

the pupil and has an action on the heart, the salivary glands, the intestines, and the central nervous system; exactly like atropin, and which is found also, like it, to antagonize the action of muscarin. These authors point out that many commercial preparations of pilocarpin contain also jaborin, and the presence of this substance may explain the mydriatic effect of pilocarpin observed by Laborde and Fitzgerald, at the commencement of its action and after the sympathetic had been divided. It is evident that to furnish conclusive evidence that pilocarpin acts on both sets of nerves, their experiments must be repeated with a preparation of pilocarpin from which all jaborin has been removed. It is possible that jaborin may turn out to be actually identical with atropin or with hyoscyamin. Professor Ladenburg of Kiel has lately asserted that there are only two mydriatic alkaloids, atropin and hyoscyamin—daturin, duboisin, and hyoscyamin being not merely closely related but actually identical.—*Ibid.*

Identity of the Mydriatic Alkaloids.

Professor A. LADENBURG, of the University of Kiel, who has already made some important discoveries regarding the constitution and products of decomposition of alkaloids, has just published, in the *Berichte der Deutschen Chem. Gesellsch.*, vol. xiii., 1880, the results of further investigations on the solanaceous alkaloids, atropine, hyoscyamine, daturine, and duboisine. His experiments, which seem conclusive, show that hyoscyamine, daturine, and duboisine, are *identical* with each other, and not merely closely related; and that atropine and hyoscyamine, though not actually identical, are isomeric in composition. He concludes, therefore, that there occur in nature only two mydriatic alkaloids—namely, atropine and hyoscyamine.

In continuation of previous papers, giving the result of his investigations, Professor Ladenburg has announced (*ibid.*, 1880, 607) that he has succeeded in converting hyoscyamine into atropine.

When hyoscyamine is decomposed (with baryta or hydrochloric acid) it forms two new products which were heretofore denominated hyoscine and hyoscinic acid. Under similar conditions, atropine furnishes tropine and tropic acid. Ladenburg has now ascertained that both the acids, hyoscinic and tropic, and the secondary alkaloids, hyoscine and tropine, are identical. The author prepared a considerable quantity of the hyoscine, not however, from hyoscyamine, but from the less costly daturine, the identity of which with hyoscyamine had previously been proven by him. Twenty grammes of commercial daturine yielded ten grammes of hyoscine. In all physical and chemical properties, the latter agreed with tropine prepared from atropine. The identity of the products of decomposition of two substances which are not themselves identical, was so remarkable a phenomenon that the author was induced to try whether he could not prepare the alkaloid atropine, not from tropine and tropic acid (as he had already done previously), but from the decomposition-products of the other alkaloid. For this purpose the following three sets of experiments were made.

1. Tropine from atropine, and hyoscinic acid from daturine, were treated on the water-bath with diluted hydrochloric acid.

2. Hyoscine from hyoscyamine, and tropic acid from atropine, were similarly treated.

3. Hyoscine from hyoscyamine, and hyoscinic acid from hyoscyamine, were treated in the same manner.

The produced alkaloids were precipitated by potassium carbonate, the precipitate dissolved by chloroform, and the latter evaporated. The residue was dissolved in diluted hydrochloric acid and precipitated with chloride of gold. This produced an oily salt, which soon solidified and which was recrystallized from

water. In all three cases the product turned out to be atropine-gold, recognized both by its characteristic colour and by its melting point.

Hence hyoscyamine may be converted into atropine, and, on decomposition, both of these alkaloids yield identical products.—*London Med. Record*, Oct. 15, 1880.

Antagonism between Opium and Belladonna.

In the first two lectures of the Cartwright course, Dr. ROBERTS BARTHOLOW considered the antagonism between opium and belladonna and submitted the following conclusions:—

Morphia and atropia are antagonistic in their effects on the cerebrum, and the result of the antagonism is to induce sopor; but this deepens into coma if the quantity used is larger, and hence the antagonism does not extend to lethal doses.

They are antagonistic in their action on the pupil (though this is not constant), and the effect of the atropia preponderates.

They are antagonistic in their action on the heart, but the effect of atropia is more powerful and prolonged.

They are antagonistic in their action on the respiration; morphia showing the respiratory movements and diminishing the excretion of carbonic acid, and atropia increasing the respiratory movements and the excretion of carbonic acid.

They are antagonistic in their action on the arterial tension; opium slowing the heart and paralyzing the arterioles, and atropia counteracting these effects.

Atropia prevents, to a large extent, and often completely, the depression, cold-sweating, and cerebral nausea caused by morphia.

Morphia and atropia are antagonistic in their action on the kidneys, the one diminishing and the other increasing the urinary discharge. They differ also in their action on the bladder, the one dulling the sensibility of the mucous membrane and impairing the vigour of the muscular coat of the viscus, and the other stimulating the sphincter. They are not, therefore, antagonistic in their effect on the bladder.

In therapeutics these antagonistic actions may be utilized to secure effects which cannot be obtained by the employment of either agent alone. The whole subject affords a beautiful example of the success of the methods employed by modern pharmacological research to improve our knowledge of the action of the oldest remedies, and to increase the safety, certainty, and range of their applications to the treatment of disease.—*Med. Record*, Nov. 27, 1880.

On the Subcutaneous Injection of Quinia.

The majority of practitioners agree with Liebreich that the hypodermic injection of quinine sulphate in any of the various forms in which it has been recommended is painful, whilst the results obtained are not sufficiently favourable to warrant its frequent employment. Professor KÖBNER, however, considers that the hydrochlorate of quinine is better suited for this purpose, not only on account of its greater solubility, but because it contains a larger proportion of the base than does the sulphate of quinine, whilst the solubility of the preparation is greater in pure glycerin than in water. Thus Professor Köbner has obtained no good results in cases of intermittent neuralgia and other affections for which quinine is usually prescribed, from the injection of 0.12–0.15 gram of quin. muriat. as are ordinarily obtained from the administration by the mouth of much larger doses (0.6–1.25), whilst the patients did not complain of any constitutional or gastric symptoms. The author gives the following as his formula for four injections: Quinin. hydrochlor. 0.5–1.0; glycerin., aa 2.0. Disp. sine acido.—*Practitioner*, Nov, 1880, from *Der Practische Arzt*, March, 1880.