roasting machine, at other times it is added to the chicory during the process of grinding." Roasted pulse (peas, beans and lupines), corn (rye and damaged wheat), roots (parsnips carrots, and mangel wurzel), bark (oak-bark tan), wood dust (logwood and mahogany dust), seeds (acorns and horse-chestnuts), the mark of coffee, coffee husks (called *coffee flights*), burnt sugar, baked bread, dog biscuit, and the baked livers of horses and bullocks (!) are substances which are said to have been used for adulterating chicory."

* Chicory when made into an infusion (2 oz. to a pint) has a specific gravity of 1023, and two "coffee" mixtures were found to yield infusions of 1022 and 1021. A high specific gravity is therefore evidence of adulteration.

The motto of the chicory roaster seems to be "dry rubbish may be shot here," and I am bound to say that the dietetic value of many of the articles mentioned must be fully equal to that of chicory proper.

The putting of Coffee and chicory on an equality is indeed placing the gentleman with the beggar, and seems to be an application to vegetables of the dogma that "all men are equal." The root which grows in the damp earth of northern climates as the commonest of common weeds, cannot be expected to equal the berry which has been ripened in the full blaze of a tropical sun. One might as well say that the common gourd is equal to the pine-apple, or that three-pence is worth a shilling.

The presence of chicory in coffee mixtures is judged of by the smell and taste. The sediment in the cup is soft and pulpy. The specific gravity of the resulting beverage is higher.

If chicory be thrown on the surface of cold water it colours the water more deeply and quickly than Coffee does, and sinks far more readily to the bottom of the cup.

The presence of sugar in many coffee mixtures may be very readily detected by Fehling's test, and the microscope serves to show the peculiar minute structure of the coffee berry on the one hand, and of chicory on the other.

What we have practically to take to heart is this, that in the present state of the law those who want their coffee pure must buy it whole and grind it for

themselves, and those who want to have coffee really good must buy it raw and roast it and grind it for themselves.

If for reasons of taste, or fancy, or economy, people wish for "chicory" with their coffee, they will do well to buy the two things separately and mix them, and a saving of money will certainly be effected by pursuing that course. It is true that the fact of "Coffee" being a mixture must be stated on the wrapper, but there is no obligation to put the proportion of the mixture, and a grocer is quite within the law if he sell you a pound of "Coffee" composed of 1 oz. of coffee and 15 oz. of chicory, provided the fact of admixture is somewhere concealed upon the wrapper.

There is no doubt whatever that the present state of the law leads to the wholesale cheating of the working classes. It is to be hoped that those who have striven so hard to give the labouring man what is called a "free breakfast table," will make some honest endeavour to free it from adulterations, and cease to put in the way of tradesmen the legalised temptation of giving a totally inadequate value for the poor man's pence.

The countenancing of these admixtures is distinctly antagonistic to the spirit of the Adulteration Act, and surely it should be the main principle of all legislation to encourage the honest man, rather than to give opportunities to the rogue.

In the general order issued by the Board of Inland

Revenue, on August 14th, 1882, there occurs this clause :

“ E. Every packet containing, or purporting to contain, coffee with any other article or substance mixed therewith, shall have affixed thereto a label denoting *in letters of not less size than the largest letters* affixed to, or imprinted on, such label, the proper names of the several articles of which such mixture is composed.” (N.B. There is no obligation to state the proportions).*

This regulation apparently does not apply to chicory, for I have before me three (and might have had many more) canisters in which the word **COFFEE** stares one in the face and the word chicory is obviously concealed.

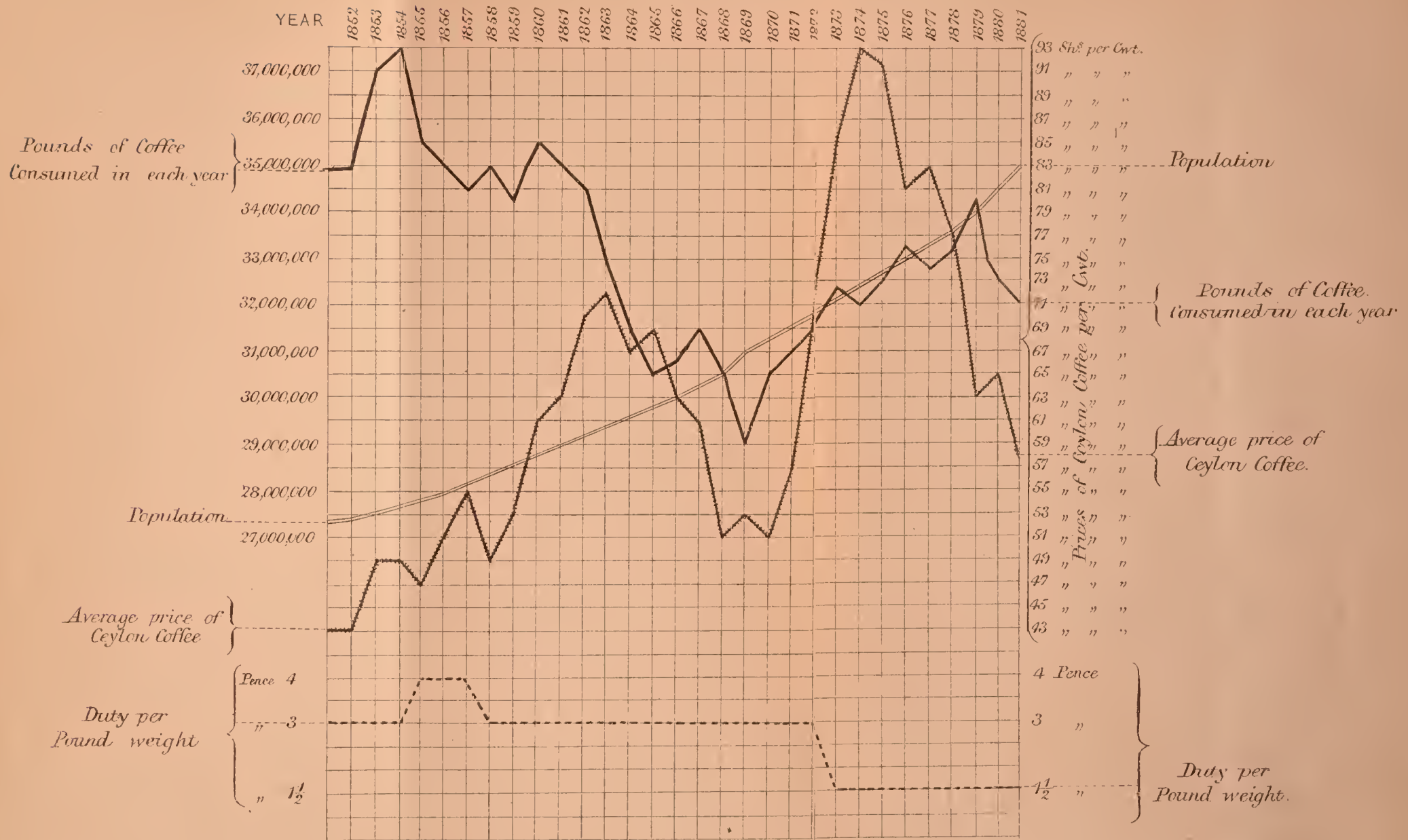
Now Tea has been very stringently protected from adulteration by a special clause in the Adulteration Act (Clause 30) which came into force on January 1st, 1876. All Tea that passes through the Custom House is now inspected, and if need be analysed, and no admixture of foreign articles or exhausted Tea is permitted. This has had no effect in checking the use of Tea, while the use of Coffee is steadily declining notwithstanding that the duty on Coffee was reduced

* There is upon the table a very decent imitation of “Coffee” which I have made myself. It consists of a mixture of 50 parts of roasted beetroot, carrot, cabbage and rice; 25 parts of chicory and 25 parts of Brazilian Coffee.

from 3*d.* to 1½*d.* in 1873 while the duty on Tea has remained at 6*d.* since 1866.

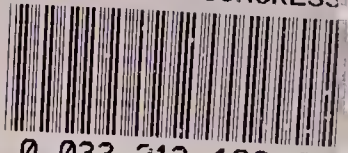
I cannot help thinking that it would be wise to attempt a policy with regard to Coffee similar to that which has proved so successful with regard to Tea. Honesty is the best policy, and I believe the Chancellor of the Exchequer would find it so. At all events nothing can be more disastrous (financially) than the present policy with regard to Coffee.

Here is work which the temperance party might well take in hand. They are a powerful body and they would do great good if they would help the working classes to a cup of real Coffee. I firmly believe that if a man, under the influence of mental or physical exhaustion, were offered a glass of gin or a cup of real Coffee he would unhesitatingly choose the latter, if he were aware of the marvellously stimulating effect which real Coffee has. The drunkard who is generally a diseased person, having a craving for stimulants of which healthy people are entirely ignorant, will never be weaned from spirits until a less harmful stimulant is offered in its place. When I can step into a Coffee-Tavern and get a really first rate cup of *stimulating* Coffee and not an insipid mess then I shall believe in the chances of a permanent establishment of temperate habits among the masses of the People.



SCHEME SHOWING THE STATE OF THE COFFEE TRADE FOR THE 30 YEARS 1852-81. COMPILED FROM M^R H. PASTEUR'S TABLES.

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