INVESTIGATION OF PURIFIED SILICEOUS EARTH.*

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The work embodied in this paper has been done at the request of Dr. H. V. Arny, with hopes that it might be of help to the Committee of Revision of the Pharmacopoeia in establishing new standards for this product in the next edition, or else deleting it entirely.

The first problem which presented itself was that of obtaining samples of the material. Personal letters were written to members of the Association residing in different parts of the country, requesting that they furnish the writer with samples obtained from as many different sources as possible. This brought out the fact that in many parts of the country it cannot be obtained and furthermore, when carried in stock, is not known, as a rule, by its official title, but is sold under the names "Kieselguhr" or "Infusorial Earth."

It could not be obtained in New Orleans, Cleveland or Richmond. Samples were ordered from two jobbers in New York with the result that one shipped "talc" and the other "kaolin." Only one wholesaler in Utah could furnish it and his product was bought ten years ago. Out of three wholesalers in Pittsburgh, only one could furnish it.

It might be of interest to note that the following question was asked recently in a State board examination: "Kieselguhr—give its official title, chemical composition, and uses." Out of the twenty-three candidates, twenty-one ignored the question entirely, one said it is a German name for "Carslbad salts," while the other stated that it is purified siliceous earth, but made no further comment.

An exhaustive search yielded nine samples, which came from the following cities: Philadelphia, Baltimore, Boston, Chicago (two samples), Pittsburgh, Detroit, New York, and Ogden, Utah. As one sample is a spurious product which consists of a mixture of siliceous earth and calcium carbonate it is eliminated, and not recorded in the results below.

ANALYTICAL DATA.

TABLE 1.

Sample	Fineness of powder.	Odor.	Loss on ignition.	Organic matter.	Carbonate in 1 Gm.	Sulphate in 1 Gm.	Iron in 0.05 Gm.
1	Very fine	None	4.8%	None	None	None	Present
2	Very fine	None	0.56%	None	None	None	Present
3	Very fine	None	10.00%	Present	None	None	Present
4	Gritty	None	11.30%	Present	None	None	Present
5	Very fine	None	8.60%	Trace	None	None	Present
6	Very fine	None	0.78%	None	None	None	Present
7	Gritty	Slight aromatic	4.0%	Trace	None	None	Present
8	Gritty	Sour milk	7.2%	Present	None	None	Present

TABLE 2.

Color of filtrate when 1 Gm. of sample is boiled with 25 cc dilute hydrochloric acid and filtered (should be colorless)

Number	1	2	3	4	5	6	7	8
Color	Slight yellow	Intense yellow	Intense yellow	Intense yellow	Intense yellow	Slight yellow	Intense yellow	Intense yellow

* Read before Scientific Section, A. Ph. A., New Orleans meeting, 1921.

TABLE 3.

Digest 1 Gm. of sample for 15 minutes with 20 cc dilute hydrochloric acid and filter; 10 cc of filtrate when evaporated to dryness and ignited should not leave a residue weighing more than 0.005 Gm.

Number	1	2	3	4	5	6	7	8
Residue	0.0043	0.0030	0.0042	0.0058	0.0070	0.0047	0.0037	0.0034

TABLE 4.

Boil 10 Gm. of sample with 50 cc distilled water and filter. Filtrate should be colorless and neutral to litmus.

Number	1	2	3	4	5	6	7	8
Test	Turbid neutral	Turbid neutral	Turbid neutral	Slight yellow neutral	Turbid neutral	Turbid neutral	Turbid neutral	Colorless neutral

The turbidity in above filtrates is due to presence of colloidal silica, which even passes through doubled quantitative filter papers.

SUMMARY.

Not one of the samples submitted conforms to the requirements of the United States Pharmacopoeia.

One sample is too highly adulterated to justify consideration and is not included in this report.

Each sample contains more than twenty times the quantity of iron permitted by the U. S. P.

Five samples (Nos. 3, 4, 5, 7 and 8) show darkening on ignition (organic matter).

When one Gm. of sample is boiled with dilute hydrochloric acid and filtered the filtrate is yellow in each case, showing excess of iron.

In two samples (Nos. 4 and 5) the matter soluble in dilute hydrochloric acid exceeds that permitted by the U. S. P.

Six samples (Nos. 1, 2, 3, 5, 6 and 7) yield turbid filtrates after being shaken with water.

Three samples (Nos. 4, 7 and 8) are not fine powders but are gritty, due to the presence of a considerable quantity of sand.

Sample No. 8 has a foreign and disagreeable odor.

Sample No. 4 shows excessive loss on ignition.

CONCLUSIONS.

1. Purified siliceous earth is a rare product and cannot be obtained at the present time from our wholesale druggists.

2. While in a few isolated cases it may be supplied by them, it is of inferior quality and not suitable for use as a filtering medium, due to the fact that it contains an excess of iron and also colloidal silica, the latter of which produces turbid filtrates—thus defeating the purpose for which it is used.

3. Its use as a filtering medium is not compulsory, since the Pharmacopoeia merely states that it *may* be used to replace talc in preparing the official waters.

4. For reasons given, the writer does not believe this product to be deserving of recognition in the next revision of the Pharmacopoeia, and respectfully recommends to the Committee of Revision that it be deleted.

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