

blowing hot and cold at the same time; with being a mere empiric; with departing from the simplicity of science, and much more to the same effect; yet, probably, such an objector would be very frequently guilty of the same kind of inconsistency as he criticised in others, for it is a curious and instructive circumstance that many of the great vegetable remedies, the value of which has been established by years or generations of the experience of thoughtful and observant medical men, contain such antagonistic principles. But a single name being given to the drug, its contradictory and compound nature is not thought of by those who prescribe it. To a few examples of this kind of natural poly-pharmacy I desire to draw attention; and if it can be established, as I believe it can be, that the effects produced by such a combination of opposite principles are good, that they are often much better than when either of the principles is given alone, there will be established a sufficient justification for the action of those who designedly introduce into prescriptions physiological antagonists, mixing them, however, in such proportion that the one shall moderate or control without entirely neutralising the activity of the other. The first example which I will adduce is that of jaborandi. The leaflets of this drug contain in addition to a volatile oil two absolutely antagonistic alkaloids, which, if they existed in such proportion that each could produce an equally powerful though opposite effect would exactly neutralise one another, and no result would follow. But the jaborine or atropine, a like alkaloid, is in so relatively small a proportion to the pilocarpine that it controls, but does not destroy, the effect of this latter.

That it does control that effect I am quite certain; and without any desire to be singular, or to effect a disagreement with men whose opinions are entitled to respect, I cannot help expressing my dissent from not a little of what is said and written concerning this drug. Thus, I find the following statement by a well-known authority:—"Jaborandi appears, however, to irritate the stomach, and often causes nausea and vomiting; and so does pilocarpine, though to a less extent, even when subcutaneously injected." My experience, which is large, would compel me completely to reverse the terms of this sentence by putting pilocarpine for jaborandi, and *vice versa*. So uniformly, indeed, did small doses (such, for example, as $\frac{1}{2}$ gr.) of pilocarpine nitrate cause vomiting when administered by the stomach, that years ago I omitted to employ it in that way, substituting for it jaborandi, as tincture or infusion because it could be generally given without causing emesis. I do not say that jaborandi will never cause sickness, but what I do say is that it causes it very much less frequently than does pilocarpine, and that just as we sometimes designedly introduce a small amount of atropine into our hypodermic doses of morphine with a view of preventing the nauseating effect of

the latter, even though atropine is to a certain extent a physiological antagonist of morphine, so nature in the case of jaborandi has effected the same kind of mixture of opposite alkaloids, I have sometimes had striking illustrations of the correctness of this statement.

In another respect the compound of opposites in this drug is superior to the pure alkaloid. It does not like that single alkaloid depress the heart. In the course of a celebrated criminal trial which took place in this city some years ago a medico-legal expert, who admitted that he knew next to nothing of medicine as a practical art, expressed the opinion that the smallest official dose of tincture of jaborandi, of which I had advised the administration to relieve a distressing dryness of the mouth, would probably depress the heart. This, however, is just what it will not do; the jaborine and the alcoholic vehicle more than counteracting the depressing effect which pilocarpine alone might cause either directly or indirectly, through provoking sickness and the admission that he had next to no knowledge of the practical effect of medicine seemed to me to be a perfectly needless one after such a statement.

Let me turn to another great drug in which a similar mixture of antagonistic principles is found. The British Pharmacopoeia contains digitalis in three forms: 1, the dried leaf; 2, the tincture; 3, the infusion. Now the leaf contains several distinct principles of which one digitonin is the direct physiological antagonist of the others. These last cause the small arteries as well as the cardiac ventricles to contract powerfully, and hence raise the blood pressure, while the first, if pure, will, like saponine with which it is nearly identical, cause them to dilate and the blood pressure to fall. But, owing to its much greater solubility in water than some of the others, there is a relatively larger proportion of digitonin in the infusion than in the tincture—at least such is said to be the case—and the contracting effect of digitalis and the other principles that resemble it, is more controlled and moderated by the infusion than by the tincture. If this is correct it may help to explain what practical experience seems to have long settled, viz., the superiority of the infusion over the tincture in the treatment of aortic regurgitation in which affection any undue amount of contraction of the smaller arteries would be a great disadvantage. In the case of digitalis, therefore, as in that of jaborandi, experience has established the fact that the blending of physiological opposites which nature has produced for us is superior to either of the things blended when given alone, although any such intentional blending on the part of the prescriber would probably be characterised as the worst form of polypharmacy. I will merely allude, in passing, to the fact that we have in physostigma such physiological opposites as physostigmine and calabarine, yet nobody objects on that account to using the extract. If, however, we turn to the