On the 13th, he was ordered Calabar bean, and powdered rhubarb, of each three grains, every hour. On the 14th, three grains of calomel and ten of rhubarb were added to the powder, the bowels being confined. On the 15th, he had a violent attack of spasm, the eyes being fixed, the face livid, and respiration almost suspended. He was restored by artificial respiration. On the 16th, a grain of Calabar bean powder was ordered every half hour. He took four doses, and then felt faint. In spite of the faintness, chloroform was given with advantage, and twenty grains of hydrate of chloral were injected into the rectum. On the 20th, another attack, almost fatal, was relieved by artificial respiration with the simultaneous administration of chloroform; hydrate of chloral being at the same time injected into the rectum. On April 2nd, ten minims of tincture of cannabis Indica were ordered to be given every four hours. On the 4th, the Indian hemp was omitted. This quantity of chloral was increased to two scruples. On the 19th, the spasms were still severe. From this time they gradually ceased, and by the 29th were scarcely perceptible. On May 15th, he was allowed to leave his bed, having been nine weeks under treatment. The objects aimed at in the treatment were perfect rest and the avoidance of every source of irritation. The food was given of such a nature as could be easily digested without mastication. The injured fingers were soothed by an anodyne poultice. The Calabar bean and Indian hemp did not appear to do good. The hydrate of chloral given by the mouth and by the rectum, although it did not always prevent spasm, yet caused sleep, and thus powerfully aided in the patient's restoration to health. The relief of the spasms of the muscles of respiration afforded by the chloroform, with artificial respiration, Mr. May says is especially worthy of note; and in that opinion I believe we shall all concur; for, had not such relief been afforded, and the respiration thus enabled to go on, it is quite certain that the patient must have died; as it was, his life was spared to treatment deserving the highest praise, and reflecting the greatest credit upon those who had the care of him.

I have thus brought my little work to a conclusion, and for all its imperfections I must again ask your kind indulgence.

ON THE SHOULDER-TIP PAIN, AND OTHER SYMPATHETIC PAINS, IN DISEASES OF THE LIVER.*

By DENNIS EMBLETON, M.D., F.R.C.P.,

Member of the General Medical Council; Lecturer on the Practice of Physic
in the College of Medicine; Physician to the Infirmary,
Newcastle-upon-Tyne; etc.

III.

If we can argue analogically from the other pneumogastric organs, we should conclude that the liver-branches of the par vagum are guided, by the blood-vessels enveloped in the capsule of Glisson, to the acini of the organ, ramifying within and around these, and that they are destined to the bile-ducts and their continuations down to the transverse fissures and to the duodenum. We know already that the gall-bladder and cystic duct are provided with plexuses proper to themselves from these and the sympathetic nerves.

Now, the system of bile-ducts constitutes the essential secreting portion, so to speak, of the liver, as the bronchi and air-cells do of the lungs; the mucous membrane, with its gastric glands, of the stomach; and the lining membrane and muscles of the heart—and these are the parts, in these several organs, to which their pneumogastric nerves are distributed. But to prove or to disprove that the hepatic twigs are really given to the system of bile-ducts, and the sympathetic twigs to the blood-vessels, a more minute and correct anatomy is wanted.

In the absence, however, of satisfactory anatomical information as to the symmetrical arrangement of the hepatic nerves of the par vagum in reference to the right and left lobes, it may not, perhaps, be unreasonable to conjecture that the right vagus supplies mainly the right, and the left vagus mainly the left lobe. For the liver, at an early period of foetal life, is a symmetrical organ, the two lobes being equal, and more equally disposed on each side of the median line of the body than they afterwards are. (Quain's *Anatomy*, 7th Edition, vol. ii, p. 879.) Thus, this organ resembles the other members of the pneumogastric series—the pharynx and larynx, the trachea and lungs, the heart, the stomach, the kidneys, etc.—and these are all supplied mainly on their right side by the right, and on their left by the left pneumogastric. It is well understood that branches are interchanged from side to side; but a symmetrical arrangement of the nerves corresponds, on the whole, to

the symmetrical form of the organs. Is it likely, I would ask, that the liver will be an exception to this rule? I find no reason to think that it will prove so to be, since it contains, in its complicated structure, like the other organs of the pneumogastric series, canals of mucous membrane—surfaces of impression, surrounded by walls of muscular fibre, for motor purposes, viz., in the ductus communis choledochus, the hepatic and cystic ducts, and the gall-bladder. Again, the blood-vessels, the portal veins, and hepatic arteries, the lymphatics and the hepatic ducts, are all so far symmetrically arranged as the differing size of the two great lobes will admit; and no doubt the nerves are subjected to the same arrangement.

Further, analogy as to disposition of parts, structure, and distribution of their nerves in the other members of the series, is in favour of the above conjecture, which receives strength also from the pathological observations of John Hunter, Sir Thos. Watson, and others, viz., that it is the right shoulder that is pained when the right lobe of the liver is diseased, and the left shoulder when the left lobe is affected. These observations clearly imply that the lobes and the nerves of the liver are symmetrically correspondent. There is a want of anatomical proof, I am aware, but how is this proof attainable? Observations and facts are wanting; and fresh investigations by competent anatomists are urgently called for in this very difficult field of labour.

From what has been adduced, the conclusion is drawn that the true path of sympathy from a diseased liver to a pained shoulder lies along the lines of the pneumogastric and the two divisions of the spinal accessory nerves.

In a case of hepatitis ending in abscess of the liver, the nerves, along with the other components of the organ, necessarily become irritated, inflamed, and in part destroyed. The result naturally to be expected will be, *inter alia*, pain in the liver, but, as we know, though we cannot account for the fact, the symptoms are often latent, or not observed; when, however, this latency does not exist, as the disease progresses the disturbance of the nerves tends to spread more or less intensely and rapidly to the hepatic plexuses and the nerves that supply them, whether sympathetic or pneumogastric; the great sympathetic ganglia behind the stomach will receive the influence and transmit it to their offsets, or some of them, and these to the viscera supplied by them, hence the epigastric and other abdominal symptoms. The splanchnic and other spinal nerves will carry the influence to the dorsal and lumbar part of the spine; hence the pains in the walls of the chest, the loin, hip, and thigh.

The diaphragm will suffer more or less by contact with the inflamed organ, and through the irritation carried to it along the phrenic twigs of the liver; and so the influence may pass up the trunk of the phrenic nerve to the brachial, and even the cervical plexus, and thus the subclavian nerve and others may be affected, which may account for pain about the clavicle, and partly for that in the side of the neck, and even in the arm. But it is not difficult to conceive that the inflammation or irritation will travel at least as readily along the nerves of the pneumogastric system as along those of the sympathetic or spinal systems, and that it will easily be propagated to the trunk of the vagus on the cesophagus from the gastro-hepatic branches, and pass up the chest; and if the hypothesis of the right vagus going to the right lobe of the liver be correct, then, in the case of the hepatitis and abscess being in the right lobe, the right vagus trunk will suffer more than the left, the nerve-irritation running up higher and higher, till the cardiac, pulmonary, laryngeal, and pharyngeal nerves are reached, and eventually the base of the skull and the side of the medulla oblongata and spinal cord, whence the par vagum and spinal accessory take their origin. Hence, we might expect, and do actually find, pain running up the inside of the chest, dyspnoea, and cough, palpitation of the heart, throat-affections and thirst, cephalalgia, vertigo, etc.

Again, we know that the internal division of the spinal accessory forms a part of the trunk of the vagus in the chest and in the neck, and that under the base of the skull it has intimate connections with the external division, and this again with the pneumogastric. The supposed inflammation, therefore, or irritation, is propagated along this lateral communication also, as far as the terminations of the external division of the spinal accessory in the sterno-cleido-mastoid and in the trapezius muscles, where, particularly in the latter situation, it is felt as active pain or merely as tenderness on pressure. It is worthy of reiteration, that the pains and other disturbances in the organs and parts named are precisely those which we meet with in liver-diseases that are not latent.

The shoulder-pain varies with the affection of the liver in intensity; as the latter increases, the pain corresponds; as it diminishes, the pain lessens or subsides. After the pus of an abscess has been evacuated, and tension is removed, the shoulder-pain disappears.

The pain has been noticed by authors in the following liver-diseases,

* Read in the Medical Section at the Annual Meeting of the British Medical Association in Newcastle-upon-Tyne, August 1870.

viz.:—Congestion; acute and chronic inflammation (hyperæmia), whether of the upper or under parts; hepatitis, with abscess; cancer; hydatids, producing great hepatic disturbance; gall-stones, impacted and detained in the ducts; occlusion of the ductus communis choledochus, with dilatation above from cancer of the head of the pancreas; and in a case of abdominal aneurism compressing the liver.

As to the nature of the sympathy, it has, of late, generally been called nervous irritation, a term difficult to be understood.

Dr. Copland, in his *Dictionary*, tells us that Baglivi attributed the sympathies of organs to membranous connection; Bordeu to the cellular tissue; Willis and Vieussens to the agency of the nerves; and Whytt and Broussais chiefly to the brain; Prochaska to the sensorium commune, to which he believed all the nerves to be continued. Dr. Klein Grant defines sympathy as "that relation of the organs and parts of a living body to each other, whereby an action excited in one part induces a corresponding action in another part."

The doctrine of sympathy held in the seventeenth century, and which arose out of the then prevalent theory of magnetism, was thus defined by Dr. Walter Charleton, Doctor in Physic, and Physician to the late King, in his *Ternary of Paradoxes*, 1650:—"The secret power of natural actives, working on analogous and determinate passives, by invisible emanations, or an influential energy transmissive to remote distances."

I believe, from the pain and tenderness of the nerves, and from the state of the hepatic organs, that the sympathetic state subsisting between the shoulder-tip and the liver is a real hyperæmic or inflammatory condition of the nerves concerned, and of their sheaths. To this it may be objected that it is not likely that a long nerve like the par vagum should be inflamed and continue to be so from end to end without the inflammation being communicated to the tissues in contact with the nerve along its course; but it may be cited in answer that the sciatic and other nerves are, for example in rheumatism, so affected, and may for months continue to be so, and yet the inflammation does not spread much or at all to adjacent parts. It has been suggested that, as the pain intermits, it may not be of an inflammatory nature; but we know that sciatic and other rheumatic pains of indisputably inflammatory nature, are most commonly of an intermittent or remittent character.

There is no *post mortem* evidence adducible that would imply the presence of inflammation in the par vagum during life; and if there be any peculiar state of a nerve which, without being inflammatory, will produce pain, I confess my ignorance of its nature, though I cannot deny that such a state may exist.

If the sympathy of the shoulder with the liver in its diseases consist in an inflammatory state of the nerves connecting these parts, as I believe it does, then the mystery which has so long hung over morbid sympathies is dissolved and disappears, and we get rid of an ancient incubus.

With regard to the *diagnostic value* of the shoulder-tip pain in liver-diseases, it has only attracted attention in cases in which it has been severe, but as has been previously remarked, it often exists when it does not amount to a prominent symptom, and may be detected when the patient is questioned, and the shoulder and neck are examined by pressure; and, as patients are unacquainted with the knowledge of the track of the nerves, it is not easy for the observer to be deceived.

It is a symptom corroborative of the others, and must be taken into account with them. In proportion to its severity in hepatic disease, it indicates the amount of inflammatory action going on in the liver, and the extent of damage done to the structure of the organ; it may, however, occur in disease of the corresponding lung, or of the corresponding wall of the stomach. We must then attend to and estimate the other symptoms present in the case before us.

Full credit, however, appears due to Hunter, Sir Thomas Watson, and others, who say that a right shoulder-tip pain indicates disease in the right lobe of the liver, and that a left shoulder-tip pain points to mischief in the left lobe; whilst, if the pain be in both shoulder-tips, both liver lobes are involved.

The observations of some authors quoted, as Dr. Copland and Professor Andral, show that no faith can be placed in the assertion of Roche and others, that pain of the right shoulder-tip is clear evidence that the upper and not the lower surface of the liver is the exact seat of disease, for in affections of the lower surface the very sign is recorded. (See Copland and Andral, *loc. citat.*)

It is highly probable, from what has been previously stated, that the nerves are distributed symmetrically according to the lobes, rather than according to the surfaces of the organ.

In cases of calculi impacted in the gall-ducts, the shoulder-tip pain recorded has been that of the right side; but closer observation may show that upon the actual position of the impacted calculus may depend the right or left situation of the shoulder-pain.

Lastly, there arise the questions:—What is the use of this sympathetic pain? Why should it be present in some cases only, and absent in the majority? To the latter of these questions, I do not pretend to answer further than this, that persons are differently constituted, their nervous symptoms may be differently arranged, and their susceptibilities diverse. To the former question, I would say that one can scarcely be satisfied with John Hunter's reason that, the liver-pain being depressing, nature sets up a rousing pain in the shoulder to continue life; for the shoulder-pain is at times so severe as to be worse than that in the liver itself, and such pain can only, and of necessity, exist at a great expenditure of material and of nerve-power, and therefore of vitality. Other authors mention the pain merely as a symptom, without assigning any use to it.

A more satisfactory answer, it is submitted, than that of Hunter, is that the shoulder-pain has, in proportion to its severity, the effect of paralysing, more or less, the sterno-cleido-mastoid and trapezius muscles, and thus these agents of voluntary inspiration are thrown out of gear, so to speak, and the side of the chest is kept to a certain extent inactive and quiet, a condition necessary and congenial to a diseased liver. The pains in and around the chest will similarly limit the action of the diaphragm and of the intercostal muscles, and thus the quiet of the diseased organ is materially provided for. In the same way, it is believed, the pain of the knee in hip-joint disease does good service, by greatly impeding the action of the muscles of the leg.

On some other occasion, I propose to show that this same shoulder-pain occurs in the same way on one side or on the other, in various diseases of the other organs of the pneumogastric series.

RECOLLECTIONS OF WORK IN AN AMBULANCE.

By WILLIAM MAC CORMAC, F.R.C.S., Surgeon to the General Hospital, Belfast.

II.

ON the afternoon of the 30th of August, we were installed in medical charge of the caserne d'Asfeld, and awaiting the arrival of the wounded. Nor had we long to wait; the fact of there being an English ambulance in occupation of the barrack must have been speedily made known, as wounded men almost immediately began to arrive. Severe fighting had been going on all day in the direction of Pont Maugis and Bazeilles, about three miles distant, which we were able to see very distinctly from our elevated position. We had scarcely unpacked our waggons and brought our stores inside, when bearers arrived with stretchers, carrying a number of severely injured soldiers. Others came on foot as best they could, having in many instances marched long distances with wounds in different parts of the body.

Dr. Webb, with two assistants, remained in charge of the door, examining the wounds of those who arrived, a large proportion of which had received attention on the field, and were enveloped in temporary dressings. All who were lightly wounded had their wounds redressed and were then at once sent away, a biscuit or two being given to each of them. Those who appeared to demand further care were passed into the house. Dr. Webb's was no easy task, for everyone who applied was desirous of admission, often in the inverse ratio of the gravity of his injury. However, he was most firm and judicious, and exercised in every instance a wise discretion. About one hundred and thirty-two poor fellows passed through our hands that afternoon.

About six o'clock, when we were getting our affairs into somewhat of order, a gentleman rode up in hot haste to inform us that at the village of Balan, where there had been fighting all day, there were upwards of one hundred wounded, with no one to look after them. He told us the place was about two kilometres, or a little over a mile, distant. Dr. Sims had our ambulance-cart got ready, into which we put surgical instruments, dressings of all kinds, chloroform, carbolic acid, and some provisions, such as Liebig's extract of meat, and biscuits; and he, Dr. Frank, and myself, with Messrs. Blewitt, Wyman, and Hewitt, started for Balan. Just at the entrance to the village we found a number of wounded in the village and houses, and also two carts, each containing three or four wounded soldiers, standing in the roadway. I stopped with a portion of our supplies, and, with the aid of Mr. Hewitt, we set about attending the poor fellows as well as we could. Dr. Wyman, who also stayed with us for a time, was taken away to see another set of wounded, and did not return again to me that night. The rest went on, and spent several hours upon the battlefield, giving all the succour they could to some hundred poor soldiers lying there untended.

I found about thirty cases to look after. In the first place, I took possession of an exceedingly nice empty house; and, with the aid of