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CASES OF PURPURA, ENDING FATALLY, ASSOCIATED WITH HÆMORRHAGE INTO THE SUPRARENAL CAPSULES.

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I AM not aware that this pathological connection has been noted in any of the familiar text-books on Dermatology, and the cases in which the association has been recorded are so few that I think it may be worth while to draw attention to the subject, especially as no fewer than four cases have come under observation at the East London Hospital for Children, Shadwell, during the past six months. The symptoms in all these cases, and in a number of others which I have been able to collect, are so similar and so constant as to form quite a recognizable clinical group. I hope to make this evident in the course of this paper.

I shall be met at the outset with the objection that the association is so rare that it may be merely accidental. That it is undoubtedly rare is evidenced by the complete absence of any allusion to it in all the formal articles on Purpura that I have been able to consult. In one of the latest of these, by Dr. Stephen Mackenzie,¹ the results of an examination of 200 cases of Purpura which occurred at the London Hospital are given; in none of these was there hæmorrhage into the suprarenals, though occurring in numerous other organs

therein specified. In order, therefore, to see how far one is justified in assuming a causal connection between the two phenomena of suprarenal hæmorrhage and purpura, one should consider (1) cases which unite both factors, and (2) cases in which either event occurs without the co-existence of the other. It is fortunate for this inquiry that very complete investigation has usually been possible, inasmuch as all the cases have been examined post-mortem, and, in many instances, bacteriologically. The paucity of records is thus partly compensated for by the great fulness of detail with which these have been compiled. I shall consider first the cases under

GROUP I.—*Cases of hæmorrhage into both suprarenal capsules, proving rapidly fatal, in which Purpura was noted before death.*

All the four cases observed at Shadwell are included in this group. In recording these, it is my pleasurable duty to thank Drs. Eustace Smith and Coutts, my senior colleagues at the Hospital, for permission to make use of the notes of the cases, which were eventually admitted under their care. Of the four cases, two were first seen by me in the out-patient department. My best thanks are also due to Dr. Clive Riviere, Pathologist to the Hospital, who performed the post-mortem examination in all four cases, and conducted the bacteriological investigation of the blood where this is recorded.

I shall describe the cases in the order in which they occurred:—

CASE 1.—George F., aged 11 months, was brought to the hospital on February 4th, 1901, with the following history:—

He had been quite well the previous day, and was playing about as usual. At 9 P.M. he went off to sleep, and was apparently quite well, but within fifteen minutes he awoke, and vomited a little; the character of the vomit was not ascertainable. He slept again, but fitfully, throughout the night. There was no further vomiting, and no diarrhœa until the morning of February 4th, at about seven o'clock, when he began to have loose green and yellow watery motions at intervals until his admission into the hospital. The child on awaking seemed peevish and ill, and cried when being washed. The mother then for the first time noticed one or two "spots" or "blotches" (hæmorrhages) on the back, and several more of these came out during the morning, until she brought the child to the hospital, at 9 A.M. The child had been fed on the breast since birth; latterly, in addition to the breast he had been given some bread and butter, toast, potato, etc.; but the diet throughout seems to have been unobjectionable, and calls for no remark.

The child had had no specific illness—no measles, whooping-cough, or varicella. He had not been vaccinated; he had had no eruption on the skin previously at any time. There was no small-pox in the house or neighbourhood; there were five other children in the family, all older; none of these were ill in any way. The parents had lost no children and were apparently healthy, except that the father

had "rheumatics." There was no "consumption" in the family. Besides the father and mother and six children, no other person lived in the house. The mother knew of no infectious diseases being epidemic in the neighbourhood. When first seen, about 10 A.M., the child was obviously moribund; he was lying quite still, with eyes half open and glazed. The respirations were shallow and slow, the extremities cold, the pulse could hardly be detected at the wrist, the face was cyanosed and the lips were livid. The body felt hot. There were very numerous hæmorrhagic patches, more thickly distributed on the chest, abdomen, thighs, and back; less thickly on the face, arms, legs, scalp, forehead, and behind the ears. The spots varied in size from that of a pin's head to that of a threepenny-bit; they became larger as the child grew worse, and passed insensibly into large mottled areas. They were irregular in shape, and varied in tint from red to purplish red. They were not raised at all above the surface of the skin.

The child was too ill for detailed examination, but some loud sonorous rhonchi were detected in the chest. There was no cough, and no catarrh of the eye or nose. He was admitted at once, and died within four hours after the first hæmorrhages on the skin had been noticed. The body underwent rigor mortis almost immediately after death, and was quite rigid within two hours. The post-mortem examination was performed four hours after death. The body was well nourished. There was extensive post-mortem staining. The body was covered with petechiæ and larger hæmorrhages, being most marked on the back, where the largest were the size of a threepenny-bit; next to this, on the thorax and abdomen, and least marked on the hand and feet. In addition to this there was dark red mottling which was not present during life. There was no œdema; and the eyes were not sunken, as in profuse diarrhœa. The tongue was furred; the back of the tongue and the fauces were injected. The larynx, trachea, bronchi, and œsophagus were normal. There was some emphysema and collapse of the lungs, but no hæmorrhage and no other morbid appearance. The heart was natural. The glands in the thorax were normal. The stomach was natural. There was no unnatural injection of the intestines, but the Peyer's patches throughout the whole length of the small intestines were much swollen and prominent, as in the early stage of typhoid. There was no ulceration or hæmorrhage in the intestines with the exception of a few minute petechial spots on the peritoneal surface. The mucous membrane of the large intestine was rugose from muscular contraction, and also appeared thickened. There was no marked hyperplasia of the solitary follicles. At one point there was a minute hæmorrhagic spot on the mucous membrane. The mesenteric glands were much enlarged. The liver weighed thirteen ounces, and showed nothing abnormal. The gall-bladder was normal. The spleen weighed $1\frac{1}{2}$ ounces, and was large and firm. There was a small splenulus. The kidneys were injected at the bases of the pyramids, but were otherwise natural. The suprarenals were both very large. They appeared dark red in colour and were apparently the seat of hæmorrhage. The bladder was normal. The brain, meninges, and all the other organs, were normal.

Microscopic Examination.—The whole tissue of the suprarenals was pretty evenly filled with extravasated blood, giving the appearance of a hæmorrhagic infarction. There was much hyperplasia of the lymphoid follicles in Peyer's patches, but no ulceration. Cultures from the splenic blood gave growths of *Bacillus coli communis*; cultures from the heart's blood grew a saprophyte.

These were probably due to a terminal infection and in no way causative of disease.

A portion of the skin with a purpuric patch was excised and examined by the writer. Figure I., being a section of skin from the case of George F., shows a vessel of the subpapillary plexus of the skin, cut longitudinally. The papillary offshoot and the main vessel are both seen to contain cocci, in the first case arranged in a clump, and in the second case arranged in threads; the appearance of the latter being indistinguishable from threads of streptococci. The section passes through the purpuric patch, which is easily visible with the naked eye in unstained specimens. The vessels in this area are seen to be much dilated and more conspicuous than is natural. No rhexis of the walls can be made out. Between the collagen bundles are fairly numerous cells, probably leucocytes. No cocci were found in the tissues; they seemed confined to the vessels.

Sections of the suprarenal capsules were also cut and stained for micro-organisms with a negative result. The hæmorrhage was seen to be especially marked in the medulla, but extended throughout the organ; blood-corpuscles were found separating the suprarenal cells, many of which appeared destroyed. There was a considerable deposit of blood-pigment granules in the hæmorrhagic area. The general contour of the organ was preserved intact, and there was no difficulty in distinguishing the medulla from the cortex.

CASE II.—The second case was admitted exactly two months later, on the 4th April. William G., aged 12 months, was the first child of his parents, who appear to be healthy. The child was quite well on the day previous to admission; he became fretful towards six o'clock on the evening of this day, and at eight o'clock seemed feverish and ill. He was seen then by a doctor, who gave him "medicine" and "a powder." He had two doses of the medicine and one of the powder during the night. At midnight he awoke and vomited once; the vomit being "thick and yellow" and smelling "faint." He began to breathe badly towards the early morning, and vomited a second time at 7.30 A.M., the vomit then being "brown" and "slimy."

He had one motion during the night which was dark brown and stained the receptacle. The motion had previously been costive; there had been no diarrhoea.

He was bathed in the morning before coming to the hospital, and no spots had then appeared on the skin, but the mother noticed their eruption during the transit to the hospital.

The child had been fed on Anglo-Swiss milk, egg, bread and butter, fish, milk puddings, etc. He had been treated at the East London Hospital as an out-patient for a month when he was five months old. He had a red rash at this time all over the body, but this had lasted only one day. He had had measles in the last week of last year; the rash then lasted a week, but he got quite well. He had been vaccinated when 2-3 months old, and there were two good marks. He had not had diphtheria or small-pox, and there had been no cases of this nature in the neighbourhood. The mother gave birth to her second child twelve days before the admission of William. There is no evidence of syphilitic infection in either children or in the parents. There was no family history of hæmophilia.

On admission the forehead was dusky, the face pale, the lips blue; breathing was laboured and rapid. The pulse was extremely feeble. On the left side of the forehead, on the upper part of the chest, the back and the arms there were numerous hæmorrhagic patches.

The child died a few hours after admission.

The post-mortem examination was made four hours after death. Rigor mortis was then general and pronounced. On the front of the chest and abdomen there were a few petechial spots; there were also some on the back of the same kind, and on the shoulder two large hæmorrhages, the size of a sixpence. There was purple mottled post-mortem staining on the back and sides of the body. There were two good vaccination marks on the left arm.

The tongue, fauces, œsophagus, larynx, and trachea and bronchi were all natural. There was no hæmorrhage in the lungs, but the fronts of both these were dotted with minute dark points of collapse. Both lungs were engorged; the posterior and lower parts being dark in colour. There was no pneumonia. The right chambers of the heart were dilated with blood-clot; otherwise the heart and pericardium were normal and showed no hæmorrhage. The thoracic glands were natural. The liver showed fatty areas; at one point anteriorly there was a dark congested patch. The gall-bladder was filled with dark green bile. The stomach was natural. There was swelling of Peyer's patches, most marked in the jejunum. The colon showed no abnormality, and there was no enlargement of the solitary follicles. The mesenteric glands were large and firm. The spleen was not enlarged; it was firm and mottled, with dark areas on the surface and in section. The stellate veins of the kidneys were somewhat full, and there were a few hæmorrhagic points at the bases of the pyramids; otherwise the kidneys were natural. The renal veins were natural.

The suprarenals were both enlarged, and were dark purplish-red. On section they were of the same colour but more marked, with lighter areas intervening. The condition was similar to, but somewhat less marked than, that observed in the suprarenals in the case of George F. The suprarenal vessels were normal; there was no infarction.

The brain and meninges showed marked venous engorgement; the brain substance was normal and firm. The tympanic cavities both contained thin mucus.

Cultures from the heart's blood, made anaerobically, on agar and broth remained sterile; and aerobic cultures on agar, gelatine, and glucose-gelatine also proved sterile.

The engorged portion of the liver was examined microscopically; the capillaries between the liver-cells were filled with blood; sections of the lungs and kidneys showed similar engorgement with blood. In the suprarenals the vessels appeared filled with blood, and in most parts blood-cells infiltrated the tissue so that nuclei of cells appeared embedded in blood-corpuscles; the cell-substance appeared destroyed. This was most marked in the medulla. Elsewhere the cell-substance did not stain well, and appeared altered and vacuolated.

In Figure II., which is a section of the skin from the case of William G., a sweat-duct is seen traversing the field from right to left. On the right of the duct is seen a blood-vessel, obliquely cut, containing fibrinous débris and numerous cocci, in clumps. Another larger vessel, cut transversely and obliquely, is shown to the left of the sweat-duct. This vessel was not in the same field (that of an immersion lens $\frac{1}{2}$) as the structures above named, but it was in the same section at the same level of the skin; the slide had merely to be shifted laterally a little to include it. In the vessel cut transversely a round fibrinous mass nearly filling up the lumen is seen. Entangled with it are very numerous cocci. In the

obliquely cut vessel adjoining this another smaller mass of cocci is observed. All these vessels form part of the subdermic plexus. The cocci seem confined to the blood-vessels, and are probably streptococci.

The section of the suprarenal in unstained specimens appeared very dark in colour. This was seen to be due to excessive deposit of blood-pigment. The hæmorrhage was, as in the first case, chiefly in the medulla, but was very extensive throughout the organ. Sections were stained for micro-organisms with negative results.

CASE III.—Margaret B., aged 7 months, was admitted on April 19th. She was then suffering from Diarrhœa, which had not, however, lasted more than twelve hours; her temperature was then 102° . There were a few râles scattered on both sides of the chest, but no tubular breathing or dulness could be found. The child was breathing very rapidly and appeared collapsed, with marked cyanosis and feeble pulse. There was no purpura at this time. The following history was obtained. The parents both seemed healthy. The mother had lost two children, one from "fits" and one from "stoppage of the bowels." Her first pregnancy had resulted in a still-birth, and she had had one miscarriage, after the birth of the first living child. Two other children are living and healthy. There was no history of phthisis or syphilis. The child herself had been somewhat delicate, beginning to waste soon after birth. When about two months old she had a "boil" on the buttocks, which lasted a month, and shortly after this she had a "red rash" over the buttocks, which lasted about a week. She gained a little flesh in the succeeding two months, but became ill again a month before admission, and was said by a doctor to be suffering from bronchitis. She had not been vaccinated. She had been fed on the breast up to one month before admission; during this latter month she had been having Ridge's food and crusts. There had not been any vomiting immediately previous to admission.

During the night after admission she developed some patches of purpura, one on the lobule of the right ear and some on the right forearm. The temperature at 6 P.M. was 104° , and at 10 P.M. had fallen again to 102° . She became rapidly worse during the night, the cyanosis and collapse increasing. At 2 A.M. of April 20th, her temperature was 100° , and at 6 A.M. it rose to 101° , and she died soon after this.

At the post-mortem examination the body was seen to be poorly nourished. The only pathological conditions, besides some engorgement and collapse of the lungs, were found in the suprarenals. The left was large, dark purplish-red in colour, and hæmorrhagic on section, the medulla being darker than the cortex. The right suprarenal was also hæmorrhagic, but a pale patch, of apparently normal tissue, was left on the front aspect.

Sections of skin were not obtainable in this case. Sections of the suprarenal body were examined, and hæmorrhage into the organ was demonstrated; not quite so extensively distributed as in the previous two cases, but quite obvious. No micro-organism could be detected after repeated examinations.

CASE IV.—Annie H., aged 12 months, was brought to the hospital on April 27th at 12.30. She had been taken ill suddenly the previous night, becoming restless, and vomiting at 5 A.M., the vomit being principally "milk"; she vomited again half an hour later, not so copiously, and the matter voided at this time was "yellow." She grew rapidly worse; at mid-day she had a motion, shortly after which she was admitted. The mother is positive in her statement that on the day before up to 9 P.M. the child had seemed to be in her usual health. The

diet on this day had consisted of breast milk, bread and butter, potato, and a small piece of sausage. She had some barley broth at 9 P.M., and vomited this at once. The child had never been vaccinated "because her teeth troubled her." There had been no illness as far as can be ascertained in the neighbourhood; the parents had lately moved and had been in possession of the present home only one month. The father is reported healthy; the mother is said to have some uterine disorder. She has had six children, two of whom are dead, one of pneumonia, and one of pyæmia from a mastoid abscess, both in-patients at this hospital at the time of their death. There have not been any miscarriages; and there is no syphilitic or tubercular history.

Present Condition.—The child is extremely ill; the respirations are 72, the pulse 104 per minute, and of very small volume. The face is dusky and the lips livid. The temperature taken in the rectum on admission was 97° . No petechiæ were noted on admission, but the body was generally mottled. The abdominal viscera seemed unaffected. The temperature rose during the afternoon; at 2 P.M. it was $102^{\circ}6$; at 6 P.M. it was $103^{\circ}2$, and at 10 P.M. it was again $102^{\circ}6$. At 2 A.M. on November 28th the temperature was 103° . A warm boracic solution was given as an enema shortly after this; and between this and 6 A.M. the temperature rose to $106^{\circ}2$. Icebags were applied with the result that at 8 A.M. the temperature was $103^{\circ}2$. The pulse and respiration continued as frequent as on admission, and the child died at 7.50 A.M., nineteen hours after admission. She passed five loose motions, yellow and green and slimy, but had not vomited, after her admission.

At the autopsy, performed 8-9 hours after death, she was found to be well nourished. Rigor mortis was quite absent; possibly it had passed off. There was much mottling of the skin, and over the centre of the back were two small petechial patches. There were hæmorrhagic patches on the arm where brandy had been injected. The tongue, fauces, larynx, trachea, and bronchi appeared natural. The lungs were generally engorged, with some collapse of the lower lobes on both sides. The heart was natural. The liver was natural. The stomach was normal and contained curdled milk. The intestines showed marked hyperplasia of Peyer's patches and the solitary follicles. There were many subperitoneal punctiform hæmorrhages. The mesenteric glands were large and soft. The spleen was normal. The kidneys were normal. The suprarenals were both injected, the left especially, the medulla being a very dark red on section. The right was also affected, but to a less degree.

The Brain.—Just behind the stalk of the pituitary body there were two or three flakes of greenish lymph on the membranes, but no evidence of any inflammation elsewhere. The surface vessels were engorged, and there was some flattening of the convolutions, but no excess of fluid in the ventricles.

Unfortunately, owing to the illness of the Pathologist, no material from this case has been obtainable.

CASE V.—A case essentially similar to these four was admitted in 1897 under Sir D. Duckworth at St. Bartholomew's.

H. W., a female infant, aged four months, was brought up one morning to the hospital. She was feverish and had a purpuric blotchy eruption all over the trunk and limbs. She was a fat child, with beading of the ribs. She had not been vaccinated. The child died the same afternoon, and no clinical notes were obtained. At the post-mortem examination the head was natural, the thymus was large; the thyroid was normal. There was no membrane in the pharynx or

larynx. The spleen was natural. Both suprarenals were of a deep purple colour, but natural in size and consistence. On section the cortex was dark red throughout; the medulla of a purple colour, uniform throughout both capsules. There was no hæmorrhage on the surface. No further details of this case were obtainable, but it is obviously very like the preceding cases here described.

The pathological specimen showing the hæmorrhagic suprarenals is in the museum of St. Bartholomew's Hospital (No. 2,320).

In the records of the Hospital for Sick Children, Great Ormond Street, I have been able to find the following cases of a similar nature:—

CASE VI.—E. R., a male infant, aged 3 years, was admitted under Sir Thomas Barlow on September 16th, 1892, with the following history:—The child had had "impetigo" around the mouth and nose for fourteen days; this was spreading on the face. On September 14th a few spots of different character appeared, and the child lost appetite and vomited. On the 15th several spots appeared on the left arm and a "blister" on the left temple, and the child became delirious. On the 16th the spots on the arm became bullous and he was admitted.

Present Condition.—Unconscious: cyanosed: moribund. A fat, anæmic child with well-marked rickets. Impetigo around mouth and nose and over the right cheek. Around these spots there was rapid gangrenous action with formation of bullæ; these extended rapidly during the hour the child was under observation. There were bullæ also on the scalp on the occiput, the left temple, the right ear and the dorsum of the left arm. The base of the bullæ was purple (hæmorrhagic). There was no smell. The mouth was normal. The throat was not seen. The temperature on admission was 103°; it rose to 105°, and the child died one hour after admission.

Post-mortem examination three hours after death. Rigor mortis well marked. Body fat. On the occipital region, the left temple, both ears and the dorsum of the left arm, were recent bullæ. Those on the arm measured 2 inches across. The base of the bullæ was a deep purple; this colour extended through the skin, but the subcutaneous fat appeared healthy. The bullæ were single, and there were no small pustules near them; their contents were not offensive. The mouth and nose were covered with impetiginous crusts. On the cheek there were several small similar patches, and around these the skin was much congested and bullæ were commencing to form. The lower lip was rather thickened; the mucous membrane of the mouth was normal.

Brain.—Some cedema of the membranes; nothing else noticeable.

Heart.—Several petechiæ on the posterior surface near the auriculo-ventricular junction; the cardiac muscle was soft. The valves were normal. Blood in heart and vessels quite fluid, but coagulated when exposed to air.

Right Lung.—Base tough and not very crepitant, but all parts floated in water. The upper lobe freely crepitant. There were numerous small pulmonary apoplexies. The bronchi were injected. The left lung was tough and œdematous, and showed numerous hæmorrhages.

The suprarenals were much swollen on both sides and engorged with blood; hæmorrhage appears to have taken place into the medulla on both sides. The engorgement of these bodies is quite out of proportion to that of the kidneys. Peyer's patches and the mesenteric glands were generally enlarged; the latter contained cheesy matter but no recent tubercle. There was marked beading of

the ribs. The bone-marrow appeared normal where examined. The bone-marrow and the blood were stained for micro-organisms, with negative results.

This case differs from all others I have noted in the development of bullæ, apparently on purpuric bases, but the clinical history and post-mortem appearances are very similar to those in the four Shadwell cases.

CASE VII.—A case which may be of the same nature, but owing to a somewhat incomplete report impossible to classify, was admitted many years ago under Dr. W. H. Dickinson on September 29th, and died on October 4th. Alice M., aged 11 months, was born of healthy parents, but was a bottle-fed infant. Fourteen days before admission she had "measles" with "bronchitis," and three days before admission was seized with bleeding from the mouth, nose and left ear. At the same time the face became covered with purpuric spots. On admission the face and body were covered with large and small livid purpuric spots. The gums were spongy; the lips were hard, swollen, and covered with clotted blood. The fauces were red and swollen, but showed no ulceration. The left ear was filled with blood. Pulse 156°, feeble; the child was drowsy.

On the 1st October the hands and feet were swollen, but there was no further bleeding from the mouth or nose. The temperature rose on October 2nd to 102°; it fell to 99° on October 3rd, and the patient died on the following day. At the autopsy, performed nineteen hours after death, there was slight rigor mortis. The purpuric spots were as described. There was lobular pneumonia with pus in the bronchi. There was some ecchymosis on the surface of the kidneys. The left suprarenal was the seat of extensive "ecchymosis." There is no mention made of the condition of the right. There was extensive ecchymosis of the large intestine. No further details have been obtained of this case, which, if correctly reported, is peculiar in the association of such extensive purpura with a unilateral hæmorrhage into the suprarenal. It is noticeable that this case survived eight days after the onset of purpura.

For the next case I am indebted to the Middlesex Hospital records:—

CASE VIII.—Annie W., aged 2 years, admitted under Dr. Coupland. She is an only child. The parents are healthy. The child has been subject to bronchitis all her life. There has been no illness in the house or amongst the neighbours. She has never been vaccinated. The patient was quite well up to November 26th. At midnight the child awoke and vomited. There were no convulsions. She was admitted on November 27th. She was a well-nourished child, but pale, and breathing rapidly (50 respirations per minute), and with symptoms of great prostration. Temperature 105°. The skin of the trunk, feet, and back was covered with petechiæ, the majority being extremely minute, but several were as large as a pin's head or larger. There were similar petechiæ over the limbs, but not so thickly distributed. Some were apparently raised. There were none on the face. The skin was generally dry; the fauces were pale, and free from exudation; the tongue was clean. There was no vomiting after admission. The chest was resonant throughout. The temperature at 1.30 was 105°; at 6 o'clock it was 105·2; at 7.30 it was 102·4, and shortly after the child died.

The post-mortem examination was performed eighteen hours after death by Dr. Voelcker. His notes are as follows:—

Rigidity present. Well nourished. There is a patchy petechial eruption over the forehead and face, with punctiform hæmorrhages over the thorax and abdomen; there are extensive patches over the buttocks and thighs. There are no papules or

pustules. The eyelids are swollen, and there is hæmorrhage into the left upper lid. There is no excoriation about the nostrils. The tongue is slightly furred and shows petechiæ beneath the mucous membrane. The pharynx shows no ulceration; there are a few petechiæ on the posterior wall. The tonsils are slightly enlarged and pale, with no ulceration of the mucous membrane. The thyroid is natural. The cervical glands are not perceptibly enlarged. The larynx shows slight injection of the glottis and the epiglottis; there is no membrane. The trachea is slightly injected. There are no pleuritic adhesions on the left side and no excess of fluid; on the right side there is a small old adhesion at the posterior part of the upper lobe one and a-half inches from the apex. There is no excess of fluid in the pericardium, and no petechiæ are visible. The heart shows nothing abnormal, and there are no petechiæ. The pulmonary artery has four cusps. There is a little pale clot on the right side; the left side remains empty.

Both lungs show some collapse, with numerous patches of congestion. There are no infarcts, and there is no pneumonia. The bronchial glands are not enlarged. There is no excess of fluid in the abdomen, and no peritonitis. The stomach has a few submucous hæmorrhages, but no membranous exudation and no ulceration. There are a few patches of submucous hæmorrhage in the intestines; Peyer's patches are swollen but not ulcerated. There is no blood in the intestine. The mesenteric glands are pale, large and swollen. The liver shows some cloudy swelling: there are no petechiæ. The gall-bladder contains green bile. The spleen is firm, dark, and congested, with adenoid tissue evident and consistence slightly increased. The kidneys are pale; the capsules shell readily; there are no petechiæ on section. There is cloudy swelling of the cortex. The ureters are natural. The bladder is natural and empty; there are no petechiæ.

The Suprarenals.—Both suprarenals are the seat of extensive dark hæmorrhage. The aorta and vena cava are natural. The pancreas is natural, and shows no hæmorrhage. There are numerous petechiæ on the skin of the scalp. The cranial bones are natural; there is no craniotabes. There is no thrombosis of the cerebral sinuses. The dura mater is natural. There are a few petechiæ over the anterior part of each occipital lobe in the convexity, and there are petechiæ in the pia arachnoid. The brain on section shows slight excess of clear fluid in the lateral ventricles, and puncta cruenta are numerous. There is no hæmorrhage in the brain itself. The vessels at the base of the brain are natural. The ribs are not distinctly beaded.

CASE IX.—I owe to the kindness of my friend Dr. Harrington Sainsbury the notes of an unpublished case which occurred in his practice at the Royal Free Hospital some years ago. G. H., a male infant, aged 13 months, breast-fed, was brought to the hospital on Saturday, May 18th, at 8.30 p.m., on account of a diffuse purpuric eruption on the arms, legs, and face. The mother said that the child had had no previous illness, and had been "in better spirits than usual" on May 12th. A case of diphtheria had been removed from the house on April 17th. With this exception no other illness was reported in the neighbourhood.

Just before daybreak on May 18th the child awoke, and was sick once, and had his bowels opened, after which he went to sleep and was roused about 7.30 a.m. by the mother, who noticed that the child seemed rather fretful, and that his eyes were bright and red, though not actually running. In fact, the mother "thought the child was sickening for measles." He had no cough. About 11 a.m. the mother washed the child, and then noticed that the face was covered with a

purple rash, also the arms—especially over the fleshy parts of the shoulder and on the back of the arms; the rash was also on the buttocks and the backs of the thighs. Between 5 and 7 P.M. the child had convulsions. He was restless and threw his head from side to side, rolling backwards and forwards, and throwing his arms about. The legs were kept fairly quiet. During this convulsive attack the child was constantly crying, the cry being rather sharp and piercing. The bowels, which had been regular before this day, were now open twice, the motion being offensive and green, but without slime or blood. Urine was passed about 5 P.M., and the napkin was not stained, so that there was probably no blood in the urine. The rash became deeper in colour and more diffuse, and the child was getting worse. He was admitted to the hospital at 8.30 P.M. on May 13th. When first seen the child did not appear very seriously ill, except that he had the rash on the face and was very restless and cried, the cry being rather like that of a case of meningitis. The body was very well nourished, and showed no obvious signs of rickets. The temperature was $101^{\circ}4$. The pulse was rapid but strong.

The rash was a diffuse blotchy purpuric eruption covering the cheeks, ears, back of head, back and outer part of arms, buttocks, and back of thighs. The lesions were not raised, and were a deep purple colour. On the forehead and upper part of the chest were punctate hæmorrhages not quite so deep in colour. The back and abdomen were not affected. The child became rapidly worse, breathing was more frequent and the pulse accelerated. On the lower part of the abdomen hæmorrhages began to develop about 10 P.M., starting as a bright diffuse flush with definite edges. The rash on the other parts of the body spread and became darker; the hands and feet became cold and cyanosed. At 10 P.M. the temperature was $97^{\circ}2$ in the axilla, but at 11 P.M. it had arisen to 107° in the rectum, and a few minutes later to 108° . The pulse became very much weaker, and the respirations irregular; and the child died at 11.30, some twenty-two hours after the first onset of illness.

The child had been vaccinated when three months old, and had two good marks.

At the post-mortem examination the cortical vessels of the brain were much injected; otherwise the brain was normal. The larynx was very deeply stained, the discoloration ending abruptly at the true cords. There were a few small subpleural hæmorrhages. The heart showed nothing abnormal. The abdominal organs were all healthy except that the kidneys were pale, with injected vessels on the surface. The suprarenal bodies alone showed any change. A large hæmorrhage had occurred in the right suprarenal, which was converted into a blood-cyst; it had then apparently ruptured, as the subperitoneal tissue surrounding it was stained with blood. The left suprarenal had numerous hæmorrhages into its substance.

No notes of microscopic or bacteriological examination are recorded.

CASE X.—Drs. Garrod and Drysdale recorded another case in the *Path. Soc. Transactions*, 1898, p. 257. The suprarenals from this case are also in the museum of St. Bartholomew's (No. 2820). An unvaccinated female infant, aged 4 months, was brought to the hospital, dead, on June 4th, 1897. No clinical history is recorded. The body, which was well nourished, was covered with a blotchy purpuric eruption. No membrane was found in the pharynx, larynx, or trachea. The thymus was large; the thyroid was natural. There was no disease of either middle ear, and no tubercle was found in any part of the body. The

brain, lung, heart, liver, and spleen appeared natural. There were no swellings around joints or bones.

Both suprarenal capsules had a deep purple-red colour, but were not obviously increased in size. On section the cortex had a deep red colour throughout, and the medulla showed a deep purple tint. The discoloration was uniform throughout both capsules, and no circumscribed hæmorrhages were seen on the surface of, or around, the glands. On microscopic examination the stroma was seen to be fairly well preserved, so that it was easy to distinguish between the medulla and cortex. The cells of the glands enclosed in the meshes of the stroma had in large part disappeared, and their place was taken by effused blood. Some of the individual spaces contained no epithelial cells at all, but were instead completely filled with red blood-corpuscles. In other parts glandular cells could be seen in considerable numbers, the nuclei of which stained well, but the cell-substance appeared to be partly destroyed. Cultures from the spleen, kidneys, liver, and suprarenal capsule all remained sterile. The resemblance in clinical and pathological features with the succeeding case is noted.

CASE XI., recorded by Dr. F. W. Andrewes,³ was seen at St. Bartholomew's in the following month (July, 1897). Florence G., aged 15 months, living in Cloth Fair, unvaccinated. She was taken ill on July 22nd. She developed a hæmorrhagic rash on the following day, at 10 A.M. She was seen at the hospital at 11 A.M. She was then feverish, and had some papules on the chest, in addition to the purpuric eruption. She was not taken in, for fear of small-pox. She died suddenly that night, the total duration of the illness being less than two days.

The post-mortem examination was performed on July 24th by Dr. Batten; the following are the notes: "Well nourished. Covered with a purpuric eruption. A few small papules on the chest (proved to be an early stage of *molluscum contagiosum*). Brain, throat, and practically all the viscera (except the suprarenals) normal; glands of the neck noted as somewhat swollen. A few purpuric spots on the parietal pleura. Spleen normal. *Suprarenals* symmetrically affected, not enlarged or altered in shape, dark red in colour, as if hæmorrhage had taken place into them. No other morbid changes could be discovered. Cultures were taken from the suprarenals, lungs, liver, spleen, and kidney. All remained sterile. Films of blood expressed from the suprarenal, and stained in various ways for micro-organisms, gave entirely negative results. Microscopic examination of the suprarenal, lung, liver, kidney, and spleen was carefully carried out, various methods of staining being employed. In no organ could micro-organisms be detected. The changes found were trifling—slight cloudy swelling in the kidney and liver, and some congestion of the lung and spleen. The suprarenal shows a fairly uniform diffuse extravasation of blood, the proper tissue-elements being obscured and apparently diminished in number."

These eleven cases are all that I have been able to collect in which symmetrical suprarenal hæmorrhage seemed the direct cause of death and was associated with purpura. I think it will be conceded that they form a natural clinical group, hitherto unclassified, with surprisingly constant features. And the complex of symptoms forms a clinical picture sufficiently striking and sensational. A young

child, usually in the later period of infancy, is apparently in normal health. He wakes up one night and is a little sick; he lies restlessly till morning, passes a loose motion or two, and suddenly develops a purpuric eruption and becomes alarmingly ill. He is dead in twenty-four hours, and there is no pathological feature of importance to be detected at the autopsy except gross hæmorrhage into the suprarenal capsules. The cause is sufficiently elusive. Often the children are still at the breast, when food toxæmia is an unlikely explanation. Moreover, food toxæmia is so frequently observed, and this group of conditions is so excessively rare, that suggestions of causal concomitance cannot be readily accepted. Infective processes are thought of, and are met with the rebutting evidence that the cases have occurred in crowded areas and in houses teeming with children, yet no previous or subsequent cases can be elucidated. Cultures from the blood have remained sterile in all the cases examined.

I owe to Dr. Apert,³ of Paris, two references of much interest to cases in which somewhat similar incidents occurred in adults. Of these, one reported by Bourreiff ("Recueil de Mémoires de Méd. Militaire," 1878, p. 172) was that of a young soldier, aged 22, who had a very sudden attack of hæmorrhagic purpura, followed by hæmorrhage from the gums, palate, bladder and lungs, which ended fatally within seven hours. There had been no vomiting and no motions during the attack. At the post-mortem examination the mucous membranes were everywhere hæmorrhagic, and free hæmorrhages had taken place into all the viscera except the spleen. The suprarenals were entirely disorganised by hæmorrhages, and were probably also tubercular; a tuberculous consolidation occupied the left apex and the bronchial glands.

Apert gives a second reference to a case reported by Wolff, but the indication is inexact, and I have been unable to trace the original report.

I have now exhausted all the references that have come under my notice in which both suprarenals were hæmorrhagic and purpura was present before death. The second part of the inquiry I set myself was to sift the evidence for either event occurring without the other, and I have now to consider—

GROUP II.—*Cases of hæmorrhage into both suprarenals, not associated with purpura.*

Two very remarkable cases of this nature were recorded by Dr. Eustace Talbot, to whom I am indebted for the following descriptions (*St. Bart. Hosp. Reports*, Vol. XXXVI., p. 207.).

CASE I.—A child aged 5 months, fat, well nourished, showing no evidence of rickets or marasmus, was brought to the hospital by its mother, who said the child

had been in its usual health till the morning, when it had appeared to be in abdominal pain, had vomited, and refused its food, and had had two or three convulsions. The child was evidently ill, and was restless and irritable. The temperature was 101°. Examination of the chest and abdomen was negative. There was no rash, and no morbid appearance in the throat. It was thought probable that the child was developing a specific fever, and directions were given to the mother with that idea. Three or four hours later the mother brought the child back moribund, saying that since leaving the hospital there had been a series of convulsions. It died shortly afterwards. At the post-mortem examination nothing morbid was found in any organ whatever, with the exception of the suprarenal capsules, which were seen to be enlarged, but of normal shape, and of a deep purple colour. On section the whole gland was seen to be deeply and uniformly stained with effused blood; there was no hæmorrhage outside the capsule, and obviously the effusion was quite recent and evenly distributed throughout the medulla and cortex. The condition was rather more intense in the right gland, but was well marked in both. On careful dissection there was no evidence of thrombosis in the suprarenal vein, the lumen being quite clear.

Microscopically, the stroma was seen to be fairly well preserved, so that it was easy to distinguish between medulla and cortex. The cells of the gland enclosed in the meshes of stroma had in large part disappeared, and their place had been taken by effused blood. Some of the individual spaces contained no epithelial cells at all, but were instead completely filled with red blood-corpuscles. Cultures were taken from the blood and various organs, but nothing was found.

CASE II.—A female child, aged five and a half months, was brought up with the history of sudden onset of vomiting, abdominal pain and convulsions; a temperature of 100 to 101, and nothing discoverable to account for the symptoms. The child was admitted, the convulsions increased in number and severity, and death took place within twenty hours of the onset of symptoms.

The post-mortem notes are as follows:—Well-nourished child; no sign of disease in any organ save in the suprarenal capsules, both of which are swollen and discoloured with recently effused blood. On section the blood is seen to be evenly distributed throughout the medulla and cortex. There are no hæmorrhages in the neighbourhood. The microscopic appearances are practically identical with those given above. Cultures were made from the blood and the various organs by Dr. Drysdale. From the suprarenal capsules a streptococcus was cultivated, which gave the morphological and cultural characteristics of streptococcus pyogenes with the important exception that it coagulated milk. The liver and spleen were sterile.

In both these cases it is to be noted that there was no purpura, though the other clinical features and the pathological appearances bear a strong likeness to those described in the cases I have noted above.

I am inclined to think that Dr. Talbot's cases may perhaps be brought into the same category with the preceding series if we consider that both cases were very rapidly fatal, and the onset of purpura was in several instances of the first series quite a late symptom, so

that these children may have died before the development of purpura was possible. These are the only cases I have come across in which there is a strong general resemblance to cases of the first series, with the exception that while there was double suprarenal hæmorrhage there was no purpura. Yet cases which probably are entirely different in causation as they are different in clinical features have been recorded of symmetrical suprarenal hæmorrhage without purpura.

Thus Spencer (*Obstet. Soc. Trans.* 1891) collected 105 cases of still-birth in which, with general venous congestion, there was hæmorrhage into the suprarenals in twenty-three cases; in twelve of these the hæmorrhage was symmetrical. In twenty-five newly born children who lived not more than four days there was suprarenal hæmorrhage in one case.

The following case occurred at St. Bartholomew's under Sir William Church. L. H., a female infant, aged 7 months, was admitted on February 12th with whooping-cough and broncho-pneumonia. She died a month later, with symptoms of collapse. There was inflammatory lymph upon the surface of the right lung; the lower right lobe was solid. Both suprarenals were hæmorrhagic. The central part of the left was filled with firm blood-clot, the peripheral part of the organ and its general contour being well preserved. The right, which was larger, was a kind of cyst; on incision blood flowed out. Further examination showed that the cyst had a well-developed wall formed presumably by the outer layer of the capsule. There was no purpura.

Ogle⁴ records a case of a female epileptic who died in a fit. Both suprarenals were found occupied by extravasated blood. The same appearances were found in an insane gardener who died very suddenly at Charenton.⁵ In the *Lancet*, 1890, a case is recorded of a female lunatic who at the age of 76 became suddenly collapsed after being ill with chronic bronchitis. She had vomiting and abdominal pains for five days, and died. Both suprarenals were intensely engorged, the right one having burst.

Talbot⁶ quotes Greenhow's report of a man, aged 29, with chronic fibrosis of the lung who was found at the autopsy to have double suprarenal hæmorrhage. There was no purpura.

A third series of cases may be described as

GROUP III.—*Cases of hæmorrhage into one suprarenal body, proving more or less rapidly fatal, but not so rapidly as in Series I.; and not associated with purpura.*

CASE I.—Still reported a case in the *Path. Soc. Trans.*, 1898, in a child aged 14 months, who died apparently of general miliary tuberculosis, dating probably from an attack of measles. The child had been ill for some months before admission. During the last six days of life there was severe diarrhoea and vomiting. At the autopsy almost every organ was affected with acute miliary tuberculosis. The left suprarenal was engorged with entravasated blood. There was no purpura.

CASE II.—There is a case recorded in the Register of the Hospital for Sick Children (XV., 153) of a child who died with Broncho-pneumonia after two weeks' illness. There was much cyanosis, but no purpura. The right suprarenal was hæmorrhagic.

CASE III.—Another case of this nature occurred at the Hospital for Sick Children, Great Ormond Street. Harold F., aged 4 years, was admitted on October 27th, and died on the same day. He had been ill for two weeks with bronchitis. He was a fat child, and there was no tubercular history. At the post-mortem examination the lungs were affected with extensive broncho-pneumonia. The heart was large and weighed $2\frac{3}{4}$ oz. The liver showed slight fatty change. The spleen was normal. The kidneys were "cardiac." The right suprarenal was hæmorrhagic throughout; the left was normal. There is no record of any purpuric eruption at any time.

CASE IV.—Dr. Batten recorded a case (*Path. Soc. Trans.*, 1898) in a child aged $2\frac{1}{2}$ years, who had attended the hospital for one month with "lichen urticatus." While attending in this way he was taken ill on February 14th with vomiting and diarrhoea; this continued during the day and following night. On the morning of the 15th he was brought to the hospital. At noon of the same day he was comatose, with Cheyne-Stokes respiration, pulse 200, temperature 102° . There was staining of the skin, which was ascribed to the rash from which he had suffered for some time. Soon convulsions ensued, the temperature rose to 106° , and the child died the same evening. There seems to have been no purpura. At the post-mortem examination, besides evidence of some small extravasation of blood in the lateral ventricles, there was no morbid appearance except hæmorrhage into the right suprarenal.

It is obviously impossible within the limits of this paper to consider the corollary question of "Cases of Purpura ending fatally, not associated with suprarenal hæmorrhage." I have noted that Dr. Stephen Mackenzie collected two hundred such cases, in none of which is this pathological accident recorded.

I have thought it advisable to make allusion to cases which, although not attended with purpura, showed suprarenal hæmorrhage, as these illustrate in some measure the cases in which both phenomena were present. I shall now revert to these cases, which more especially form the subject of this paper.

Dr. Andrewes adds to his case (quoted above) a highly suggestive note. "The history points to an acute toxæmia, presumably infective in character. Food-poisoning cannot be excluded, but seems highly improbable. *Streptococcus septicæmia*, which might have been a possible explanation in view of the hæmorrhages, can be certainly excluded by the complete bacteriological examination. Assuming that it is an infective process, it must have been by some organism which does not stain by ordinary

methods or grow on ordinary media. Variola at once suggests itself, especially as the child was unvaccinated, and, in fact, the case was notified as probably such. Against this is the fact that there was no known source of infection from small-pox, and that no cases arose subsequently in connection with it. It nevertheless appears to me the least unlikely explanation of the condition. I am not aware, however, that the suprarenal condition has been described in hæmorrhagic variola; nor, indeed, does the condition appear to have been described in any connection at all. Those who have worked at experimental diphtheria are familiar enough with the appearances of the suprarenals in guinea-pigs dead of diphtheria, which commonly show enlargement and intense congestion, or even actual hæmorrhage. This is the nearest approach I have seen to the condition of the suprarenals in the above case, and is some argument in favour of the infective nature of the disease, though here there is no question of diphtheria."

Dr. Andrewes partially favours the hypothesis of variola. Cases II. and IX., however, of the present series were in vaccinated infants a year old—a fact which seems to me to discountenance the hypothesis. Dr. Andrewes mentions *Streptococcus septicæmia* as a likely hypothesis in view of the hæmorrhages, and since this observation he has published an extremely interesting instance⁷ of hæmorrhage into the muscles observed in a case of enteric fever; the streptococcus was demonstrated in the muscles thus affected, and cultures established its identity.

In the first two of the Shadwell cases the blood and organs were apparently perfectly sterile, yet the sections of the skin taken from the purpuric portion showed unmistakable streptococci in the vessels, both artificial and deep, of the dermis. The same organism was obtained from the suprarenal blood in the second of Talbot's cases mentioned above; and in a case of Dr. Pye Smith's examined by Watson Cheyne,⁸ of a boy who died of hæmorrhagic purpura (the condition of the suprarenals is not recorded), masses of streptococci forming emboli were found in the vessels of the lungs.

Raymond Johnson (*Path. Soc. Transactions*, Vol. XLVII., p. 382) reported a case of necrosis of bone, with extensive purpura, in which *Staphylococcus pyogenes aureus* was demonstrated in the blood.

The bacteriology of cases of purpura, not of the special type here

described, has been worked out by many writers, and a considerable body of investigations have been recorded. In a case of hæmorrhagic purpura which terminated in pneumonia, and was examined post-mortem, Claisse⁹ found pneumococci in sections of the purpuric skin, and of the kidney, spleen, and endocardium. In the skin the pneumococci were massed in the deeper vessels of the dermis. It is interesting to note that the pneumococcus seemed to have infected the skin before the lungs were involved. Claude¹⁰ examined a case in which hæmorrhage occurred in the course of pneumonia, and found the pneumococcus in the blood and in the purpuric lesions. Michel-Dansac¹¹ examined a case of purpura which terminated fatally in five days, and obtained from the viscera and the blood, including the blood of the purpuric skin, almost pure cultures of *Bac. coli comm.* Babes¹² isolated an unclassified bacillus with cultural and morphological characteristics which are elaborately described in his memoir.

Watson Cheyne, in another case of purpura, found masses of a bacillus, also unclassified, in the vessels. Anthrax bacillus was found in one case apparently, by Janowski¹³ and Beneke, and the bacillus *pyocyaneus* was found by Neumann.¹⁴ I have not been able to verify these two references, which I owe to Apert's thesis.

I have not found any mention of bacteriological examination of the purpuric lesions in any of the cases in which purpura occurred with suprarenal hæmorrhage, so that my two cases are as yet isolated observations on this special type, but the same organism was apparently present in the suprarenal in the case reported by Talbot. In other clinical conditions associated with purpura it has been frequently recorded—more frequently, in fact, than any other organism. Thus Hanot¹⁵ and Luzet found it in almost pure culture in the exudation on the meninges of a case of cerebrospinal meningitis with purpura in a woman. The spleen, liver, and uterus contained the same organism, and the foetus expelled from the latter had hæmorrhagic patches on the serous membranes, and the streptococcus was demonstrated in the foetal liver and heart. Widal¹⁶ and Thérèse found the streptococcus in the purpuric lesions of a case of purpura, and demonstrated it also in the capillaries of the kidney, liver and spleen of the same case. Legendre¹⁷ and Claisse, on the other hand, found the streptococcus in the glands, but failed to find it in the skin in a case of purpura.

Chantemesse¹⁸ and Sainton obtained it in a pure culture from a case of purpura. Monnier¹⁹ found it associated with the *Bac. coli. comm* in the blood in the case of a purpuric termination of a chronic alcoholic cirrhosis. Lannois²⁰ and Courmont found a streptococcus in the blood of a case of purpura which grew in bouillon and on glycerine-agar, but not on potato or gelatine. Guarneri²¹ found the streptococcus in the blood of a scurvy patient; and Vassale found it associated with *Bac. coli. comm*. Other cases which I have not been able to verify are recorded by Finger,²² Pitruzzella,²³ and Lévi.²⁴ The streptococcus may, therefore, be said to hold the field against competitors in various types of purpura, and it is so far the only organism which has been found in the class of cases under immediate consideration. What its derivation and rôle are in these latter it is impossible to say. In Case VI. it is especially recorded that there had been severe impetigo previous to the fatal illness, and the streptococcus, it may be supposed, was ready to hand; yet in this case the blood proved sterile. How far the organism may be responsible for the suprarenal hæmorrhage it is likewise impossible to decide; but countenance is lent to the supposition that it may cause suprarenal hæmorrhage by recent experiments of Oppenheim²⁵ and Lœper, who demonstrate that suprarenal hæmorrhage is constantly present in experimental inoculations with diphtheria, tetanus, anthrax and pneumo-bacillus. Mackenzie thinks that "many cases of Purpura Hæmorrhagica are due to a latent unsuspected diphtheria." Unna remarks that thrombosis and embolism alone do not explain purpura. Mere infective thrombi do not cause hæmorrhage. There must, in addition, be a particular chemical influence, or some definite micro-organism which specifically induces bleeding. ("Histopathology of Dis. of the Skin," Norman Walker's translation, p. 50.) Rolleston,²⁶ in his exhaustive monograph on the suprarenal bodies, mentions hæmorrhage into these bodies with subsequent fibrotic organization of the hæmorrhage as a "very rare cause" of Addison's disease. An extremely interesting case is reported by Vollbracht,²⁷ in a girl aged 15, who suffered from a purpuric eruption all over the body a year before developing Addison's disease, which ran an acute course and terminated fatally within three months. The suprarenals showed old hæmorrhage and supervening tuberculosis. It is interesting to note that destruction of the suprarenals seems to favour alike cutaneous

hæmorrhage and cutaneous pigmentation, the former occurring when the destruction is sudden and complete, the latter when the process of destruction is prolonged and incomplete. That the immediate cause of death in the cases I have collected is the suprarenal hæmorrhage is confirmed by the results of experimental ablation of these glands in animals. And, as in the case of Professor Bradford's experiments on the kidney, it is found that the retention of a surprisingly small portion of healthy gland is sufficient to retard the fatal event. When the destruction had been complete, however, Brown-Séquard²⁸ found that death ensued in the following average times for the different animals tested.

Rabbits, 9 hours.

Cats and dogs, mature, 14 hours ; immature, 37 hours.

Mice, 8 hours.

Guinea-pigs, mature, 13 hours ; immature, 23 hours.

Destruction by pathological processes can not be as speedy and complete as by experimental methods. Allowing for this difference, the cases reported above nevertheless give an indication that the loss of the suprarenal is equally fatal, and at least equally rapidly, in human beings as in the animals hitherto tested.

The modern view of the function of the suprarenal, largely based on the researches of Abelous²⁹ and Langlois, and Schäfer³⁰ and Oliver, is that the suprarenals elaborate a secretion which is necessary for the maintenance of life. The withdrawal of this secretion if gradually effected produces clinical symptoms known as Addison's disease, in a manner strictly analogous to the production of myxædema by destruction of the thyroid. The result of sudden arrest of suprarenal secretion can only be inferred from experiments on animals and the consideration of the very rare cases of so-called acute Addison's disease, and cases such as form the subject of this paper. Laboratory investigations have demonstrated that the secretion is the product of the medullary portion of the gland, and we have seen that the medulla was principally affected by the hæmorrhage in the cases recorded. We may infer, therefore, that the secretion was correspondingly destroyed. What the nature of the secretion is is not yet determined ; it seems certain that it is not a ferment. That it is an extraordinarily active agent is evident ; less than $\frac{1}{8000}$ grain produced a physiological effect on the heart and arteries in an adult

man in Abelous and Langlois's experiments. Its withdrawal should, therefore, have an equally striking result. Schäfer's experiments, made with the watery extract, show that the secretion acts especially and directly in maintaining the tone of the cardiac and arterial muscles. This action was obtained after section of the cord and of the peripheral nerves—after complete destruction of the nervous tissue, in fact. This tonic action was not diminished by simultaneous stimulation of the depressor nerve, or by administration of morphia, curare and other depressants, and the extract proved enormously greater in this tonic effect than ergot, digitalis, or any other known stimulant. Removal of the suprarenal capsules produced extreme weakness of the heart and muscle-system generally—symptoms of collapse, in fact, and Schäfer considers his results “prove that one of the main functions, if not the main function, of the suprarenal capsules is to produce a material which is added in some way or other to the blood, and the effect of which is to assist by its direct action upon the various kinds of muscular tissue in maintaining that amount of tonic contraction which appears to be essential to the physiological activity of the tissue.”

The first result of the arrest of suprarenal secretion would be dilatation of the blood-vessels and ensuing diapedesis, more marked in positions where the surrounding tissues are lax. This seems to me to explain the purpura in these cases, and the sections of the skin which I have examined strikingly confirm this view. I am aware that the most opposite opinions are held as to the condition of the vessels in purpura in general, but there is considerable authority for supposing that diapedesis through dilated vessels explains at least some of these cases. It is true that Dr. Talbot's two cases in which there was seemingly nearly complete destruction of suprarenal tissue, without occurrence of purpura, remain to be explained. But the same irregularity was noticeable in some of the experimental ablations of the suprarenals, quite a number of observers finding that after removing apparently all glandular tissue the expected results did not ensue, and these failures have been explained on the supposition that not all the tissue was removed. It is still more impossible to guarantee the complete obliteration of a physiological secretion in the case of hæmorrhage into these organs. The argument for the causal connection of purpura with the suprarenal condition in these

cases rests, I am aware, on the assumption of the priority of the latter. This is, of course, a difficult matter to settle, almost as difficult as the scholastic problem as to the priority of the hen or the egg; but it seems to me to be at least probable from a survey of the cases I have brought forward.

REFERENCES TO PAPER.

- ¹ Stephen Mackenzie, "Purpura," Allbutt's "System of Medicine," page 568, Vol. V.
- ² *Pathological Soc. Transactions*, 1898.
- ³ Apert, *Paris Thesis*, "Le Purpura," 1897.
- ⁴ Ogle, *Path. Soc. Transactions*, Vol. XI., p. 280.
- ⁵ *Tribune Médical*, January 16, 1870.
- ⁶ Talbot, *St. Bartholomew's Hospital Reports*, Vol. XXXVI., p. 207.
- ⁷ Pathological Society, Paper read in October, 1901.
- ⁸ *Path. Soc. Transactions*, 1883-1884, p. 408.
- ⁹ Claisse, *Arch. de Méd. Experimentale*, 1891, p. 381.
- ¹⁰ Claude, "Maladies de l'enfance," 1896, p. 143.
- ¹¹ Michel-Dansac, "Médecine Moderne," 1892, p. 649.
- ¹² Babes, *Arch. de Méd. Experimentale*, 1893; *Annales de l'Institut Pasteur*, 1891, p. 273.
- ¹³ *Müncheiner Medicinische Woch.*, 1895, p. 30.
- ¹⁴ *Archiv. für Kinderheilkunde*, 1890.
- ¹⁵ *Archives de Méd. Experimentale*, 1890, p. 772.
- ¹⁶ Vidal and Thérèse, *Soc. Méd. des Hôpitaux*, 1894, p. 76.
- ¹⁷ Legendre and Claisse, *Soc. Méd. des Hôpitaux*, 1892, p. 12.
- ¹⁸ Chantemesse and Sainton, *Soc. Méd. des Hôpit.*, 1896, p. 272.
- ¹⁹ Monnier, *Soc. de Biologie*, 1896, p. 64.
- ²⁰ Lannois, etc., *Arch. de Méd. Exper.*, 1892, p. 114.
- ²¹ Guarneri, quoted by Apert, *These de Paris*, p. 14.
- ²² *Archiv. für Dermatologie und Syph.*, 1893.
- ²³ *Giornale delle Malattie Veneree*, 1895.
- ²⁴ Lévi, *Bulletins de la Soc. Anatomique*, 1896, p. 692.
- ²⁵ Oppenheim, etc., *Archiv. de Méd. Exper.*, May, 1901, p. 349.
- ²⁶ Rolleston, *British Med. Journal*, 1895, March 23.
- ²⁷ Vollbracht, *Wiener klin. Woch.*, No. 28, p. 737, 1899.
- ²⁸ *Soc. de Biologie*, 1892, p. 410.
- ²⁹ *Soc. le Biol.*, 1891, p. 792.
- ³⁰ *Journal of Physiology*, 1895, p. 273.

DESCRIPTION OF PLATES.

FIG. I.—Section of purpuric skin from the case of George F. stained in polychrome methylene blue and neutral orcein. (Leitz Ocular IV., Obj. $\frac{1}{2}$ oil immersion)

shows a subpapillary vessel with its main branch containing numerous cocci in clumps and threads, probably streptococci.

FIG. II.—Section of purpuric skin from the case of William G. stained with borax methylene blue, washed out with acetic acid, and rapidly passed through eosin solution (1 %). A sweat-duct is seen traversing the figure from right to left. On the right of the duct is seen a blood-vessel, obliquely cut, containing fibrinous débris and numerous cocci arranged in clumps. Another and larger vessel, cut transversely and obliquely, is shown to the left of the sweat-duct; this contains a round fibrinous mass, nearly filling up the lumen; in this mass are very numerous cocci. (Leitz Ocular IV., Obj. $\frac{1}{2}$ oil immersion.)

SOCIETY INTELLIGENCE.

DERMATOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

A MEETING of this Society was held on Wednesday, October 23rd, 1901, Dr. A. J. Harrison, President, in the Chair.

The following cases were exhibited :—

Dr. ABRAHAM showed (1) a case of *progressive Sclerodermia*. The patient was a woman, 49 years of age, who was born in the Isle of Wight, but had lived in London since the age of 9. At 4 years of age she fell off a swing and injured her spine, and had suffered more or less from the results of the injury ever since, and at the present time there was distinct curvature. Nine years ago the left ankle and lower leg became ulcerated down to the bone, but these ulcers were healed by treatment in six months. Six years ago the right side of the scalp became ulcerated, and a very foul discharge exuded from it. No hair had grown on it since. One month ago other ulcerated patches broke out on the scalp, for which she had attended the West London Hospital. She had suffered much from cold and rheumatism. Her father was healthy, but her mother and several relatives on the mother's side had died of phthisis. The patient was married and had had seven children, five of whom were dead—four from phthisis and one from pertussis. There had been no miscarriages. Until six years ago the skin was healthy, except that the arms were pigmented, as a result of her laundry work. The affection appeared first on the arms, then it spread on to the legs and chest, the skin of these parts becoming hard and tight.