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ACTION OF MERCURY ON THE LIVER.

BY

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THE valuable report of the Edinburgh Committee of the British Medical Association on the Action of Mercury on the Liver added very largely to our knowledge of the subject, without altogether settling a great many important questions concerning the therapeutics of the drug.*

Few physicians who have had any practical experience of the use of mercurial purgatives in cases of so-called "biliousness," will deny that their immediate effect is decidedly beneficial, although many may be deterred from employing them by the belief that, once begun, they must be continued, and will ultimately prove highly injurious to the patient.† The relief occasioned by a blue pill and a saline purgative is a matter of every-day observation; but the *modus operandi* of the mercury is a question on which much difference of opinion prevails, and any attempt to answer it must depend, to a considerable extent, on the view taken of the pathology of "biliousness." Do the dull, heavy, and languid feelings, the disinclination to exertion, mental or bodily, the irritable or peevish temper, the failing appetite, the muddy complexion, and dingy conjunctiva, which most persons know, alas! too well, owe their origin to catarrhal changes in the gastric and intestinal mucous membrane alone? or is popular pathology partly right in ascribing them to "bile in the blood" or a "sluggish liver"? For our part, we are inclined to hold the latter opinion, and to believe that not without reason are the disappearance from the eyes of the yellowish tinge

* 'Report of the British Association,' 1868, p. 187; and 'Brit. Med. Journ.,' 1868, vol. ii, pp. 78 and 176, and 1869, vol. i, p. 411.

† Prout, 'Stomach and Renal Diseases,' 5th ed., p. 52.

which seems as if it only required to be somewhat deepened to become jaundice, and the coincident appearance of bile in the stools after a mercurial purgative, pointed to as proofs that too much bile in the blood is (partly at least) the cause of biliousness, since with its removal from the system the symptoms disappear. So long as it was supposed that bile was formed in the blood, and only separated from it by the liver, such a view as this might meet with ready acceptance; but how are we to reconcile it with the doctrine of most physiologists, that bile is not separated from the blood by the liver, but is formed within that organ itself? Fortunately this is not difficult, for Schiff has shown that we have been latterly accustomed to take too narrow a view of the functions of the liver, and that it separates bile from the blood, or, as we may term it, excretes, as well as forms or secretes it.* This he did by tying the ductus choledochus in dogs, and putting a cannula into the gall-bladder, so that he could collect the whole of the bile secreted by the liver. Immediately after the operation, the flow of bile was abundant, but in the course of half an hour it became greatly diminished, and remained so, never again reaching the amount at first observed. This curious result Schiff found to be due to the bile being all removed from the body by the cannula, instead of passing, as it normally does, into the duodenum, whence it is reabsorbed into the blood, and again excreted by the liver. In the first half hour after the fistula was made, the liver was excreting as well as forming bile, and so more flowed from it than in any subsequent period when it was only forming it.

Whenever Schiff introduced bile into the blood, either by injecting it directly into the veins, or putting it into the duodenum, stomach, or areolar tissue, the flow of bile from the liver was at once increased, but again diminished when the additional bile had been excreted. By another series of experiments, he also found that not only can a certain quantity of bile be present in the blood without producing jaundice, but that it probably is always present. We thus see that, normally, a great part of the bile goes round in a

* 'Pflüger's Archiv,' 1870, p. 598, and Lussana, 'Lo Sperimentale,' tom. xxix, 1872, p. 337.

circle, from the liver into the duodenum, thence into the blood, so to the liver again, while another part is carried down by the contents of the intestine, and, after becoming more or less altered, passes out of the body with the fæces.

Let us now consider what the result will be if the quantity of bile circulating in this way should be increased. All observers are agreed that abundant food increases the secretion of bile; and we will suppose that this has been done by continued good living and a succession of heavy dinners, such as most Englishmen are accustomed to indulge in at Christmas time. The stomach and intestines, in all probability, also become disordered, and it would be hard to say what part of the condition in which the patient then finds himself is to be assigned to them and what to the bile; but this we can readily see, that all the symptoms that an excess of bile in the blood can produce, short of jaundice, will be occasioned; nor can these be removed by any purgative medicine, which, like aloes, will merely act on the large intestine. The colon may be cleared of its contents, but the bile will go on undisturbed in its accustomed round. Very different, however, will be the result if a purgative be administered which will act on the duodenum, as we will assume mercury to do, more especially if it be combined with such a one as sulphate of magnesia, which will act on the rest of the bowels. The mercury stimulates the duodenum to peristaltic contraction, the bile is hurried rapidly downwards, the remainder of the intestine is likewise contracting vigorously, and in a short time all chance of reabsorption is gone, for the bile has been finally evacuated. All excess of bile has thus been got rid of, and, as far as it is concerned, the liver, duodenum, and other organs may now go on performing their functions in the normal way, until some fresh indiscretion on the part of the patient again causes a disturbance.

In the account we have just given of the action of a mercurial purgative, we have assumed that it acts on the duodenum. Now, this we cannot at present directly prove; but we have the indirect proof afforded by the fact, observed by Radziejewski,* that leucine and tyrosine, which are

* 'Reichert u. Du Bois Reymond's Archiv,' 1870, p. 1.

products of pancreatic digestion, appear in the *faeces* after the administration of mercurials, as well as that yielded by the large evacuations of bile which calomel produces, and which, as Buchheim has shown,* really give their characteristic green colour to the so-called "calomel stools." By thus causing elimination of bile, and lessening the amount circulating in the blood, calomel acts as a true cholagogue, in the sense in which the word was employed by those physicians who looked upon the liver merely as an excreting organ, although, as modern experimenters have proved, it may lessen the amount actually secreted. This it may do in a double fashion, for not only does it diminish the quantity which has to be excreted by the liver in the manner already explained, but, as the Edinburgh Committee of the British Medical Association have shown, it likewise lessens the formation of bile.† In their experiments, the diminished secretion which followed mercurial purgation could not be due to the prevention of reabsorption, for the whole of the bile was regularly removed from the body as quickly as it was secreted, and we are, therefore, obliged to attribute it to diminished formation. What the cause of this may be, we are not, at present in a position confidently to state; but we know that fasting lessens the formation of bile, and if the food be hurried out of the intestine by a purgative before it has time to be absorbed, it might just as well not have been eaten at all.

We have now seen how an excess of bile may be present in the blood without the liver being either "sluggish" or torpid; and it seems to us, that the difference of opinion which has hitherto prevailed regarding the action of mercurials is in great measure due to attention having been directed to the amount of bile poured out from the liver, instead of to what is of much more importance in reference to the "biliousness"—viz., the quantity which remains in the blood after a dose of blue pill or calomel.

* Buchheim, 'Arzneimittellehre,' p. 262.

† See also Scott, 'Archives of Medicine,' No. III, p. 224, and Mosler, 'Virch. Arch.,' xiii, p. 41.