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two holes to be bored in the poles at right angles to one another. The hooks on the poles and the openings in the canvas should be fixed at the same distance apart throughout the apparatus; otherwise the canvas will not readily engage. It may be necessary to fix eyelets and laces to the ends of the canvas so as to join the two pieces together and avoid a gap in the middle of the stretcher.

A carrier in the form of a pack, or provided with a canvas bucket or trough at the lower end to support the sections of the stretcher, would probably be more satisfactory than the pattern described, in which the sections are retained in position solely by horizontal and vertical straps.

It is probable that the thickness of the poles can be further decreased without loss of efficiency. My thanks are due to Acting Serjeant-Major T. W. Cardwell, R.A.M.C., for taking the accompanying photographs; and to Serjeant A. J. Burke, R.A.M.C., for his assistance in arranging some of the details.

#### SUGGESTIONS FOR FIRST-AID OUTFITS FOR THE ROYAL FLYING CORPS.

By CAPTAIN E. G. R. LITHGOW,  
*Royal Army Medical Corps.*

FIRST-AID outfits for the Royal Flying Corps should be of two kinds, one to be carried on every aeroplane, the other in the mechanical transport.

With regard to the former, it is not desirable that it should be carried on the person of the pilot or observer, since this would entail much handling, and possible damage or loss. A suitable position for the outfit can easily be found in all types of aeroplane—*e.g.*, in the fuselage—where it would be accessible and protected from oil, &c., without being unduly conspicuous, or in any way interfering with the control of the machine. Both pilot and passenger should receive instruction in its use, and in the treatment of minor disabilities and ailments, such as wounds, burns, &c. The weight of the outfit complete should be limited to about 1 lb., and it should be packed in waterproof material.

The first-aid outfit for the mechanical transport should be more complete, and sufficient for the possible requirements of about 140 men composing the squadron. Medical and surgical panniers, and a field fracture box similar to the existing patterns, but reduced in size, would be suitable, and could be carried on the motor ambulance, which should accompany the squadron. This equipment, of course, would be used by the medical officer.

Aircraft have now become so reliable and powerful that it is quite practicable to have machines specially fitted to carry medical and surgical

equipment; these machines could search for wounded in the field, and enable urgent cases to be treated on the spot, as well as quickly notifying Army Medical Headquarters of the numbers to be collected. It is understood that the question of "Red Cross Aeroplanes" is already receiving the attention of the Powers signatory to the Geneva Convention. These aeroplanes must of necessity be piloted by medical officers.

### Lecture.

#### THE WORK IN SERBIA OF THE WELSH UNIT OF THE BRITISH RED CROSS SOCIETY.<sup>1</sup>

By CAPTAIN H. F. M. CARTER.  
*Royal Army Medical Corps.*

THE British Red Cross Society's Unit Serbia No. 1, known as the Welsh Unit, came into existence on Saturday, November 9, 1912, when the men who had been selected by Sir F. Treves to form its personnel reported themselves at Millbank Barracks, where Colonel B. Skinner, Commandant R.A.M. College, had kindly placed a barrack-room and office at the disposal of the Society. Colonel Skinner also lent the services of Quartermaster-Serjeant Walker to assist in mobilizing the unit, and to give the men preliminary instruction in First Aid, and show the contents of the Army pattern medical and surgical equipment which was to accompany the unit. Arrangements were made for the disposal of the orderlies' plain clothes, and they filled in forms stating their next of kin, and to whom they wished their pay to be sent during their absence from England. As the following day was Sunday, and some men had matters to attend to, while others wished to say good-bye to their friends, they were all given permission to go away provided they reported themselves by 9 a.m. on Monday. Instruction was continued on Monday and the men slept in barracks that night; their Red Cross uniform had been issued to them, and their other clothes made into parcels and labelled for transmission to their friends when the unit had started. The uniform issued was good and warm, similar to the Field Service dress of the British soldier. Instead of a long greatcoat a short one was issued, of the type known as the British warm. Each man was also given a pair of rubber top boots, which proved most useful. The equipment consisted of a belt, haversack, and water-bottle, cavalry mess-tin, jack-knife and lanyard, brassard and identity disc. On Tuesday 12th the work of

<sup>1</sup> Lecture to the Voluntary Aid Detachments, Wales.

preparation for departure was continued. One of the surgeons and one N.C.O. were sent to Victoria Station to check all the baggage and see it loaded into the truck. In the afternoon the men were paraded for inspection by Lord N. Crichton Stuart, Mr. D. Davies, and Mr. Bidsdale, Chairman of the British Red Cross Society, who addressed the unit and wished it luck. A photograph was taken of all the men available. At 7.30 p.m. the unit was paraded and marched to Victoria Station. Many friends came to see us off by the 8.35 train to Folkestone, amongst them M. Slavko Grouitch (Serbian Chargé d'Affaires).

The unit consisted of four surgeons, three dressers (medical students), and thirteen orderlies.

With the exception of two they were all old soldiers or sailors, and of the general duty orderlies the majority had experience of nursing which they had gained in India as hospital orderlies. The medical and surgical equipment was practically that of a tent subdivision of a field ambulance and was of the latest pattern. All the dressings and medicines were carefully packed in panniers so as to be easily transportable. These panniers look small, but contain a very large amount of compressed wool, lint and bandages, and the medicines are in tabloid form. Two reserve dressing boxes were taken full of extra gauze, lint, &c. A large number of blankets, sheets, pillows, pillow cases and waterproof sheets, and also bales of warm clothing, cardigans and flannel shirts were provided. For feeding the sick and wounded cases of condensed milk and tinned soup were supplied. The Lemco and Oxo Company gave two large boxes of service Oxo.

Medical comfort panniers were also taken. For the personnel of the unit eight days' reserve rations were taken, each ration consisting of tinned meat, biscuits, tea, sugar, chocolate, &c., enough to last a man twenty-four hours if no other food was available. All the basins, kettles, feeding cups, &c., for feeding the sick and for cooking purposes were made of enamelled iron; they were packed in large basket panniers. Carpenters' tools for making splints, &c., were also carried.

The journey to Belgrade via Flushing, Frankfort, Vienna and Budapest, was made without difficulty. Messrs. Cook's interpreters met us at Frankfort and Vienna, and at the latter place we were fortunate in arriving in time to catch the train on without any delay.

The unit arrived at Belgrade on Thursday night, 14th, at 10.30, and was met by the British Vice-Consul, Mr. Blakeney, Colonel Sondermayer, Chief of the Serbian Medical Services, and Lieutenant Yovanovitch, Adjutant to the Commandant of the city. The latter spoke English well and had held the post of Montenegrin Commercial Agent in London up to the commencement of the war, when he was recalled for service. Carriages were ready and we were all driven off to a large school, where we were to be billeted. A Russian Red Cross unit was already there waiting to get permission to go further forward. Everybody was glad

the greater part of the journey was over and turned in as soon as possible, about 1 a.m.

Next morning I went with Lieutenant Yovanovitch to call on Colonel Sondermayer at the Ministry of War and to get instructions. He was anxious for us to take over a large building and form a base hospital, but I explained that our equipment was only suitable for a mobile medical unit and we had hoped to get up near the fighting. It appeared as if we should have to stay in Belgrade, as we were there to assist the Servians and comply with their orders, so we went to inspect the barracks of the 7th Infantry Regiment, which were to be handed over to us. This regiment was said to be one of those which had lost heavily at Kumanovo, the first big battle the Servians fought in the war. It was quite close to the Ministry of War and was already equipped with 400 beds. If we had been compelled to remain there it would have made a good hospital. Arrangements had been made for several English-speaking ladies to come and assist us and act as interpreters. However, Colonel Sondermayer agreed to telegraph to the head-quarters in the field asking if we could be sent forward. Meanwhile we were to wait in Belgrade. Surgeon-General Bourke, who was acting as Director of the British Red Cross units in the North Balkan States, arrived that evening from Sofia, where he had been with the Bulgarian units which had left London before us. On Saturday, 16th, Surgeon-General Bourke and I went to the Ministry of War and were introduced to Colonel Boyovitch, Minister of War, who thanked the unit for coming out to assist the wounded. No answer had yet arrived from head-quarters at Uskub. The Servian authorities asked for a complete list of all the members of the unit, so that stamped brassards could be issued to them in accordance with the Geneva Convention. The afternoon was spent in the barracks making provisional arrangements for rations, storerooms, operating theatre and rooms for the personnel. On Sunday an answer was received from head-quarters at Uskub that we were to stay at Belgrade, so we moved into the barracks and unpacked our equipment to be ready as soon as possible for the wounded that were expected when Monastir was taken.

On Monday when nearly everything was ready Colonel Sondermayer sent for Surgeon-General Bourke and showed him a wire which said, "Send English Mission to Skoplie." Skoplie is the old Servian name for Uskub. Monastir had been taken. We then packed up again. Mr. Milan P. Baic, a Servian gentleman who had returned home at the commencement of the war, volunteered to accompany us as our interpreter. That evening half the unit was inoculated against enteric fever. On the 19th we were given a covered truck for our equipment, and two coaches for the personnel, and we started for Uskub. Trains were very crowded with soldiers and others going up to the front. Two French surgeons who were on their way to Lesocovatz to work in a hospital there were unable to find room, so we took them into our carriage.

The next day was spent in the train running up the valley of the Morava, a big river which was in flood. To pass the time we vaccinated one another.

At Kumanovo station we saw many captured Turkish guns awaiting transport to Servia, and about 8 o'clock or later we passed over the battlefield of Kumanovo. It was a fine moonlight night and we could see villages that had been burnt during the battle, which was fought on either side of the line.

Arriving at Uskub about 10 p.m. after twenty-eight hours in the train we were met by Mr. Peckham, British Vice-Consul, and Colonel Lazar Gentshitch, who as Senior Medical Officer on the Staff of General Putnik was in charge of all medical arrangements. The men were sent up to a large school, where the Russians whom we had met in Belgrade gave them tea. We were given a railway carriage to sleep in that night and were very comfortable.

Colonel Gentshitch asked whether we wished to take over a hospital at Uskub, or get forward. I asked to go on to Monastir, as there were many wounded there, it having only been captured two days. He agreed to do all he could to send us forward, when General Bourke and the Scottish unit arrived next day. The Scottish unit arrived late on the 21st. It was raining hard. On Friday Colonel Gentshitch went with Mr. Moxon of my unit and an interpreter to Veles, which was the railhead. From there the road over the mountains led to Monastir. He wished to see the arrangements for transport. Monastir is about four days' march from Veles, the rate of march depending on that of the ox-wagons which form the transport. He returned next day and said he was sorry, but for military reasons we could not be sent further forward, but he would give us a hospital in Uskub. Surgeon-General Bourke went with him to the Turkish Municipal Hospital, and decided to take it over and run it with both the Welsh and Scottish units under the command of Major Douglas, R.A.M.C., who had brought out the Scottish unit.

Major Douglas took over the charge of the hospital and both units on the 23rd, and from that time until we disbanded the two units worked together.

When we arrived in Uskub there were already installed three Russian Red Cross Ambulances from Kieff, St. Petersburg, and Moscow, which occupied two large schools; also one French Ambulance, which was in a school. There was also a Roumanian hospital, which consisted of two Doecker huts, in addition to a military stationary hospital in the citadel, and a large school which had been converted into a hospital for enteric and dysentery cases. The hospital taken over by the British Red Cross units was situated on a flat piece of ground to the east of the town, in a triangle formed by the River Vardar, the railway line, and the Kumanovo road. It was about 2½ miles from the railway station, and the approach

was along the right side of the river by a very bad and muddy road. This road was soon taken in hand by the municipal authorities and repaired. The hospital consisted of two large one-story buildings, with an administrative block between them, and a cookhouse behind. At the commencement of the war it was barely completed, and its first patients consisted of wounded from Kumanovo.

The front of the buildings looked south. The east block had evidently been intended for surgical cases, as it contained two well-lighted operating theatres, only one of which was partially equipped. The block on the west was for medical cases. In the central administrative block were store rooms and a dispensary.

In this dispensary there was a supply of ordinary drugs and a great deal of cotton wool which had been left by the Turks.

A small room off one of these theatres contained the dressings and equipment of the Swiss Red Cross Society, the members of which had gone on to Monastir attached to a Servian Field Medical unit. As the Swiss unit consisted only of three doctors and had no nurses or orderlies with it, the question of transport did not arise. The equipment was locked up and left under the care of the Servian medical officer who remained in the hospital.

In the hospital were about 100 bedsteads, which required putting together, and a number of new mattresses with native blankets and coverlets. That was all the equipment we found available.

To assist in keeping records of the sick and wounded, and in making arrangements for their discharge, the Servian authorities left an officer of their medical service, and with him some orderlies to look after patients' kits in the pack store, to attend to their wants and cook food for them. We had arranged for supplies to be obtained daily by one of the Servians, who knew the routine and to whom we should apply. We could not cook in a way suitable to the tastes of the patients who were convalescent, and most wounded men who were doing well had good appetites. One Red Cross unit in Uskub employed their own cooks to prepare the patients' food, and said it was difficult to satisfy their patients, who preferred their native dishes. For this reason all meat and bread was drawn, cooked, and issued by the Servians themselves. The Servian orderlies were very useful in attending to the wants of the patients. The language question is always a difficulty, especially at first. An interpreter would be required in every ward if every small matter had to be translated. After a while we learnt a few words and were able to understand what was wanted. A few simple phrases are easily learnt and relieve the work of the interpreters. For this work, in addition to M. Baic and Dr. Todorovitch, who came from Belgrade with the Scottish unit, we had two Servian ladies who had been working in the hospital before we took it over. They spoke French and were of great assistance to us. We were given a portable steam disinfectant for disinfecting bedding and clothing, and we built an incinerator for the disposal of soiled dressings, &c.

After we had been in the hospital for a few days, the authorities lent us a large double-fly tortoise tent, and by making all the orderlies sleep in it we were able to make room for more patients.

On the 24th we were supplied with ox wagons to bring our stores and equipment from the station, where it had remained unloaded since our arrival, in the hope that we would proceed forward, and we then started to equip the wards with the material we had brought out for a mobile unit. All the panniers were unpacked and the bales of bedding broken open and distributed round the wards. Each surgeon was given basins, towels, sheets, blankets, &c., for his ward. After seven hours' work we were ready to receive the wounded.

The first batch arrived on the 26th. They came from Monastir via Prilep and Veles, and had been about four days on the road and in the train. From Monastir to Veles the road runs over the mountains, which were covered with snow. There were about forty wounded who had been put out at Uskub, which was the first place where they came near stationary hospitals. All the wounded fit to travel by the hospital trains were taken straight to Servia, but there were always some who could not stand the journey well, and these had to be put out on the way. The cases that came to us were nearly all septic, and were suffering severely from the hardships of the journey from Monastir. They were at once washed and put to bed, and then fed on hot Oxo, bread and soup. They were then dressed. Many preferred to sleep, and thought that after days in wagons sleep was a more important matter than dressing. However, they were all examined and cleaned up, and then left to sleep as much as they wished.

Surgeon-General Bourke then left, as he had the other units in Bulgaria and Montenegro to look after.

The next lot of wounded came in on the nights of the 28th and 29th. They were also from Monastir. Amongst them were two cases of paralysis from spinal injuries, one case shot through the chest, one through the abdomen, and one shot in the head. The remainder were mostly septic wounds of the extremities. These were practically the last of the wounded we received in batches. Nearly all the wounded fit to travel had been evacuated from Monastir, and from this time onward we began to get a large number of sick, in contradistinction to wounded, from troops who were passing through Uskub on their way to other districts where there was still fighting. From November 26 to January 23, 637 cases were admitted to hospital. In addition to these we treated a large number of out-patients, of whom no careful record was kept.

The hospital was organized as follows:—

An orderly medical officer was detailed daily. He was on duty twenty-four hours and had to remain in the hospital to be available when necessary; he also had to inspect the patients' dinners and go round at night to see that everything was all right.

The care of the sick was divided between six surgeons, each of whom had charge of one or more wards. Each surgeon had a dresser, one of the medical students, a nursing orderly and a general duty orderly to assist him. A night duty party, consisting of two nursing orderlies and two general duty orderlies, was detailed for a week at a time. This arrangement was found to answer better than having men on duty for four hours and then calling their reliefs. The theatre was under the care of two medical students, who attended to all the surgical equipment and prepared everything necessary for operations. Two cooks were appointed to prepare the rations for the personnel. One had considerable experience as a caterer and used to go to the local market with one of the interpreters to purchase vegetables, &c. One man was put in charge of the disinfectant and incinerator and acted as sanitary orderly. One of the men was very handy as a carpenter and we employed him in that capacity to make splints, inclined planes, and to put up shelves in the wards. He did all his work with empty packing cases and the tools carried in one of the panniers. With barrel hoops he managed to improvise very good cradles and apparatus for slinging broken legs, &c., which were greatly admired and commented on by visitors. They said we were very good at improvising. The dispenser took charge of all the medicines and medical panniers. An admission and discharge book was kept by the senior N.C.O. so that we would have some record of our own of the number of patients, their names, regiments, and wounds or ailments apart from the one kept by the Servians. This book showed the date of admission, number of days in hospital and disposal of each patient. Notes on each case were kept by the dresser, who was responsible for the men in his ward. The daily routine was: Up at 6.30, parade at 7 a.m., when all went to their wards and saw things cleaned up; patients unable to help themselves were washed and those who could were made to wash themselves; at 8 breakfast; from 9 to 12.30 work in the wards, 12.30 dinner. After dinner, if the work was finished men off duty were allowed to get exercise and do as they pleased; at 4.30 tea and after that any ward work that was necessary; supper at 8.

After the first rush of surgical cases there was an interval before medical cases began to arrive in any numbers. These were mostly bronchitis, pneumonia, enteric fever, and dysentery. They were far more numerous than the wounded. This is usually the case on active service. Another cause was that a large body of troops was billeted in and round Uskub, and there is always more sickness in an army that is stationary than in one on the move. The sick came in in great numbers and soon all our 135 beds were full. They still came and we had to accommodate them somehow. Patients who were not very ill had to be put three sleeping on two beds close together. It is not a satisfactory arrangement, but it was the only thing to do. The largest number we had in at one time was 184.

As soon as patients were sufficiently recovered to travel they were discharged to sick furlough and sent to their homes in Serbia. Before they went away they were given some warm clothing and a small sum of money. Many had none, and if they had not been given something they would have suffered great hardship on their way to their homes, which were in many cases at great distances from the railway. This matter was taken up by the Servian authorities and towards the end of our stay every patient received some pay before leaving hospital. Many patients asked specially to be allowed to take their warm flannel shirts away with them; they liked the red ones. In connexion with this an officer in the Servian Army who was very kind to us and gave us every assistance, told us that when he was a small boy he and his parents were driven away from their home by the Turks and for some time had been refugees. Quantities of warm clothing had been sent out from England, amongst them were red flannel shirts. These were distributed to the refugees and he had been amongst those who received them. He was very grateful and said that from that time many a Servian had looked on that colour as a sign of good luck. The Swiss Red Cross surgeons left us most of their dressings and drugs when they went home, and these were very useful.

Lady Paget, wife of the British minister at Belgrade, was very kind and sent us money and clothing to be distributed amongst the Allies and Turks alike. There were many refugees in the town who had lost all they possessed during the war and were quite destitute. To look after these there was a local committee, of which M. Hadjiristitch, the mayor of the town, was chief. This Committee knew well the necessities of the refugees and where they were to be found, so we handed over to it 600 francs of the money, and the remaining 400 francs we kept and gave to soldiers leaving hospital on their way home. We proposed to make arrangements to provide hot Oxo and any medical assistance to refugees coming by train, but, as the opportunity did not arise, with the consent of the mayor a soup kitchen was started in a small hut near the hospital, and hot soup given to any refugee children who liked to come for it.

One of the difficulties which troubled us was the occasional scarcity of fuel. Wood was burnt chiefly, but the local supply was not great. It had to be brought by train and the supply sometimes ran low, so the boiling of water in large quantities was a serious matter. When we arrived there were a lot of small trees along the road in front of the hospital. These were soon cut down by parties in want of fuel. When a train load came in there was plenty. At first our only water supply was from a shallow well. This had to be boiled before drinking. It was muddy, and to clarify it we improvised rough filters out of paraffin tins at the bottom of which was a layer of cotton wool and tow. Alum was added to the water. These filters served their purpose very well until the municipal water supply was laid on to the front of the buildings.

The hard work and want of exercise unfortunately resulted in some cases of sickness among the orderlies and dressers. Our patients objected strongly to open windows, and it required constant watching to keep the wards warm and at the same time ventilated.

At first influenza was the trouble, and then two dressers contracted enteric fever from patients whom they were nursing. Both dressers had been inoculated. One was a mild case, but the other, I regret to say, was very severe and ended fatally, just as we were preparing to return to England. His loss was deeply felt by all. He was a hard worker and careful of his patients, in attending to whose wants he became infected. The Servian authorities showed their sympathy in a way which we will never forget. General Putnik expressed a wish that as the man had died as the result of his efforts to help the Servian sick and wounded he should be buried with full military honours. The General Staff, on behalf of the Servian Army, sent a telegram of condolence to the man's mother in England, and we received many other indications of sympathy from all ranks of the army and from other Red Cross organizations working in Servia. The funeral took place on January 19. The military authorities sent a company of infantry and a band, and representatives of all units stationed in Uskub were present, amongst them Colonel Marinovitch, commandant of the town.

The Russian Red Cross unit from St. Petersburg brought a large wreath of ivy, and Major Mikhailovitch, representing the Servian Medical Service, made a funeral oration at the grave. The Archbishop of Uskub ordered a memorial service to be held in the old cathedral.

During the time we were in Uskub we had many visitors at the hospital. The Crown Prince came to see the patients and spoke to all of them, inquiring where they had received their wounds, and where they came from. He was specially interested in a man who had been wounded at Monastir, and arrived in Uskub almost completely paralysed. He gave orders that the man's relations should be sent for from Servia to see him. These relatives wished to take him home to nurse, but he was not well enough at the time. However, he made great improvement, and when we sent our patients away he was able to walk with assistance. The Servian soldier is hardy and by no means accustomed to luxuries in his home. He is a good patient and is very grateful for all that is done for him.

We were not able to see much of the surrounding country. The time at our disposal in the early afternoon was limited and we could not get far. Nearly all the horses had been commandeered. Colonel Gentchitch sent round one of the staff motor-cars to take a party out to see the battlefield of Kumanovo, about 20 miles away. They had a fine day, and enjoyed themselves thoroughly. He also gave us a free pass on the railway to Salonika for some of our people who were in want of a change. The rest of us never got out of Uskub at all. News of what was

happening in other districts was hard to obtain. The press censorship was very strict. The English papers were our only means of learning how the war was progressing. In Uskub the head of the press bureau was a Captain Georgevitch, who used to send us English papers two or three times a week. An evening entertainment was given by the officers to a number of visitors from Belgrade, who had come up to see the medical arrangements at Uskub. They were all surgeons, nurses and orderlies of foreign Red Cross societies. We were asked to dinner and also as many orderlies as could be spared from duty. After dinner they danced their national dances, which were very quaint and interesting.

It was on that evening that we got orders to pack up and return to England as soon as we were able to hand over the hospital and sick to the care of others. This was not easy, but Colonel Gentchitch arranged that all the wounded fit to travel should be sent to Servia in the next hospital train. The railway bridges near Salonika had been repaired and hospital trains were going up to Monastir to take away the wounded.

The first train that arrived from there was full and there was no room for any from Uskub, so we were asked to wait a few days for the next. In it there was accommodation and we put most of the remaining wounded on board. The others, unfit to travel, were sent to the Military Hospital in the citadel. The dysentery and enteric cases and the ordinary sick were left in the hospital in the charge of a Servian doctor and orderlies. One of our own men was still suffering from enteric and unfit to travel, so we decided to leave a surgeon and some orderlies to take care of him. They reached England about a month after us.

With regard to the hospital train, which took away the wounded who were still undergoing treatment when we received orders to come home, it will probably interest you to hear how it was equipped. It was made up of goods wagons fitted with apparatus for slinging stretchers and ordinary passenger coaches into which improvised beds had been fixed. All the inner fittings of the passenger coaches had been removed and wooden frames for carrying mattresses were fixed to the floor along one side. These frames were made in pairs and stood about 18 in. from the floor. On them were thick straw mattresses. Three patients lying down could easily be placed on each pair of mattresses, so that a coach could carry twelve lying down. Along the opposite side of the carriage was a long seat for patients able to travel sitting up. The doors of the carriage were at the ends, so that there was through communication from one end to the other. In these carriages the patients lay on rigid fixed beds, whereas in the goods wagons the method of slinging the stretchers was supposed to lessen the swaying and jolting of the train. All the patients preferred the fixed beds to the swinging stretchers. Each pair of stretchers was slung on wire ropes which were attached to the floor and roof of the wagon. Windows had been cut in the sides and each wagon was provided with a stove. The spare floor space was occupied



by patients sitting down. It was possible to walk from one end of the train to the other. There was a separate coach for the commandant and officers and one for an office, dispensary, and for dressing any patients who might require it. There were arrangements for cooking soup and boiling water, but the feeding of the patients was mainly carried out at stations where the train stopped. Special station parties were organized by the Red Cross Society for this purpose. They were notified when the train was expected and made the necessary preparations to feed the wounded on their arrival. There was another type of train made of passenger coaches stripped in the same way and fitted with a French apparatus. This was made of iron bars and to these stretchers were attached by means of springs. Twenty-one patients could be accommodated in each carriage.

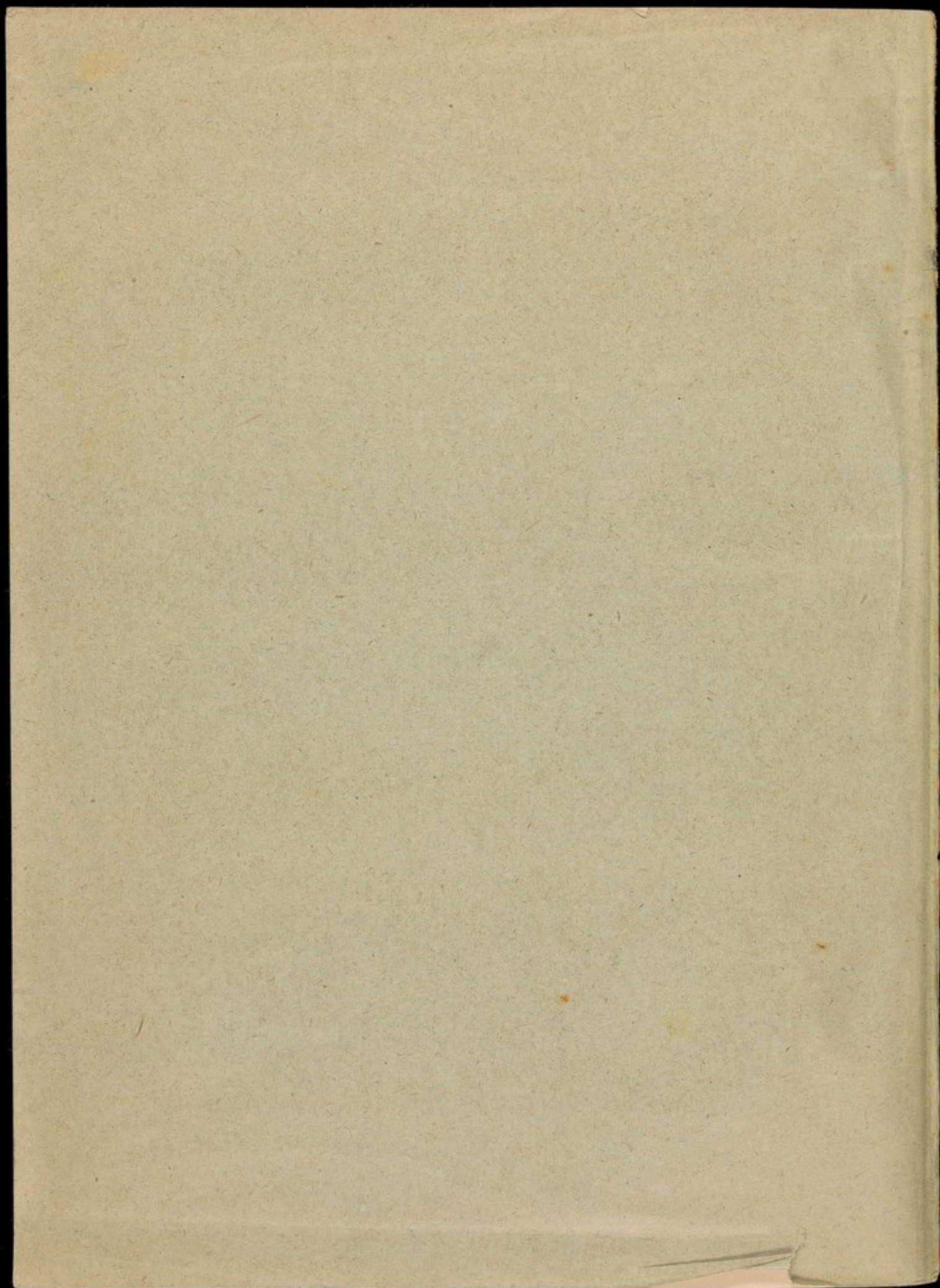
We left Uskub on January 23 by the afternoon train. All articles of equipment worth bringing back to England were sent down and loaded into a truck. There was no equipment in the wards, so we left behind what was necessary for the proper care of the patients still in hospital. Material used in the hospital was handed over to a representative of the mayor of the town for its use, as the buildings belonged to the municipality. Reserve blankets, &c., were taken by the British Vice-Consul for distribution to those who had suffered in the war, and the last of the Oxo was given to the representatives of the Macedonian Relief Fund for use among the poor refugees.

Many officers and friends came to see us off. General Misitch sent us a message wishing us a pleasant journey and regretting that he was unable to come down personally. A band was sent which played "God Save the King" and the Servian National Anthem. We had a great send-off and the Servians showed how they appreciated our work and the goodwill of the British who had sent us out to help them. We arrived in Belgrade next morning and were billeted in the Military Academy. People were anxious for us to wait in Belgrade for a few days in order that they might entertain us, but that was not possible.

Arrangements for tickets had already been made by Surgeon-General Bourke, so there was only the baggage to be weighed and registered. Colonel Sondermayer invited all the medical officers to dinner that evening, and in wishing us good-bye he thanked us cordially for our work and the assistance we had given.

We left Belgrade in the early morning of the 25th and arrived in London on the 27th, when the Welsh Unit, less the small party left behind, was disbanded.

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## MILITARY EXPERIENCES OF TRAUMATIC ANEURYSMS.\*

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LADIES AND GENTLEMEN,—Before I relate to you our military experiences of simple traumatic aneurysm—that is, aneurysm not complicated with injury to bones and viscera—allow me to say a few words on the nomenclature. By traumatic or spurious diffuse aneurysm we mean an injury which produces an extensive and diffuse extravasation of blood into the tissues; by circumscribed traumatic aneurysm, that in which the extravasation is limited by a definite wall in a sac-like manner.

In the case of arterio-venous traumatic aneurysms we may use, in place of the term “aneurysmal varix,” that of *direct arterio-venous aneurysm*; in place of “varicose aneurysm,” that of *indirect arterio-venous aneurysm*; with the addition of the word *diffuse* when there is a diffuse extravasation taking place through large or numerous openings, or *circumscribed* when there is a limited perivascular extravasation.

There are, however, also traumatic arterio-venous aneurysms in which there is no appreciable perivascular extravasation.

To-day, I wish briefly to report to you the cases of traumatic aneurysm which have occurred up to the present time in our military hospitals in connection with the recent Serbo-Turkish and Serbo-Bulgarian wars. These cases were treated by ligation or by suture by 16 different surgeons. Of these, ligation of large vessels was performed on 41 arteries and 4 veins, 45 in all. Partial suture was performed on 17 vessels, 8 arteries and 9 veins. Circular suture was employed on 15 vessels, 11 arteries and 4 veins.

I am indebted to my friend Mr. James Berry for kindly translating this paper into English.

The total number of vessels sutured was 32, comprising 19 arterioraphies and 13 sutures of veins.

Altogether, therefore, operations were performed upon 60 arteries and 17 veins, that is, upon 77 of the greater blood vessels. These operations were performed upon most of the large vessels of the body; the most common seat of operation was the femoral artery, which was tied 22 times and sutured 11 times. (See table of cases at the end.)

These cases occurred among 20,000 wounded, and doubtless there were other cases of which we have not yet received any report. I should now like to make a few observations on these cases.

Not uncommonly these aneurysms first became apparent several days after the infliction of the wound, often not until after the lapse of one to two weeks, or even later still.

The wounded, who up to that time had complained of nothing, then developed the following symptoms: pain, abnormal sensations (paræsthesia), worse in the affected limbs, and swelling of the limb. Now and then the pulsating swelling developed very gradually without any special symptoms, with so little trouble, in fact, that the existence of the aneurysm was sometimes at first entirely overlooked, even by experienced surgeons. The swelling that resulted from the blood extravasation was sometimes small; on the other hand, it was sometimes enormous, especially when resulting from diffuse extravasation. The amount of pulsation was by no means always uniform. Secondary hæmorrhages were by no means rare; often they were very profuse and sometimes even led to a fatal issue.

A serious complication was infection of the extravasated blood.

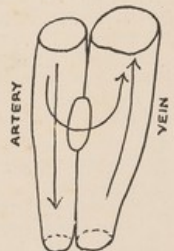
The form and size of the wound in the vessel itself varied a good deal. In the base hospitals, complete transverse division of the vessel was seldom observed in cases of uncomplicated injury to the vessel. Generally there was a greater or lesser defect in the circumference of the vessel, a broad or narrow strip of the wall remaining intact. It was not uncommon to see two holes in a vessel, one on either side of its lumen.

Of especial interest were the arterio-venous traumatic aneurysms in which the well-known characteristic thrill was observed.

Sometimes I noticed that this sign easily led to error in the exact localisation of the seat of lesion. The thrill ought not to lead to such

an error. The upper limit of the thrill, on the cardiac side, does not indicate the situation of the communicating aperture in the blood-vessel. It must not be concluded that the thrill begins at the site of the injury and extends thence peripherally. Much more often it happened that the thrill beginning at the site of lesion, extended centrally, towards the heart, along the vein and peripherally along the artery. In the direction of the heart, the thrill often extended to a considerable distance. In one case of direct traumatic arterio-venous aneurysm of the external iliac artery, I was able clearly to trace the characteristic thrill, on the abdomen of the injured man as far as the liver and behind up to the lumbar region, while on the thigh it descended as low as the upper border of its lower fourth. In cases where both wounds of entrance and of exit have existed and which at the time of operation are often completely healed, and are necessarily covered up by iodine paint or other dressings, I recommend the operator to mark clearly by means of catch forceps inserted into the skin, the exact position of these wounds, so that the exact situation of the wound in the vessel can be accurately located. It must of course lie directly between these two pairs of forceps. Occasionally, in cases where the vessels—an artery and a vein—were bound together with cicatricial tissue and where an aperture of direct communication existed between them, I noticed that the peripheral portion of the artery was perceptibly narrower than the proximal. More remarkable was the condition of the vein, which, as a rule, was considerably larger on the proximal (cardiac) side of the injury than on the peripheral.

In the lower extremity especially it was evident that a not inconsiderable portion of the blood-stream was diverted from the artery, not into the valvular peripheral lower portion of the vein, but into its central portion, thus being sucked upwards towards the heart (see figure). This explains the transmission of the thrill upwards along the course of the vein, towards the heart.



The dissecting out of the vessels is often rather tedious and requires patience.

In certain cases of diffuse hæmatoma in which the blood has come from a simple hole in the vessel, it is not necessary to make any exposure of the vessel by dissection above and below the wound. It is sometimes sufficient to perform a simple suture of the edges of the aperture.

But in the case of arterio-venous aneurysms the artery and vein must be dissected away from each other sufficiently to separate completely the blood-stream of each. Then resection, suture, or ligation can be performed as seems best.

It must be remembered that free bleeding from the peripheral end of the artery is a sign that the collateral circulation has been well established.

Suture is certainly the most difficult and tedious proceeding and is undoubtedly not the right treatment in all cases; nevertheless it appears to be efficacious and to be indicated not only in those cases where it is absolutely necessary, but in others where it can be easily and aseptically carried out.

I cannot to-day discuss the question of technique.

If it is possible to retain strips of the vessel, preserving its continuity, this may be done with advantage by putting the stitches into the wounds of the vessel wall in a transverse direction.

In general an otherwise healthy vessel appears to stand dissection, if not too prolonged, by no means badly.

The hæmatoma must be removed, the bleeding vessels dealt with, and the cavity drained, after complete closure by suture of the incision wound, by other openings specially made for the purpose. In these cases secondary hæmorrhage may occur after several days and be very serious.

No secondary hæmorrhage has occurred in our cases of suture.

In one case of lateral suture of the popliteal vessels progressive gangrene of the foot occurred, evidently from emboli due to thrombus.

The large number (5 cases) of gangrene of the leg following deep ligation of the femoral (3) and popliteal (2) arteries is very striking.

The early surgeons were already acquainted with the danger of such ligation.

On seeing, some months later, cases that have been operated upon we find not infrequently, both in cases of ligation and of suture, greater or less interference with functions, such as muscular weakness, paræsthesia, œdema, etc. On the other hand we find some quite ideal cases.

When should an aneurysm be operated upon? Immediately, of course, in those cases where rupture and hæmorrhage are threatening. In other cases we see sometimes retrogression and even cure without any operation being undertaken. I myself saw, a few years ago, a very large, tense, diffuse traumatic aneurysm due to punctured wound of the femoral artery in its upper fourth. The wound was already healed, but I feared evil, and strongly recommended operation. This the patient refused. A colleague, however, injected gelatine, and the aneurysm disappeared.

We know that many aneurysms are cured by non-operative treatment, especially by well applied digital pressure, but these proceedings are difficult to carry out in military hospitals in time of war. Where the conditions make it possible non-operative treatment should be attempted. I have myself tried injection of gelatine on several occasions for our wounded, but only with transitory success.

If hæmorrhage threatens, if the swelling increases, if pain is severe, if there appears no tendency towards retrogression, then it is certainly better to operate than to wait.

Arterio-venous aneurysms should be operated upon, as they offer small prospect of spontaneous cure, although they often remain stationary for a long time and cause relatively little trouble.

A certain amount of preliminary treatment is useful. It is especially desirable, when there is much swelling, that the limb should be elevated for a time in order to reduce the swelling, if the conditions permit of this.

If operation is undertaken early, within a few days of the injury, the walls of the vessel will probably be found soft and friable, and the stitches will tear out easily. On the other hand, with later operations, three to four weeks after the injury, cicatricial changes are often found which render the dissection to a certain extent difficult. If there is extensive extravasation of blood into the surrounding tissues, the hæmatomata should always be removed.

Simple ligation of the afferent artery, without removal of the clots, may, in certain cases, cut off the circulation completely and thus produce gangrene.

In some cases local anaesthesia is sufficient.

The localisation is often more easy if the operation is performed without the use of an Esmarch's bandage. We did most of our operations without it. Nevertheless, when this is possible, the bandage may be laid loosely round the limb in readiness for use if required. Perhaps the damage to the vessels is also less if Esmarch's bandage be not employed.

If violent haemorrhage suddenly occurs, as it often does while the dissection of the vessels is being carried out, it is not always easy to bring the bleeding points quickly into view. It is frequently possible with surprising rapidity to feel and to close with the finger the hole in the vessel from which the blood is flowing and which is frequently quite large.

It is scarcely advisable to draw far-reaching conclusions from a somewhat small collection of cases. We must, however, remember that cases of this kind are only to be seen in any number in military hospitals in times of war, and experience of this kind is fortunately not common. In the future may it be rarer still!

TABLE OF CASES OPERATED ON FOR TRAUMATIC ANEURYSM.

1. Aneurisma art. carot. ext. Ligatura a. carot. ext. Operator: Rychlik (Prag-Cetinje).	Cured.
2. Aneurisma art. carot. int. Ligatura a. carot. int. Operator: Gjurgjevich (Belgrad); post 4 dies. (Autopsia: Encephalomalacia, pneumonia.)	Died.
3. Aneurisma arterio-venos. direct. A. carot. commun. et venae jugularis int. Sutura lateral. Art. carotis. Ligatura venae jugularis commun. Anaesthesia localis. Operator: Klapp (Berlin, Belgrad), operation performed only a few days ago.	
4. Aneurisma arterio-venos. direct. A. et V. subclaviae. Ligat. A. subclav. Sutura later. Venae subclav. Operator: Soubbotitch (Belgrad).	Cured.
5. Aneurisma A. axillaris. Ligatura A. axill. Operator: Kojen (Uskub)	Cured
6. Aneurisma art. axillaris. Ligatura A. axill. Operator: Kojen (Uskub).	Cured.
7. Aneurisma diffus art. axill. Ligatura A. axill. subseq. gangrena. Amputatio humeri. Operator: v. Oettingen (Berlin, Belgrad).	Cured.
8. Aneurisma diffus art. axillaris. Sutura lateralis Art. Operator: Rychlik.	Cured.
9. Aneurisma arterio-venos. diffus A. et V. axillaris. Paralysis extrem. super. Sutura end to end (post invaginationem) art. axillaris. Sutura lateralis venae axill. Operator: Jedlicka (Prag, Belgrad).	Cured. Paralysis persists.
10. Aneurisma circumscrip A. brachialis. In the first instance Matas' operation; owing to valvular occlusion no passage of blood, consequently resection performed. Circular suture was not successful, as the stitches did not hold, and finally ligature adopted. Operator: Klapp. Operation performed only a few days ago.	
11. Aneurisma art.-venos. direct. A. et V. brachialis. Resectio. Ligatura. Operator: Soubbotitch.	Cured.
12. Aneurisma arter. brachialis. Sutura. Operator: Kojen.	Cured
13. Aneurisma direct art.-venos. A. et V. brachialis. Resectio, sutura circul. A. et V. brachialis. Operator: Slajmer (Laibach, Belgrad).	Cured.

14. Aneurisma diffus Art. cubitalis. Ligatura, evidement. Cured.  
Operator: Rychlik.
15. Aneurisma diffus a. radialis et a. ulnaris in plica cubiti. Sutura a. radialis. Ligatura a. ulnaris. Cured.  
Operator: Soubbotitch.
16. Aneurisma diffus a. interosseeae antibrach. Evidement. Ligatura a. interosseeae. Complete hæmostasis. Cured.  
Operator: Klapp. On the 4th day severe secondary hæmorrhage. Died.
17. Aneurisma diffus art. gluteae. Evidement. Ligatura. Cured.  
Operator: Rychlik.
18. Aneurisma art.-venos. A. et V. iliace ext. Sutura } peripher. art. iliace et sutura lateralis V. iliac. Cured.  
Operator: Jedlicka.
19. Aneurisma art.-venos. A. et V. iliace ext. Sutura circul. art. iliace. Ligatura venae iliace. Cured.  
Operator: F. Bauer (Malmö, Belgrad). Operation performed only a few days ago.
20. Aneurisma art.-venos. direct A. et V. iliace ext. Sutura circul. art. il. ext. sut. lateralis venae iliace ext. Cured.  
Operator: Soubbotitch. Operation performed only a few days ago.
- 21—43. Aneurisma arter femoralis; 33 cases: of these 22 ligated (in one of these lateral suture of the femoral vein as well), 11 cases were sutured. Of the 22 ligated 2 died (sepsis 1, anemia 1). In 3 cases of ligation in the lower third of the thigh gangrene followed and amputation had to be performed (all followed by recovery). The remaining 17 cases recovered without complications.
- Operators: Jedlicka 7, Soubbotitch 5, Willems (Ghent, Belgrad) 4, Babasinoff (Moscow, Belgrad), 2, v. Saar (Innsbruck, Belgrad) 1, Fieber (Vienna, Belgrad) 1, Lewit (Prag, Belgrad) 1, Gjurgjevitch (Belgrad) 1.
44. Aneurisma arter.-venos. direct. A. et V. femoralis. Resectio A. et V. sutura circul. Cured.  
Operator: Groenberger (Stockholm, Belgrad). Result unknown.
45. Aneurisma arter.-venos. A. et V. femoralis. Sutura circul. art. Ligatura venae. Cured.  
Operator: Jedlicka.
46. Aneurisma arter.-venos. A. et V. femoralis. Sutura lateralis art. Ligatura venae. Cured.  
Operator: Jedlicka.
47. Aneurisma arter.-venos. diffus. A. et V. femoral. Sutura circul. arteriae, sutura duplex lateralis venae. Cured.  
Operator: Jedlicka.
48. Aneurisma diffus arter. et venae femoralis. Sutura circul. art. et venae femoralis in canal. Hunteri. Cured.  
Operator: Soubbotitch.

49. Vuln. [sclopet in inguine. Laesio transversalis Arteriae femoralis et lateralis venae femoralis. Thrombosis arter. et venae. Gangraena cruris incip. No blood extravasation, thrombus removed. Resectio et sutura circularis arteriae. Sutura lateralis venae. Gangraena progressiva. Enuclatio coxae. Thrombus obturans in arteria femoralis in canale Hunteri longitud. 3 ctmtr. Cured.  
Operator: Kostitch (Sarajewo, Belgrad).
50. Aneurisma spurium art. femoralis: Vessel wall only grazed, protuberance at this place size of a hazel-nut. Reduced by stitching over. The stitches give; fresh protuberance appears. Two months later ligature of femoral artery. Cured.  
Operator: Babasinoff.
51. Aneurisma diffus. art. femoralis. Sutura lateralis. Cured.  
Operator: Rychlik.
52. Aneurisma diffus. art. femoralis. Sutura lateralis duplex. Cured.  
Operator: Klapp.
53. Aneurisma art.-venos. circumscrip A. et V. femoralis. Sutura circul. A. femor. et sut. lateral venae femoralis. Cured.  
Operator: Klapp. Operation performed a few days ago.
54. Aneurisma art.-venos. direct femorale. Resectio, sutura circul. art. et venae. Cured.  
Operator: Klapp. Operation performed a few days ago.
55. Aneurisma art.-venos. profundae femoris. Ligatura. Cured.  
Operator: Klapp. Operation performed a few days ago.
56. Aneurisma art.-venos. popliteum. Sutura later. venae, ligatura arteriae. Cured.  
Operator: Rychlik.
57. Aneurisma art.-venos. poplit. Ligatura, dein gangraena cruris. Amputatio. Cured.  
Operator: Rychlik.
58. Aneurisma art. poplit. Ligatura, dein gangraena cruris. Amputatio. Cured.  
Operator: Rychlik.
59. Aneurisma arterio-venos poplit. direct. Sutura lateralis A. et V. poplit: Fourteen days later appears acute progressive gangrene of the leg (Embolia). Amputation refused. Cured.  
Operator: Soubbotitch.
60. Aneurisma art. popliteae. Sutura later. art. poplit. Cured.  
Operator: Klapp. Operation performed a few days ago.
61. Aneurisma diffus art. popliteae. Ligatura. Cured.  
Operator: Gjurgjevitch.
62. Aneurisma diffus art. tibialis ant. Ligatura high up. Cured.  
Operator: Rychlik.
63. Aneurisma diffus art. peroneae. Ligatura at its origin. Cured.  
Operator: Soubbotitch.

