venoms of the best known snakes in India, *viz.*: the cobra, Russell's viper, and the krait, the relative proportion of the above factors would be:—

Cobra venom ... A 1+B 7+C 2=10.
Daboia „ ... A 5+B 2+C 3=10.
Krait „ ... A 2+B 4+C 4=10.

Or it may be found that the components of the various snake venoms differ not so much in the proportion of their quantities as in the intensity of their virulence. But whatever be the exact outcome of Mitchell and Reichert's researches, it is satisfactory to know that we are becoming more intimately acquainted with the constitution of this complex and subtle poison.

July 10th, 1883.

REPORT ON SOME OBSERVATIONS IN CONNECTION WITH PNEUMONIA AS OBSERVED ON THE PUNJAB FRONTIER.*

BY G. M. GILES, M.B., F.R.C.S.,
Surgeon, I. M. D.

During the past cold season, while stationed at Delhi, the circumstance of my being associated, in the medical charge of the 15th N. I., with Dr. J. Kelly, late of the 1st P. I., led to frequent conversations between us on medical subjects. One, which roused much interest in my mind, concerned the pneumonia of the Punjab Frontier, the which, he was convinced, was a disease almost specific, and distinct from the acute crupous pneumonia met with in Europe. He was strongly of opinion too, that the disease was at any rate in many, if not in all, cases propagated by contagion.

Not long after, I received orders to proceed to Dera Ismail Khan, and on arrival, was directed to take over medical charge of the 4th P. I. at what appeared to be the end of an epidemic outburst of pneumonia in the regiment.

There were several cases convalescing in the hospital, but only one in whom there was still high temperature and acute disease.

I found that the other medical officers of the station held much the same opinion of the disease as that I had heard from Dr. Kelly. Dr. Mackenzie of the 5th P. I. had indeed recently made an experiment with the view of testing the infectiousness or non-infectiousness of the malady, but with negative results.

Dr. Haig of the 1st P. C. was strongly in favour of the theory of infection, and had collected a small series of cases in which the disease had appeared a short time after contact.

In these days, when the evidence in favour of the part played by microscopic plant organisms in the production and propagation of disease is daily gaining strength, my attention was at once drawn to the probability, or at least possibility, that this disease, too, might be an instance of the same phenomenon.

The bulk of my apparatus was still lying at Calcutta, but I had with me most of my objectives, and amongst them an immersion $\frac{1}{12}$ inch by Ross, and a small portable stand. Luckily Dr. Mackenzie had a heavier stand, and by balancing one of its objectives in the substage well, I contrived to improvise a fairly efficient achromatic condenser.

My first care was to examine the blood and sputa of the patient, who still remained "down" with the disease.

His temperature was still high, 103° (about), copious gelatinous semi-purulent expectoration, marked pneumonic physical signs. In the blood I detected some round particles, less granular and of sharper outline than the faint granular particles, frequently present in blood, when rapid tissue charges are in progress. At the time, though unlike anything I had previously met with in blood, I was inclined to consider them particles of oily matter, gleaned from the skin, whence the drop had been taken. At that period of the case too, it happened that there were but few present, and it was not until afterwards that their constancy, even after careful cleaning of the skin with dilute caustic

* This interesting paper has been placed at our disposal by Surgeon-General Townsend, C.B. It was accompanied by details of cases with descriptions and drawings of microscopical appearances.

potash, taught me to put quite a different interpretation on the appearance.

The sputa shewed little that was worthy of remark, save the great preponderance of *débris* over formed elements. In such a granular mass it was impossible without the aid of special selective staining agents, such as methyl-analin violet, methylin blue, vesuvin, &c., to distinguish any given particles as of parasitic character. The only stain, however, that I had by me was carmine, which is quite useless in an investigation of this sort.

Through the kindness of Dr. DeRenzy, I afterwards obtained some violet ink, (which is often a solution of methyl violet) but unluckily, after a few trials, I found it to be a different preparation, consisting of particles in suspension, and so useless for my purpose.

As long ago as 1865, Villemin in experimenting as to the infectiveness of tubercle found that, in that disease, inoculation with the blood of a living patient produced uniformly negative results, while the subcutaneous injection of sputa was rapidly infective.

On this account, I was in no way discouraged by the non-success of Dr. Mackenzie's blood inoculations, and determined to try the effect of hypodermically injecting sputa.

The two rabbits which he had made use of were still alive and well, and with them accordingly I performed the following experiments.

February 7.—Took some of the freshly ejected sputa of the remaining pneumonia case and mixed it, by means of a spatula, with about an equal quantity of water, beating it until the glairiness was sufficiently broken to admit of the mixture passing through a large hypodermic needle.

Of this mixture, I injected about ℥v. into the pleural cavity of No. 1 rabbit, and the same quantity into the cellular tissue of the back of No. 2 rabbit.

A few hours after the breathing of No. 1 had already become very rapid, and on holding the little animal against the ear, something much like a friction sound could be heard near the point at which the injection had been made.—No. 2 appeared in its normal condition.

February 8.—No. 1 appears sluggish and ill this morning. Respiration excessively rapid, and its sound altered, though neither the normal, nor the abnormal, sounds were sufficiently like those heard in the human subject, to enable one to call the latter tubular breathing.

No. 2 appeared about the same, no sign of swelling at the point of injection.

Evening.—No. 1 evidently very ill. No. 2 appears less lively.

February 9.—This morning No. 1 was found dead, and No. 2 evidently very ill, breathing very rapidly. Temp. 103°.

Necroscopy of rabbit No. 1.

The body is well nourished and sleek. P. M. rigidity well marked.

Chest.—On dissecting back the skin, a small extravasation of blood was found at the site of the puncture.

Both pleuræ full of turbid fluid.

Right lung—(the side of the puncture). Both parietal and visceral pleuræ covered with recent lymph. The point of puncture cannot be made out either on the parietal pleuræ or on the lung.

The lung is deeply congested throughout, but floats, though with difficulty.

Left lung.—No lymph on pleuræ, but both these and lung itself congested. Both lungs break down under very slight pressure with the fingers.

Pericardium.—Distended with a slightly turbid fluid.

Heart.—Right side full of dark coloured fluid blood. Left side black clots.

Abdomen.—Peritoneum normal.

Liver.—Dark coloured and congested.

Kidneys.—Medulla pale, cortex congested.

Spleen.—Natural size and consistence.

Stomach.—Healthy, contains partly digested food.

Intestines—Healthy, large bowel full of fæces.

Bladder.—Distended with urine, high coloured, acid re-action, no albumen. On examining the pleuritic fluid with the immersion lens, it was found to contain, besides leucocytes, multitudes of small rounded particles non-granular with fairly

bright contour. They varied somewhat in size, from about $\frac{1}{40,000}$ inch to $\frac{1}{20,000}$ inch in diameter.

The collected fluid was put aside in a small gallipot and covered with a piece of glass.

On examining it the next day, (February 10th,) the fine dots were found collected into zoogloea like masses, and contained, in addition, some larger and brighter particles reaching the size of $\frac{1}{20,000}$ to $\frac{1}{15,000}$ inch in diameter (about), round, and containing a central dot (nucleus). On the previous day no such nucleated particles had been observable. On the day after, the smaller sort were less numerous, and on the next, all had disappeared. The blood contained similar minute particles.

At this stage of proceedings, I was anxious to try if the fluids of the dead rabbit were also infective, but to my great annoyance the person from whom Dr. Mackenzie had obtained his rabbits, would not let me have any more on this account; I had to make my further experiments with dogs instead of rabbits.

February 10th, morning.—Rabbit No. 2 appears slightly better, but is still breathing extremely rapidly. Temperature 99°.

Examined its blood and found it contained great numbers of micrococcus like particles, exactly similar to those found in the serum from rabbit No. 1's pleura. In one or two places I found these collected into zoogloea like masses, and, what was still more remarkable, there were also present a number of the larger nucleated cells, quite identical in appearance with those to be seen to-day, (one day after death) in the pleuritic serum that had been put aside from necroscopy on rabbit No. 1

To-day I injected ℥. xv. of the pleuritic fluid from rabbit No. 1, into the subcutaneous cellular tissue of the back of a healthy bitch of moderate size, the animal's temperature at the time being 102·1° F.

In the evening, rabbit No. 2 appeared again worse; refusing to eat.

The bitch appeared none the worse as yet, beyond slight effusion, marking the point of injection. Temperature 102·4°, Resp. 36.

February 11th.—Bitch appears fairly well, except local tenderness and swelling. Temp. 102·8°; no micrococcus like bodies can be made out in the blood.

Rabbit No. 2 very sluggish this morning and breathing with great rapidity; at 1-30 P. M. the animal was evidently dying, and its blood was found to swarm with micrococci, all three forms (large, small, and zoogloea) being represented.

At 2-30 P. M. it died.

An hour afterwards, having obtained the kind assistance of Dr. Haig, 1st P. C., I made a necroscopy as below.

Body in good condition, but coat rough and staring. Rigor mortis as yet undeveloped.

No trace of the point of injection can be made out.

On opening the chest, a quantity of turbid fluid welled out from each pleura.

The pericardium was also distended with a somewhat clearer fluid.

Pleura coated with recent lymph, which has caused extensive adhesions over both lungs.

The cut bronchi exude a watery frothy excretion.

Right lung—Floats as a whole. Base and lower part of upper lobe consolidated almost throughout, not in an uniform manner.

The outer surface and sections presented a curious appearance, being mottled all over with airless consolidated patches, which, failing to collapse, stood out in relief above the narrow, still crepitant interspace. Hence even the parts most advanced in consolidation still floated.

Left lung—Generally similar to the right, but consolidation of base not so far advanced.

Heart—On removal was found to be covered with a coating of recent lymph, which in places had caused adhesions to the pericardium.

Right cavities full of dark fluid blood. The left nearly empty; no clots.

Peritoneum, Liver, Kidneys, Spleen.—All normal.

Stomach—Contained some half digested food.

Intestines—Natural, large bowel empty.

Bladder contains some urine of acid reaction, which with nitric acid gave a doubtful albumen reaction.

The blood and pleuritic fluid contained abundance of all three forms of organism.

11th, evening.—Dog restless; considerable local swelling. Temp. 102°.

It will, however, serve no purpose to follow closely the further daily history of this animal, as the experiment had a practically negative result.

A large abscess formed in the site of the injection, which was opened on February 13th, and gave vent to a quantity of foul stinking pus.

The pus which was evacuated contained immense numbers of the smaller, and some of the larger nucleated bodies, and in addition swarmed with the bacteria usually found in decomposing pus, but at no period was there any appearance of micrococci in the blood, and as soon as the abscess was evacuated, the animal rapidly recovered.

At first I was inclined to impute this failure to the circumstance of the serum, during the exposure to the air, having become infected with the ordinary septic bacillus, and hence, from its irritating character, causing local inflammation and the encystment of both poisons. That this, however, was not the only reason, the two following experiments will show.

February 13th.—(By this time a fresh outbreak of the disease had supplied me with several new cases for observation.)

Injected some freshly ejected sputum, from an active case, into the pleural cavity of a pup. The animal never shewed any sign of inconvenience, no micrococci could at any time be made out in the blood, nor any sign of lung trouble.

About a fortnight after, I again injected some fresh sputum into the subcutaneous cellular tissue of each of the dogs, no result whatever following in either case. On this account I conclude rather that dogs are not capable of being infected. This is the more probable, as the non-infectibility of certain genera of animals is a common phenomenon in the history of most microphytic diseases. Koch, in his experiments on the septicæmia of mice, found that it was impossible to communicate the disease he had produced in the house mouse to field mice or to rabbits, and the same is the case with anthrax, which though communicable with most deadly certainty from the horse to man, and to many other very diverse animals, yet exhibits the same eccentricity of being non-inoculable on other animals, often closely allied to the original host of the parasitic bacillus of that disease.

I made also one other experiment with a rat, injecting, as I intended, some fresh sputa from one of my patients into the chest. The animal lived for over a week after, and appeared fairly healthy, when I left Dera Ismail Khan, early in March, to make a tour of the outposts.

It died during my absence, and Dr. Mackenzie, 5th P. I., makes the following note.

Chest.—Healthy, injection seems to have gone into the peritoneal cavity, just under diaphragm at one side of lower end of the sternum.

Peritonitis and enteritis present. Bowels black, and covered with recent fibrinous exudation. As the little animal struggled a great deal, and was moreover very pugnacious, it is very probable that my needle, missing its aim, passed through the lower part of the chest into the abdomen as described in the note.

Dr. Mackenzie was unable to make any microscopical examination of the peritoneal fluid, as I had taken the immersion glass with me, with the view of investigating the nature of a case of "Ludianah" disease that had occurred in a horse at Tonk. I may here remark incidentally, that I am convinced that this disease is identical with the malignant carbuncle of cattle, (the localized form of anthrax), met with in Europe. I am fairly familiar with the bacillus of this disease, having seen several preserved microscopic specimens as well as photographs of the bacillus.

The fluid from the tissues of the huge slough, which extended over the whole of the lower part of the face and neck of the unfortunate animal, swarmed with the, comparatively speaking, huge bacilli characteristic of the disease, and were also present in the blood, though

in nothing like the same numbers.

The spleen, it is true, was not notably enlarged, but the animal appeared to have died of the local disease before it had time to extend largely to the blood generally.

On my return from the outposts, I made an examination of the tissues of the rabbits and also of the horse.

In the tissues of the former I could not with any certainty make out any micrococci, but in the absence of any means of differentiative staining, this was hardly to be expected, and it was only with much difficulty that I assured myself of the presence, in the organs of the horse, of the much larger and more characteristic bacilli.

Some attempts were also made to cultivate these bodies both in a rough substitute for "Pasteur's" fluid and also in some clear serum from an ascitic patient. With a doubtful exception, however, the results were negative.

Probably a constant temperature approaching that of the blood is needed for their propagation, but I had no means whatever of attempting an experiment under such condition.

It will be observed, however, that this organism propagated well enough in the abscess cavity of the bitch, in spite of their failing to enter her blood and infect her with pneumonia.

I made some attempts, too, to photograph these bodies by connecting a small landscape camera with the microscope, but the resulting apparatus was so shaky that I failed to get any satisfactory negatives.

This closes the experimental side of these observations. Let me now turn to the clinical aspect of the question.

(*To be concluded.*)

MEDICAL WOMEN FOR INDIA.—Mrs. Scharlieb had the honour of being received by the Queen on the 12th instant before taking her departure for Madras, where she intends to practise her profession. During the interview Her Majesty made many inquiries respecting the condition of the native female population of India, and displayed much interest in the facts which Mrs Scharlieb, from personal experience, was able to give her on the subject. At the conclusion of the interview the Queen presented Mrs. Scharlieb with her likeness, and desired her to tell the women of India of all classes that she was much interested in hearing about them and that they had her fullest sympathy.

REPORT ON SURGICAL OPERATIONS PERFORMED IN THE MAYO HOSPITAL, LAHORE, DURING 1882.

BY EDWARD LAWRIE, M.B.,
Professor of Surgery.

TABLE I.

Description of Operations.	Number of Operations.	Died.
I.—*Operations on eyeball.*		
1. Iridectomy ...	40	
2. Solution of lens ...	3	
3. Extraction of lens ...	321	
4. Puncture of globe ...	2	
5. Staphyloma ...	3	
6. Excision of eyeball ...	6	
7. Lachrymal fistula ...	3	
II.—*Operations on joints.*		
1. Reduction of dislocation ...	1	
2. Extension of stiff joints—		
(*a*). elbow ...	1	
(*b*). shoulder ...	1	
(*c*). hip ...	1	
3. Excision of joints—		
(*a*). elbow ...	1	
(*b*). shoulder ...	2	
(*c*). hip ...	1	
III.—*Operations on bones.*		
1. Excision for necrosis ...	16	
IV.—*Amputations.*		
A.—For injury—		
1. Primary of forearm ...	2	
2. „ „ arm ...	2	
3. „ „ leg ...	3	
4. „ „ thigh ...	1	1
5. Secondary of shoulder ...	1	
6. „ „ hip ...	1	
B.—For disease—		
1. Thigh ...	3	
2. Foot ...	3	
3. Arm ...	1	
4. Fingers ...	6	
5. Toes ...	3	