

profession, is, we may assume, two-fold in its nature. First, it would protect the public against incompetent and inefficient practitioners, and second, it would protect the qualified practitioner against the unjust and unfair competition of the unqualified practitioner.

If it is ever hoped to raise up a reliable and competent class of professional men who are capable of being a real help to the medical profession, the individual must have the protection of registration upon a plane high enough to actually protect him against the competition of unqualified men.

Elsewhere I have referred to the pharmacist of to-day as a commercial pharmacist and I should like to make clear, my idea of the distinction between the commercial pharmacist and the professional pharmacist. The commercial pharmacist practices a kind of pharmacy which is wholly independent of the medical profession, while the professional pharmacist practices a kind of pharmacy which is wholly dependent upon the medical profession. To be sure, these two kinds of pharmacy are hopelessly mixed in the drug store of to-day and, united with them, is a miscellaneous lot of retail merchandising, that bears no relation *whatsoever to any kind of pharmacy*. But the fundamental distinction between commercial and professional pharmacy, is their relationship to the profession of medicine. Whether professional pharmacy,—and that means the physicians' delegated work, and, practically, that means the prescription-business,—can ever be separated from the "hodgepodge" we now call the drug business, is a question, but it, undoubtedly, belongs with the rest of the physicians' delegated work, in the hands of a well-educated, well-equipped, competent, reliable man, who for lack of a better term, we may call a professional pharmacist.

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### ATROPA BELLADONNA.\*

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*History*.—Atropa Belladonna is the subject of many legends and how it came by its name is interesting to know. Atropa (Greek, Atropos) was the eldest sister of the Three Fates, who were worshipped by the ancient Greeks and were supposed to preside over accidents and events; to determine destiny; and the period of human life. Their names were Clotho, spinner of the thread of life; Lachesis, the second, who twisted it and under whose fingers it was made now strong, now weak:—

"Twist ye, twine ye! even so  
Mingle shades of joy and woe.  
Hope and fear, and peace, and strife,  
In the thread of human life."

Atropos, the third sister—"the inflexible," the fate that cannot be avoided—armed with a pair of shears remorselessly cut short the thread of life. Belladonna from the Latin (Bella) Handsome, (Donna) Lady—so named because Italian

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\* Read before the Cincinnati Branch A. Ph. A.

ladies used a cosmetic made from the berries, and the Spanish ladies used preparations made from this plant to dilate the pupils of their brilliant eyes.

In many parts of Southern and Central Europe and in some parts of Asia, flourishing in shady places, growing by old walls or thriving amongst rubbish heaps—may be found this herbaceous, perennial plant, of the Solanaceæ family, three to five feet high, known as the “deadly nightshade.” It has merited its ominous name from the dire effects it produces on any human being who ventures to eat any portion of it.

The wide-spread distribution of the plant made its properties known to the inhabitants of most countries, and although no definite mention of it can be traced in ancient literature it is reasonable to suppose that it was well known to ancient peoples. Theophrastus, the pupil and successor to Aristotle, describes under the name Mandragora, a plant closely resembling belladonna, and Dioscorides is said by some to mean the same herb in the plant he names Strychnos-manicos.

There can be no doubt that its poisonous properties were utilized in the good old days—though seldom referred to as a remedy. For the past two centuries it has been pretty regularly mentioned by all those who wrote comprehensively on medicine, and more or less used, but never so common until its usefulness in the examination and treatment of the eye, opened for it a new and important field. It has been a panacea among Homeopaths and a specific with the Eclectics since the foundation of their schools. In “regular medicine” belladonna has a more recent introduction, due to the well-known pharmacist, Mr. Peter Squire, of London, who about 1860 commended it as the basis of a useful liniment, for the relief of neuralgic pains. At the present time it is considered one of the most important items of our Materia Medica.

*Description:*—The plant flowers in June and July. In September its livid, purple, bellshaped, flower gives place to shining, purple black fruits or berries, luscious in appearance and sweet to the taste. These berries have been eaten by children while playing in fields and lanes and in most instances with most unfortunate results. All parts of the plant are active. The parts directed for use by the U. S. and Br. Pharmacopœia are the leaves and the root. Leaves should be collected when the plant is in flower, roots from plants three years old or more, collected in autumn. Leaves which have been kept long should not be used, as they undergo changes through absorption of atmospheric moisture, emitting ammonia and probably losing a portion of their nitrogenous matter.

Our U. S. P. directs us to use leaves of the following description: “Usually of a dull-brownish color, the leaves much wrinkled and matted together, frequently with the flowering tops intermixed; leaves from 6 to 20 cm. long; 4 to 12 cm. broad; broadly ovate; apex acute; margin entire; narrowed into the petiole; upper surface brownish-green, lower surface grayish-green; epidermis more or less papillose; particularly on the under side, odor distinctly narcotic, especially on moistening; taste somewhat bitter and acrid. The powder is characterized by few hairs and numerous, small arrow-shaped crystals of calcium oxalate. Leaves when assayed by the U. S. P. process should yield not less than 0.35% of mydriatic alkaloids. The dried roots of not less than 0.5% of mydriatic alkaloids.

Roots described as follows: Of cylindrical or somewhat tapering, longitudinally, wrinkled pieces 1 to 2.5 cm. thick, the bark somewhat incurved at the edges of roots, which have been split before drying; externally brownish-gray, dusty or mealy; outer layers of the periderm rather soft; frequently abraded and thus showing lighter patches; fractures nearly smooth, mealy and emitting a characteristic puff of dust; internally whitish; the older roots showing medullary rays near the bark; nearly inodorous; taste sweetish; afterwards bitterish and strongly acrid. Roots that are shrunken, spongy, dark-brown and free from starch should be rejected as also old woody roots and stem-remnants. Microscopical examinations of belladonna root shows bark rather thick, free from bast fibers, composed almost entirely of parenchymatous cells, more or less filled with starch grains and calcium oxalate raphides.

In various parts of Europe both the leaves and the root of belladonna are adulterated with the similar products of a *Phytolacca*, which has been variously supposed to be the *Phytolacca Decandra* of North America, which has become naturalized in Southern Europe. The leaves and general appearances resemble those of belladonna, but are to be recognized by their upper surfaces being without hairs and brighter than in the belladonna plant. The dried *phytolacca* root resembles superficially that of belladonna, but may readily be distinguished by the epidermis not being easily abraded with the finger nail. The histology of the root is characteristic, the raphides are acicular instead of being as in belladonna, sandy crystals, and the root itself is generally characterized by the alternating distinctly separate rings of wood and bast tissue.

Attention has been called to the species of *Scopola*, a genus connecting *atropa* and *hyoscyamus* as resembling belladonna. The rhizomes of the *Scopola Carniolic*a are very similar to the roots of belladonna, the bark, however, of the former is less thick. *Scopola Japonica* (Japanese Belladonna) was found to be similar to *Scopola Carniolic*a. This drug is official under *Scopola*.

*Active Principles*:—The active principles upon which the medicinal repute of belladonna depends are atropine and hyoscyamine-alkaloids possessing the same chemical formula ( $C_{17}.H_{23}.NO_3$ ), but differing somewhat in therapeutic properties. The close connection of the alkaloids suggest that it would be difficult to obtain one free from the presence of the other, and as a matter of fact, the official atropine allows a small amount of hyoscyamine. The melting points of these two alkaloids differ—the most reliable test, however, is dependent upon the fact that while a solution of hyoscyamine is capable of rotating the plane of polarisation of a ray of light to a considerable degree, pure atropine is optically inactive. Investigations undertaken at the request of the Schering manufactory to determine why the proportion of hyoscyamine and atropine in a root seems to vary with the method of working, reached the surprising conclusion that the optically active hyoscyamine can be changed into the optically inactive atropine under a variety of circumstances such as fusion, action of weak soda solution (even at ordinary temperature), and of ammonia. Other existing alkaloids of belladonna are belladonnine hyoscine and atropamine, besides the usual vegetable constituents, such as albumen, gums, etc., and a coloring principle named atrosin. Belladonna has been studied by Vanquelin and many chemists after him, but it was not until 1833

that atropine in a state of purity was isolated from it. This was accomplished simultaneously by Geiger and Hess, two German chemists, and Mein, a German pharmacist.

*Preparations:*—Pharmaceutical preparations of the leaves are Extract Belladonna and Tincture Belladonna. From the extract we prepare the U. S. P. plaster and ointment. The extract is also a constituent of Co. Laxative Pills, and of Podophyllum, Belladonna and Capsicum Pills. Of the root we have Fl. Ext. Belladonna and Belladonna Liniment. Other official products are Atropine, Atropine Sulphate, Oleate of Atropine and Homatropine Hydrobromide.

*Uses:*—Belladonna is one of the most useful agents in the materia medica, ranking high in its efficacy and its wide range of usefulness. The most important uses of atropine or belladonna are:— (1) In the form of a belladonna plaster or liniment atropine or belladonna, it is used to relieve pain on the area where it is applied. (2) As a cardiac and respiratory stimulant especially where immediate effects are desired. (3) As an antidote for morphine poisoning, and it is often given with morphine to avoid poisonous effects. (4) Atropine is used to dilate the pupil, so that the retina or background of the eye may be more easily examined and to prevent adhesions between the iris and lens, when the iris is inflamed. (5) Atropine is often given to check secretions, for example, profuse perspiration, etc.

*Symptoms of Overdoses:*—Symptoms of overdoses are dryness of the mouth and throat; redness and dryness of the skin, pulse and breathing rapid; pupils widely dilated; great restlessness, followed by delirium. The delirium is peculiarly wakeful, active and talkative, the excessive excitement is followed by a deep sleep, which gradually becomes deeper (stupor).

*Antidotes:*—As antidotes give evacuants (emetics and cathartics), tannic acid; keep body warm; give artificial respiration if the breathing is embarrassed. Give heart and respiratory stimulants, such as whisky, caffeine, strychnin, etc.

A recent writer on Materia Medica advises us *not* to give morphin, for while atropin is the antidote for morphin, the dangerous effects of atropin are due to the exhaustion of the breathing. If morphin is given in such cases, the breathing is only made slower. Morphin, therefore, is not an antidote for atropin, though atropin is an antidote for morphin.

*Cultivation:*—Having reviewed this most interesting plant, let us, but for a few moments consider its cultivation. Until recently the manufacture of belladonna preparations was carried on exclusively with wild plants, gathered in a somewhat haphazard fashion by herb collectors. When the scientific cultivation of medicinal herbs on a large scale was introduced, many critics declared that wild belladonna was superior in alkaloidal strength to that of the cultivated variety, but manufacturers at home and abroad, upon investigating, have shown that this fear is groundless, results showing that a plant of much greater alkaloidal strength than what our U. S. P. demands may be obtained.

Since belladonna is not an indigenous plant, present war conditions have opened our eyes, as to the future supply, and great necessity of home production or cultivation of this plant, and we are glad to note what is being done to conserve this wonderful drug. Pioneer among those who have introduced the scientific cultivation of belladonna in the U. S. are Johnson & Johnson of New Brunswick,

N. J. Their experiments have led the way to a higher grade of belladonna, to any that has heretofore been known. Their farms comprise fourteen acres, at the above-mentioned city, a fairly large one at Conshohacken, Pa., near Philadelphia, and forty acres at Salinas, Calif. The work of Johnson & Johnson in the culture of the belladonna plant, has aroused worldwide interest, and this interest is just now being revived. During the years which have passed extended experiments have been made as to the influence of soil, climate, fertility upon the plant and the yield of the alkaloid. The researches of Johnson & Johnson upon the cultivation of belladonna in the United States have been most varied and extensive, a considerable amount of which has been published for the benefit for all interested therein. Incidentally it might be mentioned that this work is enormously extensive and as yet they have not been able to supply their own demands. But they are glad to make their contribution to American materia medica, and they believe the experience they have gained by the contribution to the knowledge of such an important plant as belladonna will compensate them for their outlay. We hope that in the near future their efforts may be rewarded with an abundant supply of this drug so as to also make a financial success. By coöperation with other nations the U. S. Department of State, through its consulate service and the Department of Agriculture, through its Bureau of Plant Industry, bring out and put at our disposal much valuable information about the growing of foreign plants.

Among others the U. S. Department of Agriculture at the Arlington Experimental Farm, Virginia, is carrying on interesting work in regard to the breeding of plants, in order to obtain a type of belladonna plant, fairly constant in the yield of its alkaloids. Observation work is also carried on by Parke, Davis & Co. of Detroit, Mich., Eli Lilly & Co. of Indianapolis, Ind., and a firm of Glenolden, Pa.

Among the schools of pharmacy which have undertaken the cultivation of medicinal plants so as to facilitate and make more comprehensive the study of pharmacy and pharmacognosy, we would mention the Minneapolis College of Pharmacy and the Philadelphia College of Pharmacy.

We consider the appeal to pharmacists by Mr. Kilmer, in the October issue of the "Practical Druggist," should receive deep consideration where he says:—"It is the duty of the pharmacist to supply the materia medica needed for the alleviation of disease, and especially those which he can grow or otherwise produce for himself. If we could thus multiply and extend the cultivation of medicinal plants among the thousands of druggists in the United States, we would soon find ourselves independent of other sources of supply."

"Here, then, is our opportunity and our duty to protect and conserve the supply of drugs and medicines against existing influences and such as may come upon us in the future." In fulfilling our duty we will be able to supply ourselves with a quality of crude drugs which will yield for us the purest and best preparations.

*Bethesda Hospital, Cincinnati.*