gametes of the formula either *Ab* or *ab*. Exactly the same considerations must be borne in mind in dealing with individuals belonging to Group III. Here again it is possible to have homozygous individuals of the genetic formula *Ba Ba*, or heterozygous of the formula *Ba ab*.

This possibility of homozygous and heterozygous individuals must always be taken count of in determining the groups to which an offspring of any two parents may belong. So far as can be ascertained from his paper it appears that it was failure to grasp the possibilities underlying matings involving heterozygous parents which induced Buchanan (1922)⁷ to deny the value of the blood groups as evidence of non-paternity.

For individuals of Group I. four genetic constitutions are theoretically possible—*AB ab*, *AB AB*, *AB Ab*, and *AB aB*.

Group IV. consists of double recessives; for individuals belonging to it only one formula, *ab ab*, is possible.

Medico-Legal Application.

On the basis of the above considerations the medico-legal application of the subject may be summarised as below (Table II.).

TABLE II.

When parents are—	Children must be—	Cannot be—
II. + II.	II. or IV.	I. or III.
III. + III.	III. or IV.	I. or II.
II. + IV.	II. or IV.	I. or III.
III. + IV.	III. or IV.	I. or II.
IV. + IV.	IV.	I., II. or III.

The first, third, and fifth of these types of mating constitute by far the majority of unions.

When parents are *I. + I.*, *I. + II.*, *I. + III.*, *I. + IV.* or *II. + III.*, the offspring may belong to any of the four groups. Such unions constitute only a very small proportion of all matings, owing to the rarity of Groups I. and III. The first type has not yet been observed. (Table III.)

TABLE III.

When children are—	Parents may have been—
Group I. . . .	Groups <i>I. + I.</i> , <i>I. + II.</i> , <i>I. + III.</i> , <i>I. + IV.</i> , <i>II. + III.</i>
Group II. . . .	Groups <i>I. + I.</i> , <i>I. + II.</i> , <i>I. + III.</i> , <i>I. + IV.</i> , <i>II. + II.</i> , <i>II. + III.</i> , <i>II. + IV.</i>
Group III. . . .	Groups <i>I. + I.</i> , <i>I. + II.</i> , <i>I. + III.</i> , <i>I. + IV.</i> , <i>II. + III.</i> , <i>III. + III.</i> , <i>III. + IV.</i>
Group IV. . . .	Any combination of groups.

In considering the actual usefulness of the above table it must be borne in mind that unions involving Group I. are extremely rare.

The whole matter may be summarised in von Dungern and Hirschfeld's two original propositions: (1) that the properties A and B cannot appear in the blood of the offspring unless present in the blood of the parents; and (2) that the appearance of the properties A or B in the offspring, when absent in the parents, constitutes proof of non-paternity.

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TWO CASES OF SYMPTOMLESS PERFORATION OF THE OESOPHAGUS

REVEALED BY SEQUELÆ IN THE LUNGS.

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IN the following case the assumption is that a fish-bone or similar object caused perforation of the oesophagus and pleura, and opened up the way for the entry into the lung of septic organisms. Hæmoptysis in children is uncommon, and in this particular case the clinical history did not afford any clue as to its origin.

History.—A girl, aged 8 years, was admitted to St. George's Hospital under Dr. J. S. Collier on April 19th, 1922, having just previously coughed up about half a pint of blood. She had had a trivial cough for a few days, but there was no history that any foreign body had been swallowed or inhaled. The child had previously enjoyed good health. A history suggestive of pulmonary tuberculosis in the child's father was obtained.

Condition on Admission.—The patient did not appear very ill. There were signs of dullness on percussion of the right side of the chest low down in the axilla and back, with diminished vocal fremitus over the dull area, together with harsh breath sounds and prolonged expiration. The left lung was clear, and there was no pain or dyspnoea. Temperature 102° F., pulse 120, respirations 24.

Further History.—There was more hæmoptysis on the 20th and 21st. This sputum contained no organisms. On the 21st the breath became foetid, and the physical signs at the base of the right lung had become more pronounced. The daily range of temperature was from 100° to 103°. On May 23rd the patient began to cough up offensive sputum containing pus cells and many organisms, chiefly streptococcus and *M. catarrhalis*. From this time onwards about 5 oz. of sputum were expectorated daily. On the 25th the breath sounds heard at the base of the right lung were indefinite and there was a patch of skodaic resonance above this. On this day an X ray examination revealed no foreign body, but it showed an irregular opacity of the lower two-thirds of the right lung, and suggested the presence of a cavity near its base. From this time the patient gradually got weaker and the right side of the chest scarcely moved with respiration. Death took place on May 16th.

Autopsy.—At the autopsy, performed by Dr. R. Donaldson, the trachea and bronchi were normal. The left lung was congested with a patch of collapse near its apex. The right side of the chest was full of dark brown, foul-smelling fluid, containing fragments of disintegrated lung. Only the lower part of the lung was left, and this was almost completely gangrenous, the few areas not so affected being solid and gelatinous in appearance. It was impossible to say what had become of the pleura because the lung was so completely destroyed. There were no adhesions whatever, and no enlarged glands could be found. A small sinus, just large enough to admit a probe, led from the right side of the oesophagus, at its lower end, into the gangrenous mass in the right pleural cavity. No foreign body could be found anywhere. The liver and myocardium showed cloudy swelling.

The second case illustrates the possibility of morbid changes in the lungs leading to a fatal issue some years after perforation of the oesophagus, probably caused by a foreign body, and furnishing no symptoms at the time.

History.—A man, aged about 49, was admitted to St. George's Hospital on March 11th of this year complaining of dyspnoea and pains in the chest, especially on his right side. He had been compelled to leave off work five days previously owing to asthenia. For over 20 years he had suffered from bronchitis and emphysema, and had been in hospital several times. The last occasion was in the winter of 1917, when he had three "fits," accompanied by hæmoptysis, and on one occasion also by vomiting. He had never had any further "fits," but always had a considerable amount of expectoration, sometimes blood-stained. His sputum had been examined from time to time, but tubercle bacilli had never been found.

Condition on Admission.—His temperature was 100°, his pulse 100, and his respirations 33. His thumbs, but not his fingers, were "clubbed." He had advanced pyorrhœa, and his urine was loaded with albumin. His chest was barrel-shaped and moved well with respiration. The percussion note was resonant. Râles were heard all over the chest and expiration was prolonged. The heart was normal. There were no other signs of importance.

Further History.—During the next few days he expectorated about 6 oz. of sputum daily, which, on examination, contained pus cells, streptococci, and *M. catarrhalis*. On March 17th he had a hæmoptysis and expired immediately.

Autopsy.—At the post-mortem examination, performed by Dr. Donaldson, the following interesting condition was revealed. In the œsophagus opposite the bifurcation of the trachea there was a small puckered area, across which one or two narrow fibrous bands were stretched. Behind these bands a small opening was found which led downwards and opened into the right bronchus just beyond the bifurcation of the trachea. This sinus had been present for a considerable time, as there was no sign of surrounding inflammation. The trachea and bronchi contained much coagulated blood. There were dense adhesions of the pleural surfaces at the base of the right lung. The left lung was voluminous, and there were slight œdema and congestion of the lower lobe. The right lung was smaller than the left. On the pleural surface towards the lower part of the upper lobe a small irregularly-shaped yellow area was seen showing through the thinned superjacent lung tissue. On cutting into this a small abscess was found embedded in the lung surrounded by consolidated and partly necrotic tissue. In the vicinity of the area were two small, hard, gritty particles situated near a branch of the right bronchus. These particles were analysed and found to consist of cadmium. Possibly they may have been used in stopping teeth. Elsewhere the pulmonary tissue was congested, but there was no other area of consolidation. No evidence of tuberculous disease was found. The heart showed no changes of importance. Both kidneys were enlarged and in a state of subacute glomerulo-tubular nephritis.

I am much indebted to Dr. Collier for allowing me to report these cases, and to other members of the staff for their reports and advice.

THE USE OF THE THORACOSCOPE IN CASES OF ARTIFICIAL PNEUMOTHORAX.

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A PROPER investigation of the nature and extent of adhesions in cases of artificial pneumothorax is essential to the successful treatment of many of these patients. When partial adhesions hold up the lung from a good collapse, then, even if clinical improvement sets in, the presence of the adhesions is liable to give rise to two troublesome complications later on. Because the compression is held up by a band or fan-like adhesion attached to a rib, the intra-pleural pressures are rather more liable to exert an influence upon the mediastinal membranes, and encroachment of gas on to the opposite side of the thorax is more apt to occur and interfere with the functioning of the opposite lung. Again, owing to the adhesion, at a later stage of the proceedings, and sometimes unfortunately early, the lung opens out again and gradually adheres somewhat extensively to the thoracic wall. This is particularly liable to occur in cases which develop fluid.

The investigation of adhesions in an established pneumothorax is best carried out by two means, viz.: (1) careful screening in the X ray room, and (2) inspection through the thoracoscope. The screening should be done with the patient in the upright position and be so carried out that he is turned about so that the rays pass from different angles through the chest. The pioneer work of Prof. H. C. Jacobaeus has shown¹ that the introduction of a thoracoscope is a simple procedure when there is an appreciable gas cavity present into which to introduce it, and my own experience, though small, entirely corroborates this. I have now looked into the pleural cavity in five cases; on the first two occasions at Vejlefjord Sanatorium in August, 1921, just before and just after Prof. C. Saugmann cauterised some adhesions; and on the other occasions at Bramcote Sanatorium, Nuneaton, on July 6th, 7th, and 8th, 1922. Through the kindness of Dr. Peter W. Edwards, at that time medical superintendent of the sanatorium, I thorascoped some of his patients. So little did the operation upset the patients that they were in two instances polishing the

floor of the wards in the morning the next day but one after the operations, which were performed late in the afternoon under careful local anæsthesia preceded by a small dose of scopolamine and morphia; and in the case of one of the patients he actually went to sleep during the course of the proceedings. Unfortunately it was in this, the third case of four Dr. Edwards and I chose, that the instrument failed. A short circuit developed in the distal part of the thoracoscope, and it was while attempts were being made to rectify it that the patient went to sleep with the cannula in his chest. At that time I had not got a second instrument at hand, and was not able to get the defective one repaired for many weeks; hence I was unable to proceed with the fourth patient. This was a great disappointment because this patient had been purposely left to the last as being one, with two or possibly three thin lateral adhesions, which looked like being easy to cauterise. It is an interesting point, however, to learn that the present state of this patient, according to Dr. Edwards's successor's report on Nov. 18th, 1922, is "fair as to his general condition; he has very little cough and sputum, and his exercise capacity equals about three miles a day walking." The third Bramcote patient had adhesions of such a nature as deterred me from attempting cauterisation. But had I had Prof. Jacobaeus's experience I should have tackled them because they seemed to be holding up the lung very definitely from a good degree of physical collapse, though not, from clinical symptoms, appearing to be interrupting progress. Yet his present state was first rate. He now works in the sanatorium's carpenter's shop and has a "most satisfactory general condition," while doing "a full day's work without resting."

A CASE OF RAPID AND FATAL ABSORPTION OF CARBOLIC ACID THROUGH THE SKIN.

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THE following unusual accident occurred on Oct. 20th, 1921, when a man, aged 30, in robust health and sober habits, was taking home a bottle of crude carbolic acid as a disinfectant for the house. He travelled home by train, a journey of about 20 minutes.

From what the coroner ascertained at the inquest it would seem that the man was only just in time for his train, which was crowded, and in hurrying to get into a carriage he probably broke the bottle of carbolic acid in his pocket. On arriving at his destination he appears to have made an attempt to leave the carriage, but fell back again into his seat and was thought by the other occupants of the carriage to be intoxicated. At the next station he was helped out of the carriage, but fell. The station-master, who had received first-aid instruction, gave the following information:—

About 6 P.M. on Oct. 20th he was called by his staff to the man, whom he found lying on the platform unconscious, as if he had fainted; his breathing, quiet at first, became noisy like snoring, the pulse seemed steady, the eyes did not respond, there was no burning of the mouth, the breath did not smell of alcohol. He noticed some twitches, but there was no irritability; the man just seemed "dead to the world." He observed that his trousers were damp and that he had broken a bottle of carbolic in his pocket. He called a doctor, who thought the man had had a stroke and fallen and ordered his immediate removal to hospital.

Condition on Admission.—The patient arrived at Whipps Cross Hospital at 7.5 P.M. and was seen by one of us. He presented the following conditions:—

Extensive carbolic acid staining and burning of the left hip, left thigh, and scrotum; unconsciousness with stertorous breathing; lungs filled with loud mucous râles; pulse regular and of good volume; heart normal; abdomen normal; pupils contracted. There were no signs of burning about the mouth or throat.

¹ THE LANCET, Dec. 2nd, p. 1184.