easily borne by the skin, it can be placed in actual contact with the tumour in any place without danger of setting fire to the bed-clothes.

It proved most successful, for, even in a ward of the hospital, where the bright sun could not be effectually shut out, the translucency of the hydrocele was made apparent to every student.

ON WOOLSORTERS' DISEASE.

By JOHN HENRY BELL, M.D., Bradford.

DURING the investigation which has been made into the cause and nature of this disease, the following facts have been elicited.

First: It is not confined to wool-sorters, but affects other classes of workpeople who manipulate the wool or hair after it has been sorted. Fatal cases have been observed in packers, washers, preparers, carders, overlookers, and buyers. Until recently, it was not known that wool-sorters were more liable to have external anthrax than other persons. This form of the disease has also been met with in persons who have accidentally come into contact with infective material. A case has been reported of a boy having anthrax on the temple, from lying for a short time upon a bale of mohair; and another, of a gentleman having anthrax on the right temple, from touching some "Van" mohair with his right hand at the warehouse of a friend.

Second: Alpaca and mohair are not the only infective materials. Many fatal cases have occurred from the manipulation of other dry and dusty hairs and wools. "Greasy" wools are less dangerous; it is probable that the "yolk" in them fixes the infective particles. All hairs and wools (excepting Algerian) may at times contain uncleansed fleeces from animals which have died from anthrax, and may occasionally communicate the disease to those who come in contact with them. I have seen such cases from the sorting of British wools, and have heard from my medical friends of others; but the proof is not yet complete.

Third: The disease is not confined to this district; fatal cases have been reported at Leicester, Norwich, Glasgow, Constantinople, and in Massachusetts. I think it will yet be found in other places; and certainly in Peru and Asia Minor, and at the Cape.

Twelve months ago, employers and representatives of woollsorters met Her Majesty's Inspector of Factories, and representatives of the Sanitary Authority, at Bradford, to consider what precautions should be taken to minimise the evils of dealing with foreign hair and wool. Certain regulations were agreed upon. Particular kinds of hair and wool, which were generally believed to be the most dangerous, were to be steeped in water, washed, and otherwise dealt with, before they were sorted. This regulation has been generally acted upon. The result has been most gratifying. Excepting one case, I have not heard of any illness from sorting materials thus dealt with. If "sorted while still damp, as early as possible after washing", as was agreed upon, there will be no risk (some months ago I wrote); "but, if dried too much, I should be afraid of a case cropping up occasionally, because I know the infective germs are not all destroyed by washing in water at 100° to 120° Fahr." The cases I have now to report are of this kind.

Within three weeks, three men, who worked in the same room, have recently died from this disease. These cases deserve particular notice, as each case differs in some respect from those previously published.

CASE I. *Anthraxæmia*.—J. Gill, aged 72, a back-washer, had never been a day from work on account of illness, and had worked for the same firm over twenty-three years. On Saturday, May 14th, 1881, he complained of feeling tired (indeed he had not been very well for several days), but continued his work till giving-up time, about noon. When he returned home, he went to bed, and slept most of the afternoon; during the evening he felt rather cold, had some cramp in the fingers, and noticed that some of them were bloodless and numb. He slept well through the night. On Sunday morning, he complained of a feeling of oppression across the chest, for which he took an emetic. His appetite was not good, but he took some meat and vegetables for dinner. I visited him at 11 o'clock P.M. He complained of nothing except some uneasiness, as if he "had something on his lungs". He did not appear ill, and said he did not feel too ill much, except that, when he raised himself in bed, he felt weak and weary. Pulse 82, soft and full; temperature 97.2°, axilla; respirations 24. No pain or cough; skin moist; tongue slightly coated.

On Monday, May 16th, 10.30 A.M., he had passed a restless night, sleeping occasionally half an hour at a time. The uneasiness and weariness continued. He felt faint if he raised his head from the pillow. He had some thirst, but neither pain nor cough. The percussion-sound on both sides of the chest was clear; the vesicular murmur was on the right side inaudible, on the left side distinct. There were some

bronchial sounds. Respirations 40; temperature in the axilla 93°; in the rectum 101°; pulse imperceptible. The extremities were cold; the blood was stagnating. He died at 11 A.M., in my presence, forty-seven hours after leaving work.

I have attended many cases of this disease when the cough was slight; this is the first case I have known without cough.

I examined blood taken from the finger ten minutes before death, and failed to detect any bacilli. A small quantity, given to a mouse, produced death in thirty-six hours. Non-mobile bacilli were numerous in its spleen.

No *sectio cadaveris* was allowed. Forty-eight hours after death, I saw the body; it did not present the appearances of rapid discoloration and decomposition, which are sometimes seen within twenty-four hours after death from this disease. The left side of the chest did not yield fluid. I removed some from the right side by a hypodermic syringe for examination; it contained numerous long motionless bacilli.

I visited the mill where the deceased had worked, and was shown the various processes to which the wool was subjected before arriving at the machine which he tended. I was told, that, during the last six weeks, a lot of 250 bales of "Van" mohair, which was considered of good quality, had been used. When taken out of the bales, the hair was washed in soap-suds at 120° to 130° Fahr.; then passed through rollers; dried by hot air; sorted; washed, and dried again as before; passed through five preparing machines (or carded), then combed, before it arrived at the back-washing machine, where it passed through soap-suds at a temperature of about 100° Fahr. (at the time of my visit 130° Fahr.). The hair had been manipulated by more than a dozen workpeople before it reached the deceased. At each stage, its infective powers would be weakened. Those who handled it most, when it was most virulent, did not suffer. From this, and many other corroborative instances, it appears probable that the virus may gain access to the blood through some accidental abrasion of the mucous membrane. It is important to notice, also, that twice washing in soap-suds at 130° Fahr. is not sufficient to destroy or remove all the infective particles.

CASE II. *External Anthrax*.—J. R. Baker, aged 58, machine wool-comber, on Monday, May 16th, tended the back-washing machine at which the deceased J. Gill had worked on the previous Saturday. He had always enjoyed good health, was very temperate, and had worked for the same firm nine years. Soon after he commenced work, his left forearm was touched by one of the cog-wheels of the machine—a small portion of skin on the outer surface was nipped and torn; he thought nothing of it, but washed the blood and dirt off with a little wool, which he wet in the warm soap-suds through which the "Van" mohair was passing in his machine. Three days afterwards (May 19th), his forearm was swollen; he was surprised at this, as he "had excellent healing flesh", and went in the evening to consult Mr. Kenyon. On May 20th, he discontinued work at noon; and I saw him immediately afterwards. He said he did not feel ill, but was afraid that he had got his arm poisoned. The forearm was swollen to the hand and the elbow, and pitted on pressure; the injured part was one and a half inches in length, of a crescentic form, and half an inch in breadth at its broadest part; it was not painful, and there was no redness of skin excepting at the edge of the wound. Blood taken from the margin did not appear to contain bacilli.

On May 21st, I saw him at 10.30 A.M., with Dr. Rabagliati and Mr. Kenyon. He had passed a moderate night; slept well, had no pain or feeling of general illness; appetite good, tongue natural. The arm was swollen to its upper third; the swelling of the forearm was very hard, and did not pit on pressure. There was a raised-vesicular rim along the margin of the skin around the wound. Pulse 72; temperature, left axilla 97.5°, rectum 101.2°. Serum from vesicles, examined at 2.30 P.M., contained a few bacilli. Two tubes of this, given to a rabbit, had no apparent effect.

May 22nd, 12.30 P.M. He had rested well through the night; his appetite was good; he had no feeling of illness, no pain, except of fullness from swelling of the back of the hand, which was very tense, and did not pit on pressure. The swelling extended to the shoulder; the upper third of the arm was not so hard as the lower part. Pulse 84; temperature in the left axilla 98.2°, in the rectum 100.7°. Serum from vesicles contained one bacillus in about a score of fields. A small quantity, given to a rabbit, produced no perceptible result.

May 23rd, 10.30 A.M. He had a good night, and felt well; he had no pain, except fullness from swelling of the hand. Soft swelling had advanced over the clavicle and pectoral muscles. His appetite was not so good; he was more inclined to drink. Tongue natural; no cough. Pulse 104; temperature in the left axilla 101.4°, in the rectum 105°. The circumference of the left forearm was 3 3/8 inches more than the right; of the arm, 4 1/2 inches more than the other. There was no redness of skin beyond the vesicular margin of the wound, the surface

of which was covered with a dirty grey-coloured eschar. Serum from vesicles contained a few bacilli; half a drop, given to a rabbit, had no perceptible effect. 9 P.M. He had no pain or distress. The tongue was moist. He had taken food moderately. The swelling had extended over the scapula; as far as the middle, it was hard, terminating by a distinct ridge; beyond, it was softer. In front, the swelling had extended over the chest, and was not so hard as behind. Pulse 116, soft. After he had been helped up in bed to the sitting position, and lay down again, the pulse was 130, and irregular. Temperature in the left axilla 99.8°, in the rectum 104.1°; respiration 24.

May 24th, 10.30 A.M. He passed a fairly good night; was not restless. He had no pain, but some uneasiness over the abdomen, which was relieved by vomiting. He appeared calm and composed. Pulse 130, very small, and difficult to count. Temperature in the left axilla 99.1°, in the right axilla 99.8°, in the rectum 102.3°; respiration 22. Serum from vesicles contained ten to twenty bacilli in each field. The contents of two tubes, given to a mouse, were fatal in seventeen and a half hours. 9.30 P.M. He had a restless day; passed no urine; his appetite was gone; his face shrunken. The swelling was extending; the extremities were cold; pulse imperceptible; temperature under the tongue 95°. He died ten hours afterwards. Serum from the arm contained bacilli; two tubes, given to a mouse forty-five hours afterwards, were fatal in sixty-five hours.

Post mortem examination, made by Mr. Kenyon, nine hours after death. The ends of the fingers were of a dark colour. The upper surface of the scrotum had a dark-red colour. The swelling of the arm was much more yielding than during life. The injured part of the forearm was removed; the cut surfaces were crowded with small interstitial hæmorrhages. There were no pleural effusions, nor enlargement of bronchial glands. The blood was fluid. There was no staining of the endocardium; no subserous petechial spots in the heart. All the viscera were apparently natural. Portions of the internal organs were sent to Professor Greenfield for examination. Serum from the arm contained numerous long motionless bacilli; after keeping two days in a capillary tube, the bacilli were very long and convoluted.

WOOLSORTERS' DISEASE.

By S. LODGE, M.R.C.S., Bowling, Bradford.

JOSEPH BOOTH, aged 62, had suffered from bronchitis several times. He was inconvenienced by hydrocele, and this I had tapped twice or thrice, at distant intervals. He was a somewhat weak, but temperate and regular workman, and found constant employment as a comber, washer, or carder of wool. He was engaged in the latter occupation up to May 4th, and he died early on the 6th.

On the 5th, a message was received from him of the usual character—not a particularly pressing one—and Mr. McArthur visited him. He found him sitting upright in bed, quite sensible, breathing rather quickly but easily; he complained of pain in the head and in the region of the liver; he had vomited some dark fluid. The tongue was furred, and red at the margins; the temperature low; pulse small and quick; the skin moist; and he was blue all over, but especially upon the extremities, both upper and lower. There was great congestion of the lungs, but no *râles* could be detected. The unfortunate man died after thirty hours' illness.

With respect to the certificate, we agreed that it would be safest not to assign a first cause of death; but, as the second, in Mr. McArthur's absence, I wrote "venous congestion".

For important sanitary reasons, it was necessary to have the body removed as soon as possible; but, before the interment, I determined, as far as circumstances permitted, to ascertain the *post mortem* condition; and, therefore, forty-eight hours after death, made a second external inspection of the body, and secured a few tubes of blood from the jugular vein. I had previously mentioned the case to Dr. Bell, and I believe he did the same.

Immediately after death, there was discoloration, almost amounting to blackness, over the face, neck, and chest; but, on my second inspection, when the blood was taken, this appearance had considerably changed; still there was much lividity of these parts, and of the extremities also.

The blood was immediately handed to Mr. Tacey for examination, and he reports having found a few rods, *i.e.*, bacilli, and, when the fluid was stained (according to Kock's method) with aniline violet, some spores. His observations were made with a Zeiss, 16 × 1500 diameters.

The remarkable point in connection with the foregoing case is, that the man was taken ill when employed at a carding machine. The material he was watching, as it passed through the process, had been previously twice washed at a temperature of 130°, and afterwards dried in a swift current of hot air. Of course, it had been carried through the preparing machines (five in number), and twice combed. In fact, when carded, it only required to be rolled into balls to finish it.

SIX CARDIAC AND VASCULAR CASES: WITH REMARKS AND ENGRAVINGS.

By EDWIN RICKARDS, M.A., M.D.,
Physician to the General Hospital, Birmingham.

CASE I. *Stenosis of the Pulmonary Valve: Imperfect Ventricular Septum: Malposition and Narrowing of the Pulmonary Artery: Narrowing of the Descending Part of the Arch of the Aorta.*—John L., aged 21, was an out-patient at the General Hospital, January 1876. He was cyanotic; his lips, ears, fingers, and toes were of a purple hue; his skin was thin; his fingers bulbous; his nails incurved. From his account, there did not appear to be any family tendency to disease or malformation of the heart, rheumatism, syphilis, or disease of the lungs. He earned his livelihood by playing a whistle in the streets. All his life he had been blue-skinned, and subject to attacks of palpitation of the heart, accompanied with cough, shortness of breath, and pain in the chest, the pain extending from nipple to nipple. He was especially liable to these attacks at the end of a long tune and in cold weather. When he was so affected, he said, he became "as black as a coal, and his veins stood out". His hands and feet were always cold. He was fully developed, though somewhat undersized for his age. He was very intelligent. His chest was carefully examined. There were no signs of disease of the lungs; no marked increase of cardiac dulness; no thrill. The apex-beat and impulse were normal. A coarse superficial systolic murmur was heard at the base of the heart, having its maximum intensity at the second left costal cartilage. Between the base and apex of the heart was heard another murmur, soft and systolic, and having its maximum intensity over the sternum on a line with the nipples. At the apex of the heart, the two sounds were distinct, though the first was accompanied by a soft systolic murmur. The pulse, 80 per minute, presented no peculiarity; the temperature in the mouth was 97.4°; the urine was not albuminous.

In consequence of notes being taken of his case by Mr. Spofforth (the physicians' assistant), and of some remarks I made to the students, he was lost sight of until the following December, when he was admitted into the hospital with acute phthisis, of which he shortly died. Between his being an in- and an out-patient, he had three attacks of profuse hæmoptysis. At no period was there any dyspnoea.

A *post mortem* examination was obtained with difficulty, and was made under rigid conditions. The lungs were studded throughout with small cheesy masses of catarrhal pneumonia, some of which had softened. There were a few small cavities. The heart was slightly enlarged, and weighed ten ounces and a half; its muscle was healthy. The aorta was much narrowed beyond the origin of the left subclavian artery. The pulmonary artery was very narrow, and was situated on the right side of the aorta. The right chambers of the heart were dilated, and their walls somewhat thickened; the left chambers appeared of normal size. The septum ventriculorum was deficient at its base, so that the finger could be passed from the right to the left ventricle, and from the right ventricle into the aorta. The pulmonary valve was represented by a conical diaphragm, with a central aperture scarcely large enough to admit of the passage of a crow-quill; in this diaphragm were three deep indentations, showing its origin from the three segments of the pulmonary valve. The auriculo-ventricular and aortic valves were perfect; on all of them were small vegetations, evidently of long standing. The aorta appeared to come off from both ventricles equally. The foramen ovale and ductus arteriosus were both closed. The engraving shows the right ventricle opened along its right border; its anterior part removed; the pulmonary artery turned back and drawn over to the left side, so that the posterior part of that vessel is seen anteriorly in the engraving. A slit has been made in the posterior part of that vessel to expose the conical diaphragm, through which a fine curved probe has been passed. The left ventricle has been incised, and a thick probe passed from it through the abnormal aperture in the septum into the right ventricle. A slit has been made in the anterior part of the aorta. The small vegetation are only apparent on the tricuspid valve, and there indistinctly. I am