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

the neighbouring people of the village, arranged some beds upon the floor, and extemporised an operating-table in one of the rooms. All this took some time, and it was now quite dark. The first poor fellow whom I examined had his left tibia smashed by a bullet. It was too plainly a case for amputation. He was a soldier of the marines. Mr. Hewitt administered chloroform, and then compressed the artery for me. One volunteer held a candle, whilst another held a basin and sponge, and, under these difficult circumstances, I removed the leg in the upper third. The next was an artilleryman, whose left leg was very extensively shattered by a shell explosion. Both bone and soft parts were much injured. There was great muscular development of the calf. I amputated this leg as the other, by oval skin-flaps and circular division of the muscles. For some days these men received very little attention, but both recovered admirably under the care more particularly of Mr. Blewitt, who remained with Dr. Frank at Balan that night, and subsequently remained there permanently as one of our Balan division. I often saw these two men when I rode out to visit Frank. They got on without a single drawback.

There were several other important cases; for instance, a soldier of the marines, who was shot through the middle of the left deltoid muscle, and the ball passed directly into the chest through the head of the humerus. There was no wound of exit, and a probe passed in an indefinite distance. There were short cough, difficult respiration, and bloody expectoration. It was clearly a case of penetrating wound of the chest with lodged bullet.

Schylter, another marine, was lying insensible with extensive fracture of the skull from a shell. The brain was a good deal lacerated and exposed. For neither of these poor fellows could anything be done.

In another artilleryman, an immense fragment of shell had become wedged between the tibia and fibula, penetrating the calf. It was very difficult to remove. These and the other cases having been attended to, we prepared to return to Sedan, as it was very late, and we were all tired. Amongst us, we must have attended to two hundred and fifty wounded men that afternoon and night.

In spite of our fatigue, we were awakened very early the next day (September 1st) by the sound of heavy cannonading. Towards five o'clock, when it became light, we perceived that everything was enveloped in a dense fog. The troops could not have seen each other, yet the firing commenced between three and four in the morning. It went on *crescendo*, and after the fog lifted, extended all along the lines, which were some four miles in extent. At each end—Floing and Domchery on the north-west, and Bazeilles and Balan on the south-east—the infantry and cavalry came into collision, while on the rising ground in front of us, about a mile and a half distant, we had a fine view of the Prussian batteries of artillery, which, from ten o'clock in the morning until four in the afternoon, literally rained shells upon the French positions just in the rear of the hospital. The French, of course, replied, and there was in consequence a storm of projectiles flying close over our heads in both directions all this time. The heavy guns of the citadel just alongside of us were also firing; and all these, together with the incessant burr-r-r of the mitrailleuse and the musketry fusillade, made us feel as if our quarters were exceedingly hot. Several times the Prussian shells struck the building, and some of them burst in the enclosure and killed and wounded several persons—amongst the rest, two of our male nurses or infirmers, and several soldiers. About four in the afternoon, the German fire was turned in another direction, and the feeling of relief which we all experienced was as agreeable as it was great. At six o'clock, the cannonading and fighting stopped altogether.

During the entire day the wounded were arriving, some hobbling along on foot, some carried upon stretchers. Our guards at the door had no easy task, for, besides the wounded, numbers of demoralised soldiers demanded admission, seeking shelter and protection. In the barrack square not less than 4,000 men of all arms had accumulated, and, as night came on, they lay stretched side by side upon the ground so close as to render it almost impossible even to pick one's way amongst them without trampling on somebody. During all that day I was busy examining the wounded carried into the hospital, and performing operations on those who needed them. These last were done at one of the ward windows, and we were unable wholly to divest ourselves of the unpleasant conviction that at any moment a shell might burst in our midst, dealing destruction to all around. I suppose one would perhaps be accustomed to it in time, but, at first, operating in the direct line of fire, as we were, with the shells continually whizzing in our ears, has a somewhat disquieting influence. I did not succeed in keeping a record of all the work that was done that day; indeed, I wonder I kept any record at all. I find, however, that I performed several amputations of the leg, the thigh, the forearm, and the arm; that I excised the shoulder and the elbow joints; and also performed partial resections of the upper and lower maxillæ, and of nearly the whole ulna. The

number of bullets and pieces of shell that were extracted from various parts of the body are too numerous to reckon. Thus came to an end our second day's work.

As closely as I have been able to calculate, we received, during the course of that day, 274 patients into the hospital, and dressed and otherwise attended to, at the door, 250 more, at the very lowest calculation. It was very hard to turn these wretched hungry men away, but we could not help it—we would otherwise have been overrun; but towards the end of the day our discipline relaxed, and we allowed some of them to get a night's rest and food, which they took lying about on the staircases and in the passages of the hospital.

We were all pretty well exhausted; and, although there were many whose cases demanded interference, we felt it necessary to take some hours' rest. All within had been attended to more or less, temporary dressings had been applied to the wounds, opiates administered to those suffering pain, and some food given to the hungry, and nearly all were tired. Outside, all was quiet. The soldiers in the barrack square lay stretched in profound sleep by their expiring camp-fires. Looking over the town and country, we saw the flames of burning houses in several places, and a loud hum of thousands of voices rose in the night air from the caged soldiers in the town. We went to bed all uncertain as to what might happen on the morrow, and wondering if the bombardment would recommence. Rumours of the most varying kinds reached us, but the prevailing opinion was that all had been lost; that regiments had given themselves up *en masse*; that even generals had fled. A colonel who had been at Weissenburg, Wörth, and Forbach, whose eagles had been decorated, told how, when he could fight no longer, he had burnt his colours, and buried the eagles along with his decorations, that they might not fall into the enemy's hands. Heard other officers declared, with tears in their eyes, that their country had been dishonoured, betrayed, and lost by incompetence of the grossest kind.

Next morning, the 2nd of September, the sun shone out bright and beautiful over the wreck and ruin of the previous day. We rose early. From the ramparts, we saw strewn about the dead soldiers; a little further off we saw Prussian burying parties busily engaged interring the killed, an office which was not wholly completed for nearly a week. Our own dead, and these were a good many, were interred in a trench some little distance from the hospital. After the town became again somewhat more *en règle*, the civil authorities took charge of the burials, and relieved us from further trouble. We commenced early in the day to attend to those cases which had not been thoroughly examined the day before. I may here repeat what has been insisted on elsewhere, and by none better or more forcibly than Professor Longmore, that it is of the very last importance to make a complete examination of gunshot wounds during the primary stage, that is, as soon as possible after the receipt of injury, and before inflammation sets in; and that no probes and no apparatus will subserve the uses of the finger. If necessary, the wound may be somewhat enlarged. It is but of small consequence to do so in comparison with having the extent of comminution in an injured bone undiscovered, or a lodged bullet unextracted.

The mortality consequent upon primary amputations is so very much smaller than that attendant upon those called secondary, that this point cannot too strongly be insisted upon. Quite a large number of poor fellows were sent to us from other ambulances, ten days or more after the battle, whose limbs should have been removed in the first field-hospital they reached. We were obliged to amputate, but the mortality was distressingly great. Again, it may not perhaps be of vital importance to remove a lodged bullet; but were it only for the mental solace afforded to a soldier by the extraction of the ball, that would be a sufficient reason to do so if possible. A soldier seems generally to imagine that his life almost depends on the extraction of the missile that has injured him, and his joy is proportionately great when it is successfully removed, while he never appears to be happy, in either mind or body, so long as it remains in the wound. Of course the great difficulty consists in their being neither hands nor time sufficient after a great battle to make these examinations as fully and as completely as the occasion demands.

Meanwhile, the day wore on, and the fighting did not recommence; the batteries on the hill-slopes opposite did not re-open their deadly fire. We saw heavy columns of Prussian infantry posted inactive in the fields. First came to us the report of an armistice of forty-eight hours, to bury the dead; then the stupendous news that an army of 100,000 men, 400 pieces of artillery, 70 mitrailleuses, and an Emperor to boot, had capitulated without being able to strike another blow for their country or their liberty. Once in Sedan, there was no way out of it; the French army had been transformed into a disorganised mob; the officers knew not where their men were, the men knew nothing of their regiments or their officers. Men of all arms were mixed up together. Some were cooking horseflesh, some were eating it even raw; many were lying

about the streets in the deep sleep of fatigue; everything and everybody looked utterly wretched and miserable. At every corner were the bloody skeletons and entrails of horses, off which every scrap of flesh had been cut; but bread was not to be had for love or money. In the hospital *encontré* the same thing was going on. Four thousand men had collected there, and the *débris* they left behind required the hard work of relays of men, during several days, to remove. All the 2nd September, like the 1st, we were engaged in performing amputations, excisions, and in removing balls and pieces of shell deeply lodged, only interrupted, from time to time, by calls to see some fresh arrival.

In the evening, after a hard day's work, we got a summons to say that in the town were large numbers of wounded untended. A party of us went down. In every second house, almost, there were wounded men; the theatre was full of them; the church was full of them; other public buildings were full of them. Some of these we had transported to our own hospital; to others we administered what comfort we could. Subsequently, aid arrived from other ambulances, and from the military medical officers; but for the first few days the *encombrement des malades*, as the French call it, was almost enough to make one give up in despair. That evening, to my great relief, I heard from Dr. Frank, and that he was safe. When I saw the village in which he was in flames, and knew it had been the scene of a desperate fight, I feared we might never again see him alive. Indeed, at one time, and with too much reason, he had given himself up for lost. All by himself, he tied the carotid artery for a wound of the face, and performed other operations, but he had not sufficient help. There were two cases, he afterwards said, where amputation should have been performed at the hip-joint, but had to be left undone.

ON THE CLIMATE OF ALGERIA.*

By J. HENRY BENNET, M.D.,

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A RESIDENCE of eleven successive winters on the north shore of the Mediterranean, and an attentive study of meteorological phenomena during that period, have enabled me to arrive at tolerably precise and clear conclusions respecting the winter climate of this region of the Mediterranean area. At the close of the winter before last, however, I was still uncertain as to the real nature of the climate of the south western or Algerine shore of the Mediterranean, so conflicting are the statements respecting it. According to some, it is a dry tonic climate, owing to the vicinity of the great desert of Sahara; according to others, it is hot, moist, and relaxing, owing to the combined influence of the desert, of the Mediterranean Sea, and of the Atlantic Ocean.

Wishing to judge for myself, after reading all I could find on Algeria, I started from Marseilles on the 13th of April; arrived at Algeria on the 15th; made three exploratory journeys, east to Fort-Napoleon, south to Tenet-el-Had, and west to Oran, where I arrived on the 30th. From thence I passed over to Cartagena in Spain. By bringing what I knew already of Mediterranean meteorology to bear on what I saw in Algeria, botanically, meteorologically, and geologically, during these journeys, I was able to arrive at certain definite conclusions. By comparing these conclusions with the evidence of impartial observers, and especially with that of Dr. Armand, a military surgeon, who has written an exhaustive work on the climate and diseases of Algeria, I have attained a clear idea of the Algerine climate, which I will endeavour to convey to my hearers as briefly as possible. I would remark that in choosing this subject for a paper I have been influenced by the fact that, during last winter and spring, I saw in the south several persons who had been sent to spend the winter in Algeria, from Newcastle and its neighbourhood; and, therefore, I presume that the question of its climate possesses some interest for the medical practitioners of the northern capital of England.

Under the name of Algeria is now comprised the greater part of the south-western shore of the Mediterranean, occupied by the Atlas mountains. These mountains extend from Tunis eastward, to Morocco and the Atlantic westwards. To the north it is limited by the Mediterranean, and to the south by the great desert of Sahara. The width of this region, from east to west, is about four hundred miles. The depth from north to south, from the Mediterranean to the desert, is about one hundred and twenty miles. The Atlas chain is not constituted by one range of mountains extending from east to west, as is generally supposed, but by three parallel ridges, the lesser, the middle, and the greater Atlas, with connecting spurs and buttresses, and with intervening valleys

and elevated plains. Thus the whole region is a kind of Switzerland, a mountain country, which would be the seat of glaciers, lakes, and large rivers, were the mountains high enough to reach the line of perpetual snow, as in Switzerland. But they are not; none attaining an elevation greater than seven thousand feet. There are, consequently, no perpetual snow, no glaciers, and the large rivers which are fed by such an origin do not exist. The rivers are small, and mere torrents in summer. Still the mountain-ridges and summits, being from one to seven thousand feet in elevation, are high enough and cold enough to precipitate water in abundance out of moisture-laden clouds in winter, and to be covered with snow and ice in their higher regions for several months every year.

The meteorology of Algeria is very peculiar, but is easily understood on reference to the map, and on the consideration of the cosmical elements which northern and central Africa present. North of the belt of mountain land which constitutes Algeria, is the Mediterranean Sea, a thousand miles in width, and from three to four hundred in breadth. South, we have the great sandy desert of Sahara, the hottest region on the earth, which occupies a considerable portion of the continent of Africa. As a necessary result of the constant heating, rarefaction, and rising into the higher atmospheric regions of the superincumbent air, there is always a vacuum forming on the desert of Sahara, which the atmosphere of the surrounding regions rushes in to fill. This rushing of air is necessarily greater from the cool regions of the north than from the warm regions of the south. Thus, during nearly the entire year, winter and summer, moist north-east, north, and north-west winds are rushing over mountainous Algeria towards the desert. It is stated that the wind at Algeria only blows directly from the desert thirty days in the year. If it be so for 334 days in each year, the wind that passes over Algiers and Algeria is a moist sea-wind. The same phenomenon, in a modified way, occurs from the same causes in Egypt. I am told that the wind blows from the north up the Nile, thereby much facilitating navigation nine months in the year.

The atmosphere at Algiers and in Algeria must therefore be moist, winter and summer, except during the few days that it blows, as a dry hot wind, from the desert. That it is moist is proved by the large quantity of rain that falls during the six winter months, and by the very heavy night dews that reign all through the summer.

According to Dr. Armand, the mean rain-fall at Algiers from 1839 to 1865 was 36 inches, 31 of which, or six-sevenths, fell in winter, and only 5, or one-seventh, in summer. Dr. Scoresby Jackson gives the same mean rainfall. The distribution was as follows. November, 5 in.; December, 8 in.; January, 6 in.; February, 5 in.; March, 3 in.; April, 4 in.; May, 1½ in.; June, ½ in.; July, 0 in.; August, ½ in.; September, 1 in.; October, 2½ in. Rain fell on ninety days or nights; on seventy-eight days in the six winter months; on twelve days in the six summer months.

In some winters, the rainfall has been even more, amounting to 40 or 45 inches. The large amount of rain which falls will be best understood when we compare it with that of southern England, where it varies from 16 inches to 22, and with that of Nice, where it is 25. On the east coast of Spain, the rainfall is even much less, not amounting, probably, to more than 12 or 14 inches, and often not to that.

Even in summer, when the Atlas mountains, scorched by an African sun, have become so hot that they no longer precipitate moisture from the winds that rush over them, hurrying towards the great desert, and when little or no rain falls, the air is still saturated with water pumped up from the broad Atlantic, and from the Mediterranean. At night, as soon as the temperature falls a few degrees, such heavy dews form that a double tent is saturated, according to Dr. Armand, in the hottest and finest weather.

The influence of the copious and frequent winter rains, and of the heavy summer dews, is evident in the luxuriant vegetation of Algeria. I expected to find a sunburnt arid region, the portal of the barren desert of Sahara; instead of which, I found a garden of Eden. The valleys were knee-deep with natural herbage and flowers, or with grain crops where sown, and the mountains were clothed with grasses, brush-wood, and timber from base to summit. The verdure, when I was there in April, extended far into the desert. The valleys and mountains of Algeria, indeed, were nearly as verdant and luxuriant as are those of Switzerland.

In the interior mountain-land, even at an elevation of 1,500 or 2,000 feet, in winter the fall of snow is often great, and the frosts severe. During the retreat from Constantine in 1845, more than five hundred soldiers lost their lives from cold and frost, as in the retreat from Moscow. The porter of the garden of acclimatisation at Algiers is a living illustration of this disaster. He walks about on two wooden legs, having lost both his own from frost during this retreat.

At Algiers proper, the climate is much milder and more equable,

* Read in the Public Medicine Section at the Annual Meeting of the Association in Newcastle-on-Tyne, August 1870.