last or fourth flag, which is to be placed close behind the third flag, at a height of three feet above it; if we can see the fourth or furthest flag above the tops of the other three flags, the Earth is a plane, or if the second flag from the telescope be above a line joining the tops of the first and third flags, the Earth is a globe.—(*Signed*)—"PARALLAX;"—JOHN WEIR, C. W. MILLARD, Engineers and Surveyors.

Dated November 24, 1856 *Witness*—R. F. HINDE

COPY OF CERTIFICATE.—We, the undersigned, hereby certify and declare, that on the eleventh day of December, one thousand eight hundred and fifty-six, we accompanied Messrs. Weir and Millard, and assisted in placing the flags in the manner above mentioned, and that upon looking at the flags with a powerful telescope, the top of the second flag was fifteen inches and one half of an inch above a line joining the tops of the first and fourth flags, and twenty-four inches and one quarter of an inch above a line joining the tops of the first and third flags, thereby proving that the earth is a globe, and that from the results of this experiment, "Parallax" is bound, by the before-mentioned agreement, to renounce, for ever, his theory of the earth being a plane.—(*Signed*)—R. F. HINDE, Sussex-street, Norwich, manufacturer; ALEX. SANDERSON, Magdalen-street, Fye-bridge, tobacconist; W. H. DAKIN, Davey-place, Norwich; JAMES NEWBEGIN, St. Andrew's, tobacco manufacturer.

Will nothing stop "Parallax's" mouth?

TEA

THE word "Tea" is applied to the leaves of numerous plants from which infusions are made in their several native countries. Thus in Paraguay they use a species of Holly, in Abyssinia and Arabia the leaves of *Catha edulis*, and in Labrador those of *Ledum latifolium*.

We propose, however, in this paper, to say a few words about that article which is generally and popularly known as tea, and which forms such an important commercial commodity between China, India, and our own country, How long tea had been used in China before its introduction into Europe early in the seventeenth century no one can venture to say, but it appears to have been first known in England about the year 1660, and no article of commerce, perhaps, presents a parallel history of such rapid development. In 1678 the East India Company imported into England 4,713lb. Tea, however, continued to be a rarity for many years after that date, fetching a high price, and consequently remaining beyond the reach of all but the more wealthy. The demand for it increased so rapidly that in 1725 the consumption in the United Kingdom reached 370,323lb. Since then tea has been more and more in demand, until we find the returns for last year show as much as 139,223,298lb. imported, and 111,889,113lb. entered for home consumption, the computed real value of the tea imported during eleven months of 1869 being 9,115,823*l*.

The plant from which this large source of wealth is obtained is a shrub, the native country of which is still not definitely known. Although it has been cultivated for many hundreds of years in China, and its use alluded to in ancient Chinese legends, it has not been discovered in that country in a wild state, but truly native tea occurs in the jungles of North-eastern India.

At one time botanists were inclined to the opinion that black and green teas were furnished by two distinct species, the former by *Thea bohea* and the latter by *T. viridis*. So little difference exists between them that there seems no doubt as to their being mere varieties, and both are now usually referred to one species, the *Thea chinensis* of Linnæus. Though tea is now largely grown in Assam and some also in Japan, the plants cultivated in both countries are varieties introduced from China. The black and green teas of commerce may be prepared from either form of the plant according to the pleasure of the tea farmer, the colour in a great measure depending upon the rapidity of the artificial drying of the leaf, and also upon the length of time the freshly gathered leaves are exposed to the air before heating. There are, however, districts in China called respectively the Black and Green tea districts, in which the plants are grown specially for each purpose. For the preparation of either sort the leaves are gathered by hand, and the younger ones should alone be taken. If they are intended for the manufacture of black tea they are exposed to the air for a short time, after which they are placed in iron pans and submitted to a gentle heat for a few minutes. By this process much moisture is thrown off, and the leaves are rendered pliable, so that they are easily pressed or rolled between the hands, by which the characteristic twist or curl is given to them. Before, however, they are fit for market, they are exposed to the air for two or three days, and finally dried in iron pans over a slow fire. The chief difference in the preparation of genuine green tea is, that it has to be more quickly dried after undergoing the curling or twisting process in the hands, black tea being allowed to remain in heaps in a flaccid state, before the final drying or roasting, which, in itself, is much slower. A great deal, however, of the green tea consumed in this country, is artificially coloured by the Chinese, chiefly with Prussian blue, gypsum, and turmeric. Of course it is only inferior teas that are so treated, a good face being thus given to them. They can mostly be detected by placing a handful of the tea on a sheet of white paper; a thick, greenish dust will not only be left on the paper, but will rise every time the tea is shaken. By breaking a few leaves also with the finger nails this coloured tea will show a brownish fracture, while genuine uncoloured tea is more or less green throughout, and consequently little or no dust is deposited from it. As the leaves of true tea vary very much in size and form, adulteration with the leaves of some other plants is not so easily detected. The nearest approach, however, to the form of the true tea leaves are those of *Camellia sasangua*. This plant itself is a near botanical ally to the tea, and the leaves are moreover used by the Chinese for scenting many of their teas. Most other leaves which have been found as adulterants may be detected by their forms.

We give a figure of a leaf of true tea.

If a leaf of black tea be soaked in cold water, spread out, and inspected through a microscope of ordinary power, it will present the appearance shown in the cut, the older and larger leaves will be of a dullish green, and the younger ones of a light semi-transparent green. It will not serve us to examine the internal structure of the leaf, as it has many points in common with other leaves, and would moreover require minute examination. The best black tea, then, should present the appearances above indicated, and the same may be said of green tea, with this exception, that after being soaked it is of a paler green colour than the former.

Amongst the commercial varieties of tea the following are the best known:—Congou: this constitutes the bulk of black tea from China. It is that which is usually sold as black tea, and of course varies much in price according to its purity; a really good tea of this description ought to be had at the present time at 2*s*. 6*d*. per lb.

Souchong and Pekoe are both finer kinds of black, and fetch higher prices. Another kind of black called Orange Pekoe may be known by its long, wiry leaves, which are mostly genuine; it is artificially scented, and is generally used by grocers for mixing with inferior kinds. A fine Pekoe, however, ought to be obtained for about 4*s*. per lb.

Caper is a common black tea, artificially scented; the leaf as we see it in commerce has the form of the Gunpowder leaf, but these are made up of tea-dust and other matters agglutinated.

Amongst green teas, genuine Gunpowder is the finest; the qualities and prices however vary very much; the leaves of the best are in fine, close curls, and are the

younger ones gathered from the tops of the plants. The lower qualities of this tea are almost all coloured artificially, and many contain no perfect or whole leaf at all, but are made up of broken tea-leaves ; 4*s.* 6*d.* per lb. may be considered a fair price for a good quality Gunpowder tea. In Hyson the leaf is longer than Gunpowder ; it is mostly composed of the true leaf, but is very frequently artificially coloured.

Oolong is really a green tea, but with so black an appearance that its colour is only developed by putting it in hot water. It is artificially scented, and is used for mixing with other kinds of tea.

The cultivation of tea in Assam has sent several good kinds into our markets, the Congou, Souchong, and Flowery Pekoe of these plantations being, as hitherto imported, all genuine teas. We regret, however, to see that in the course of the past few weeks a quantity of artificially coloured green tea has been imported from the Indian plantations. Many of the Assam teas have a fine malty flavour, which is so much esteemed that it is frequently imitated and imparted to other teas in London.

A great deal that has been said and written for many years past on the subject of adulteration of food we are bound to admit as truth, but, on the other hand, there has

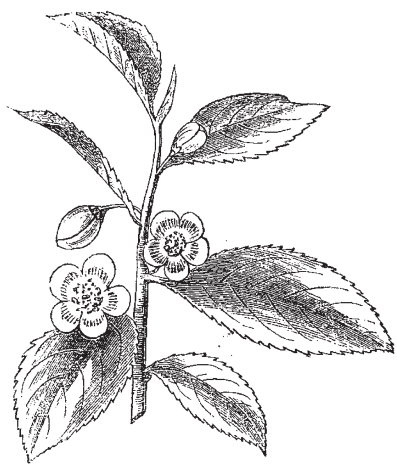

FIG. 1.—Tea (*Thea chinensis*, L.)

been some exaggeration. With regard to tea, the great demand amongst all classes has led to a very keen competition, not only amongst retail dealers, but also amongst importers themselves. The system of mixing inferior articles with those of better quality must not be wholly laid to the charge of the British tradesman or merchant, for the natives of the several countries producing the various commercial products, practise a great amount of deception. The importation of several chests of such rubbish as the "fine Moning Congou," about which so much talk was made a few weeks since, as well as the numerous cargoes of "tea-dust," a sample of which is now before us, composed of small fragments of various kinds of vegetable matter and other substances, with little or no tea, are proofs that others than the retail dealers are the most culpable. We are ashamed to own that in many instances this system of deception has been taught the natives by our own countrymen ; but such is not always the case, and other articles besides tea, as we shall have occasion to show in the course of these papers, are equally subject to native adulteration. A system of manufacture of spurious tea, called "Lie Tea," is openly known to exist in China, and was at one time profitably carried on in England. It consisted in converting the leaves of numerous plants into imitation tea for the purposes of adulteration. Though teas of varied qualities are imported from China, those of the very finest kinds seldom leave the country, except a small quantity which is carried overland to Russia, where they sell for as much as 50*s.* per lb., and the same price is even paid by the princes and mandarins of China in the very country where the tea is produced. It is said that these fine teas would deteriorate in quality in such a journey as that from China to England. A fine variety of Assam tea called Flowery Pekoe, is now chiefly imported for the Russian trade, very little of it being sold in this country. It is worth about 7*s.* 6*d.* per lb., consequently there is little demand for it. Though the Russians boast, and with good reason, of the quality of their tea, a vast quantity of rubbish is sent to that country from China for consumption by the poorer classes. This is known as Brick Tea, and is frequently made up of the sweepings of the manufactories and warehouses mixed with bullock's blood and other refuse, and compressed into hard cakes or bricks ; for use it has to be boiled. In some parts of India the natives use a similar kind of brick tea, making, instead of a clear infusion, a thick kind of drink more like soup.

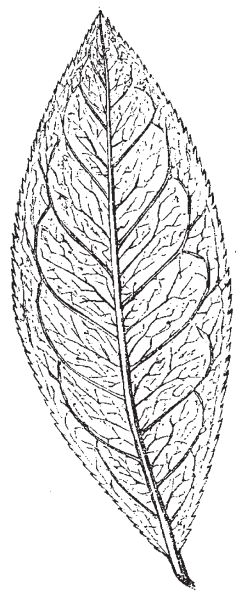

FIG. 2.—Leaf of the Tea Plant—natural size of a full-grown leaf.

Tea contains an active principle called "theine" and a volatile oil, it also contains about fifteen per cent. of gluten or nutritive matter, and about twenty-five per cent. of tannin or astringent matter. The effect of theine upon the human system is to excite the brain to greater activity, but whether or not it soothes the vascular system by preventing the rapid waste of the body, is a point upon which physiologists are not quite agreed. Theine, however, if taken in excessive quantities produces tremblings, irritability, and wandering thoughts, it has been recommended that when these symptoms show themselves, cocoa should be used as a beverage for a few days. The volatile oil is narcotic and intoxicating ; it is to this oil that the flavour and odour of tea are due, it is of course present in larger quantities in new teas than in old, therefore the fresher the teas are the fuller is their flavour and odour, consequently no kind of tea improves by being kept exposed to the air or even in paper, so that tea weighed at the time of purchase should be preferred to that sold in packets, the buyers of such tea having to risk the length of time it has been packed ; and, moreover, the teas themselves are usually of an inferior description.

Since writing the above, I have had two samples of green tea sent me which have been offered for sale in London during the past week. One sample is composed of nearly or quite half its weight of the young fruits of the tea-plant about the size of small peas, the remainder being made up of broken tea-leaves agglutinated and rolled together, and enclosing fragments of various matters, mineral as well as vegetable, which, of course, are included for the purpose of increasing its weight and bulk. The other sample consists principally of leaf stalks, a few leaves, rice husks, and the pappus fruits of some Compositæ. Truth compels me to say that all the leaves I have examined out of these samples have been leaves of the true tea-plant, or rather fragments of such, but all artificially coloured, and so superficial is the colouring that it can be easily wiped off with the dry finger. These teas have been offered for sale, one at 1½*d.* and the other at 1½*d.* per lb., the duty paid on them being equal to that charged on the best teas—namely, 6*d.* per lb.

This class of tea can, of course, only find a sale amongst unscrupulous tradesmen, who buy it to mix with good teas, and where a comparatively small proportion of this rubbish is mixed with a large quantity of good tea, but yet in sufficient bulk to increase the tradesman's profits, it is difficult for the purchaser to detect a few hundred or more such leaves in the thousands which go to form a pound of tea. It is high time there was some regular system of examination of such articles directly they come into port.

J. R. JACKSON

NOTES

PROFESSOR HELMHOLTZ has left Heidelberg for Berlin, to occupy the position left vacant by the death of Magnus, but with the title of Professor of Physiology.

AT the meeting of the French Academy on the 4th inst., Professor Brandt was elected a correspondent of the section of Anatomy and Zoology. In the final election he received twenty-two votes out of thirty-eight, the remaining sixteen being in favour of Mr. Darwin. In the first ballot Professor Huxley received three votes, and M. Loven one.

ONE of the improvements in the management of the Hunterian Museum of the Royal College of Surgeons, introduced by the present Conservator, has been the publication of an annual report of the progress and condition of the collection, and the exhibition in the theatre of the College, of the specimens that have been added to the Museum during each twelvemonth. As the College year ends at Midsummer, this exhibition has just taken place, and has enabled those interested in the Museum to judge of the nature and value of the additions, and the mode in which they have been prepared. The new specimens include fifty-five specimens of pathological anatomy, one hundred and eleven of normal human and comparative anatomy; the latter chiefly prepared from animals which have died in the Zoological Society's Garden, and a considerable series of skeletons and skulls. We propose to refer more fully to Professor Flower's Report on a future occasion.

THE naturalists of Switzerland have decided to form a scientific congress devoted to the study of the natural phenomena of the Swiss Alps, to include the geologists and palæontologists of France, Germany, and Italy, who have paid special attention to this subject, to be held in Geneva on the 31st of August and 1st and 2nd of September, and to be called the Congress of Alpine Geologists. Among the promoters of the congress are Prof. Studer, of Berne; Prof. Mérian, of Bâle; Prof. Escher de la Linth, of Zürich; Prof. Desor, of Neuchâtel; Prof. Favre, of Geneva; Profs. de Loriol, Heer, and Mousson, of Zürich; Prof. Rütimeyer, of Bâle; Prof. Renevier, of Lausanne; Profs. Vogt and Pictet, of Geneva. A committee for the organisation of the congress has been formed at Geneva, with M. Pictet as president, M. Alphonse Favre as vice-president, and MM. Ernest Favre and E. Sarazin as secretaries. All geologists interested in the subject are invited to be at the president's reception on the evening of August 30th, and anyone wishing to communicate any address or paper is requested to write to M. Ernest Favre, 6, Rue des Granges, Geneva.

WE are pleased to hear that the Government of Demerara has re-considered its resolution for discontinuing the geological survey of that colony, and has now resolved to complete it, under the direction of Mr. Charles B. Brown, an associate of the Royal School of Mines.

A SPECIAL extra meeting of the Syro-Egyptian Society of London will be held on Tuesday, July 19, at half-past seven P.M., for the exhibition of a collection of drawings of Egyptian antiquities, by the late R. Hay, F. Arundale, and C. Laver, Esqs. Messrs. Simpson and Bonomi will give explanations.

AT a meeting of the trustees of Owens College, Manchester, held on Thursday, the 7th inst., the vacancy caused by the resignation by Professor W. Jack, M.A. of the Natural Philosophy Professorship, was filled up by the appointment of Dr. Balfour Stewart, F.R.S., superintendent of the Kew Observatory, to the Senior Professorship, and of Mr. James Thomson Bottomley, M.A., F.C.S., Demonstrator and Lecturer in Natural Philosophy in King's College, London, to the Junior Professorship of Natural Philosophy. Dr. Stewart was also appointed Director of the Physical Laboratory which is about to be established in the college. We are informed that Mr. Bottomley has since withdrawn.

M. CLAUDE BERNARD has been elected a member of the Imperial Council of Public Instruction in France for the year 1869-70; M. Briot has been appointed Professor of Mathematical Physics and the calculus of probabilities in the Faculty of Sciences at Paris; and M. Emery, Professor of Geology, Mineralogy, and Botany in the Faculty of Sciences at Dijon.

THE annual public meeting of the Paris Academy of Sciences for the distribution of prizes and rewards, which should have been held in December last, was postponed till the present month, and is now again put off for some unexplained cause.

IT is with great pleasure we hear that the London Institution, in Finsbury Circus, has appointed Mr. John Cargill Brough to the post of Librarian. The library of this Institution is so valuable that it is fitting it should be under the care of a man who combines literary and scientific qualifications in so eminent a degree. It was right that an office once filled by such men as Maltby and Brayley, should have fallen into good hands.

WE understand that Dr. B. H. Paul has been appointed editor of the *Pharmaceutical Journal*, the new series of which we recently announced.

THE list of members of the Institution of Civil Engineers, corrected to July 1, 1870, contains the names and addresses of 16 honorary members, 702 members, 999 associates, and 177 students, making together 1,894 of all classes.

THE House of Commons decided on Friday last that the land belonging to the Thames Embankment shall be kept entirely free from building. The Natural History Museum will therefore occupy the ground already indicated by us on the space adjoining the Royal Horticultural Gardens.

Apropos of this subject, one of our daily contemporaries (and by no means the worst informed on scientific subjects) makes ludicrous blundering. While generously affirming that "any