Correspondence.

AN IMPROVED RHEOSTAT FOR INDUCED CURRENTS.

To the Editor of the Scientific American:

While residing on Staten Island, N. Y., I invented a simple rheostat for the Faradic current, the construction of which was published in the SCIENTIFIC AMERICAN on November 9, 1878.

When applying the Faradic current through this rheostat for therapeutical purposes, the seance has to be interrupted whenever a change in the strength of the current is required. My present rheostat obviates this, besides being still simpler than the other.

Directions for Making.—File the screws of four binding screws *lengthwise*, half way; put the filed, flat sides of two binding screws against each other, and tie or solder them together, thus obtaining two double binding screws, joined end to end.

The black line indicates the joining. Roll tightly a thick knitting needle three or four times around in thin writing paper, and glue or gum the paper while rolling. When dry, cover the paper with plumbago by using either stove blacking or a soft pencil. Slip the binding screws on the blackened needle, and the rheostat is ready. F. G. OEHME, M.D.

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Artificial Rubies.

Many visitors to the Paris exhibition of 1878 will remember an interesting collection of artificial rubies exhibited by M. Fremy. These had been obtained either by heating together at a high temperature a mixture of alumina and minium or a mixture of equal weights of alumina and barium fluoride, with a trace of potassium bichromate in each case to impart the rose color. As earthen crucibles had been used in the operation, it was then supposed that silica derived from them might have determined the crystallization of the alumina. This, however, has since been disproved in respect to the latter mixture, and numerous experiments made by M. Fremy in conjunction with M. Verneuil have demonstrated that nearly all the fluorides possess, to a remarkable degree, the property of determining at a red heat the crystallization of alumina (*Comptes Rend.*, civ., 738). Calcium fluoride, especially, appears to exercise over alumina an enormous power of mineralization; for when pure native calcium fluoride and pure alumina were calcined for some hours at a white heat in the same crucible, but separated by a platinum plate pierced with holes, the emanations from the fluorspar proved sufficient to cause the alumina to change its amorphous state and form a crystalline mass. In order, however, to prevent any "perturbation in the commerce of precious stones" being caused by this announcement, M. Fremy adds, in a foot note, that although the rubies obtained by this method are of fine color, good shape, very distinct in crystallization, and in every respect more beautiful than previous products, they are still small, and therefore without commercial importance.—*Pharm. Journal.*

The Origin of a Small Race of Turkeys.

In 1877 the author sent a number of wild turkeys to Santa Cruz Island, situated in the Pacific Ocean, about 20 miles off shore. The island is about 30 miles long, and five to ten wide, and contains no animals injurious to fowls excepting a small gray fox. The first season four hens raised 61 birds to maturity, which attained the size of the parents. The next year the produce was 120, of about the same size. These birds multiplied and lived perfectly wild in the forest, and in a few years it was observed that they had diminished very much in size, so that now it would be impossible to find a cock which would weigh over six pounds, which is less than one-third the size of their original ancestors, or the first and second island generations.

The author thinks this is undoubtedly a case of pretty close inbreeding, although he does not think the fact is conclusively established. These birds had an abundance of feed on the island, consisting of acorns, berries, insects, and grass, and have always been healthy and vigorous, with habit of flight about the same as that of the Eastern wild birds in their native haunts. The writer has introduced wild turkeys in various places on the Pacific slope north of San Francisco, which have been prolific and healthy, and attained the normal size.—*J. D. Caton, American Naturalist.*

The Vienna Papyri.

A recent number of the Vienna *Mittheilungen*, which communicates periodically the results of the examination of the papyri of the Archduke Rainer, contains a notice by Professor Bickell of a fragment of an ancient recension of a gospel. Professor Bickell regards it as a Greek translation from the Aramaic. A photographic facsimile of it is given, which is about 12 centimeters square and does not contain more than 100 Greek MS. symbols. It gives the words addressed by Christ to the Apostles after the last supper, as they are recorded in St. Matthew xxvi., 30 to 34, and St. Mark xiv., 26 to 30, but with notable variations. For instance, the words, "After I am risen, I will go before you into Galilee," do not appear in this fragment. The noted palæographist Wessely believes the fragment dates from the beginning of the third century. Professor Bickell recalls that Papias mentions, according to the testimony of St. John the Disciple, that St. Matthew wrote down in Aramaic a collection of Christ's discourses, and that this collection formed the groundwork of St. Mark's gospel. Hence he suggests that this fragment may really be a portion of a pre-canonical gospel. Professor J. Krall has discovered from five fragments of a papyrus on "Æsthetics" that the lost play entitled Scylla, hitherto attributed to Euripides, was in truth a dithyrambic poem by Timotheus, who flourished a century later. The editor himself, Professor Karabacek, states on the authority of one of these papyri that the earliest mention of the Turks by name must now be pushed back to 808 A.C. Hitherto the earliest date, as found in a MS. in the British Museum, at which the Turks appear in history was set down at 873 A.C.

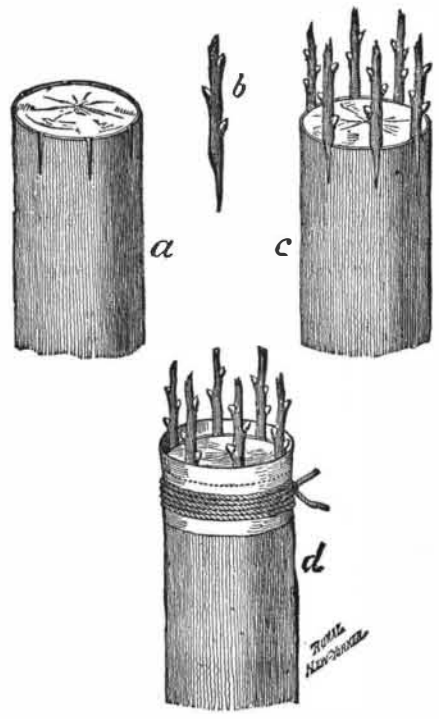
The Influence of Tea, Coffee, and Cocoa on Digestion.

Dr. James W. Fraser, in a recent number of the *Journal of Anatomy and Physiology*, has recorded the results of an interesting series of experiments on the action of our common beverages on stomachic and intestinal digestion. The experiments have been most carefully arranged from a physical standpoint, and give us some valuable hints on the digestion of the chief alimentary principles, but they have no bearing, it should be mentioned, on individual variations of human digestion, or on the influence of the various glands in preparing the gastric or intestinal juices. They are, however, of much value in showing how standard preparations of the peptic and pancreatic ferments are modified in action when our ordinary daily beverages are allowed their free action on the digestion of various articles of food. The digestive processes were carefully investigated, and absorption was imitated by a proper dialyzing arrangement. An artificial peptic juice, and afterward an artificial pancreatic juice, were employed, and the amount of nitrogenous matter dialyzed was most carefully estimated. The food stuffs experimented on were raw and cooked serum and egg albumens, raw and cooked myosin, syntonin, alkali albumen, casein, gluten, starch, and oleine. The results obtained from an exhaustive series of experiments and analyses show that all the three typical infused beverages—tea, coffee, and cocoa—retard the digestion and absorption of all the nitrogenized proximate principles of dietetic substances when peptic and pancreatic digestion are taken together, and that they uniformly retard peptic digestion, although tea may assist the diffusion of peptones from the stomach. Pancreatic digestion is also uniformly retarded, and diffusion thereafter is but rarely assisted, so that neither of them compares advantageously with water as a standard beverage for experimental investigations. A summary of dietetic advice is added to Dr. Fraser's observations, which will, in the main, agree with that which is now given by our best authorities in cases of dyspepsia; and we are glad that experimental inquiries afford so strong a basis of support to empirical clinical observations:

"1. That it is better not to eat most albuminoid food stuffs at the same time as infused beverages are taken, for it has been shown that their digestion will in most cases be retarded, though there are possibly exceptions. Absorption may be rendered more rapid, but there is a loss of nutritive substance. On the other hand, the digestion of starchy food appears to be assisted by tea and coffee; and gluten, the albuminoid of flour, has been seen to be the principle least retarded in digestion by tea, and it only comes third with cocoa, while coffee has apparently a much greater retarding action on it. From this it appears that bread is the natural accompaniment of tea and cocoa when used as the beverages at a meal. Perhaps the action of coffee is the reason why, in this country, it is usually drunk alone or at breakfast, a meal which consists much of meat, and of meats (eggs and salt meats) which are not much retarded in digestion by coffee. 2. That eggs are the best form of animal food to be taken along with infused beverages, and that apparently they are best lightly boiled if tea, hard boiled if coffee or cocoa, is the beverage. 3. That the casein of the milk and cream taken with the beverages is probably absorbed in a large degree from the stomach. 4. That the butter used with bread undergoes digestion more slowly in presence of tea, but more quickly in presence of coffee or cocoa; that is, if the fats of butter are influenced in a similar way to oleine. 5. That the use of coffee or cocoa as excipients for cod-liver oil, etc., appears not only to depend on their pronounced tastes, but also on their action in assisting the digestion of fats."—*Lancet.*

HOW TO GRAFT OLD TREES.

The *Rural New-Yorker* says that the following is an easy and effective method of grafting old trees. By it the percentage of failure is reduced to a minimum, and branches at least six inches in diameter, and, in the case of pear trees, 75 years old, may be worked with assured success. Last year we mentioned the case of such a pear having been grafted two years before with the Kieffer, that gave a full crop last year fall. Saw off the branch at right angles to the stem to be grafted,



CROWN GRAFTING.

as shown by *a*. Then cut a clean slit in the bark through the wood, as shown—a slit the same as in budding. Separate the bark from the wood and insert the cion, *b*, one for each slit. The number of slits for each stock will be determined by its size. We will suppose the stock illustrated to be six inches in diameter, and that six cions are to be inserted. The stock after receiving the six cions is shown at *c*. Grafting wax is not needed. A thick paper may be wound about the top of the stock, extending about one inch *above* it and securely tied with strong twine, as shown at *d*. The space above the stock encircled by the inch of paper may then be filled to the top of the paper with a puddle of soil and water, made so thin that it can be readily poured from any suitable vessel. This mud protects the surface of the wood of the stock, and excludes the air from the insertions. It gives every advantage of wax without its objections. Of course, stocks of any size may be worked in this way. One, two, or any number of cions may be inserted, according to the size of the stock.

Geometrical Proportion.

Various problems have been based on the rapid increase of the last number in a series of geometrical proportion. A man offers to sell a horse for what a farthing will increase to if multiplied by two, and the product doubled successively for every nail, twenty-four in all, in the horse's shoes. The twenty-fourth term of a geometrical proportion with a ratio of 2, and whose first term is unity, is 8,388,608. A pound sterling contains 960 farthings, so that the horse would cost over 873 pounds, or over $4,000. A cent treated as the basis for a similar calculation gives at the end of thirty days over five millions of dollars. We give below the series, numbering also each term. It will be noticed that the increase at first is slow. Thus eight days are needed before the amount increases so as to exceed a dollar. To find the sum of any number of terms, the last one must be multiplied by two and one must be subtracted from the product.

1	$0.01	16	$327.68
2	.02	17	655.36
3	.04	18	1,310.72
4	.08	19	2,621.44
5	.16	20	5,242.88
6	.32	21	10,485.76
7	.64	22	20,971.52
8	1.28	23	41,943.04
9	2.56	24	83,886.08
10	5.12	25	167,772.16
11	10.24	26	335,544.32
12	20.48	27	671,088.64
13	40.96	28	1,342,177.28
14	81.92	29	2,684,354.56
15	163.84	30	5,368,709.12