THE HERAPATHITE TEST FOR QUININE.*

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The so-called herapathite test for quinine, described by Herapath,[1] has long been recognized and described in textbooks on organic chemistry. When using this method for the identification of quinine in some tablets containing quinine sulphate, it became evident to the authors that the method of procedure as outlined could be simplified. The results obtained with their modified method have shown that the separation of the alkaloid from the tablet or pill is not necessary to obtain a crystalline precipitate characteristic of quinine.

The reagents employed, which were those recommended by Herapath, consisted of Solution A, composed of 12 Cc. of acetic acid, 4 Cc. of 95% alcohol, and 6 drops of a 10% solution of sulphuric acid, and Solution B, a 10% alcoholic solution of iodine. The technique used in making the test, modified in that the reagents were applied directly to the tablet or pill to be tested, rather than to the isolated alkaloid or its salt, was as follows:

Powder and place upon a microscopic slide a small portion of the tablet, a piece as large as the head of a pin being sufficient, and cover with a coverglass. Then add enough of Solution A to partly fill the space beneath the coverglass, and, from the opposite side of the coverglass, a drop or two of Solution B.

Rosettes of olive-green, cinnamon-brown, or bluish crystals immediately make their appearance in the preparation when examined under the microscope at about 90 magnification. This crystalline precipitate has been called "herapathite" after its discoverer and is known also as the "iodo-sulfate of quinine" or "sulfate of iodo-quinine" (Fig. 1). Single crystals, many of which appear as right-angled parallelograms and six-sided prisms, are present as well (Fig. 2).

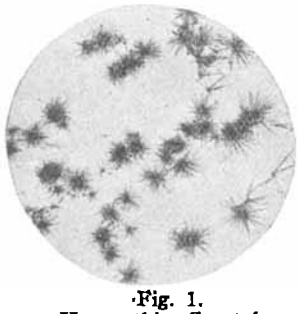

Fig. 1.
Herapathite Crystals.
(× 120.)

Fig. 2.
Herapathite Crystals.
(Illustrating Single Crystals.)

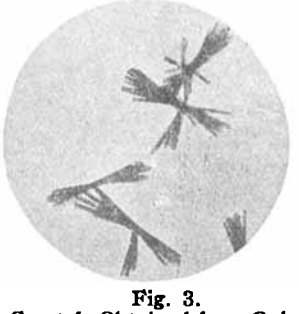

Fig. 3.
Crystals Obtained from Quinidine. (× 120.)

In order to determine what influence, if any, was exerted on the modified test by the presence of additional ingredients, tablets and pills containing substances other than quinine or its compounds were tested. The composition of the tablets

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[1] *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, 3, 161–183, 1852; 6, 171–175, 1853.

employed for this purpose, according to the labels, was as follows:

No. 1:	Acetanilid	2 grains		Ammonium salicylate	2 grains
	Quinine sulphate	1 grain		Quinine hydrobromide	1 grain
No. 2:	Camphor	1/2 grain		Tinct. Gelsemium	1 minim
	Fldext. Belladonna	1/4 minim		Camphor	1/4 grain
	Quinine sulphate	1/2 grain	No. 10:	Ferric chloride	1/2 grain
No. 3:	Quinine hydrobromide	1 grain		Quinine hydrochloride	1 grain
	Acetanilid	1 grain		Arsenic chloride	1/64 grain
	Aloin	1/10 grain		Mercuric chloride	1/48 grain
	Podophyllin	1/20 grain	No. 11:	Reduced iron	1/2 grain
	Gelsemide	1/50 grain		Arsenious acid	1/100 mgr.
No. 4:	Acetanilid	2 grains		Strychnine sulphate	1/200 grain
	Morphine sulphate	1/20 grain		Quinine sulphate	1/2 grain
	Quinine sulphate	2 grains	No. 12:	Quinine hydrobromide	
	Caffeine, pure	1/2 grain		Podophyllin	
No. 5:	Quinine	2 grains		Aloin	
	Ext. Aconite leaves	1/2 grain		Atropine sulphate	
	Morphine sulphate	1/20 grain		Strychnine sulphate	
	Arsenious acid	1/20 grain	No. 13:	Phenacetin	
	Strychnine	1/30 grain		Opium	
No. 6:	Quinine sulphate	2 grains		(Phene-sal)	
	Acetanilid	2 grains		Dover's powder	
	Morphine sulphate	1/8 grain		Quinine sulphate	
No. 7:	Camphor	1/4 grain		Atropine sulphate	
	Fldext. Belladonna	1/8 minim		Aloin	
	Quinine sulphate	1/4 grain		Camphor	
No. 8:	Acetphenetidin	2½ grains		Strychnine sulphate	
	Quinine sulphate	2½ grains	No. 14:	Quinine tannate (powder)	
No. 9:	Acetphenetidin	1 grain	No. 15:	Quinine salicylate (powder)	

All of these samples gave the crystalline precipitate characteristic of quinine or its compounds when the test was applied as directed. In no case did the presence of other ingredients interfere with the reaction. The rosettes were clear-cut and easily discernible, particularly those obtained from Sample 4 (Fig. 1), single crystals (Fig. 2) being obtained from the reaction with Sample 13. When the other common cinchona alkaloids (cinchonine, cinchonidine and quinidine) were tested with these reagents, crystals were formed only with quinidine. These crystals, however, differed decidedly from those formed with quinine as they consisted of bundles of dark rods arranged characteristically (Fig. 3). The reaction is not a sensitive one and often crystals are obtained only with difficulty. Neither the powdered barks nor the tinctures of red cinchona and yellow cinchona gave crystalline precipitates when the reagents were applied.

The results of these tests demonstrated the simplicity with which the identity of quinine can be established without resorting to the technique required to obtain the alkaloid in a pure condition. The reagents are applied directly to the powdered material (tablet or pill), whereupon the crystalline precipitate is immediately formed. Such a simplified method of procedure should make the herapathite test more widely used than at present.