spleen. These extended about 0.2 centimetre into the substance of the spleen. There was a small amount of perisplenitis on the area in contact with the kidney. *Suprarenals*—No obvious macroscopic change. *Stomach*—Very congested. Appearance of acute gastritis. No definite ulceration. *Pancreas*—Appeared normal. *Intestines*—Normal. *Bladder*—Normal. *Rectum*—Normal. *Thyroid and parathyroid glands*—Normal. *Brain*—There were a number of small (?) cystic spaces in the left posterior cerebrum. These did not appear to have any acute origin. *Pituitary*—Appeared normal. No bony damage to the skull.

HISTOLOGICAL FINDINGS

The following tissues were examined histologically: kidney, lung, liver, spleen, myocardium, pancreas, brain, stomach, voluntary muscle of leg, adrenal, thyroid, and pituitary.

Renal Changes.—The most important changes were those found in the kidneys. In these there were slight oedema of interstitial tissue and changes in the glomeruli and tubules.

The glomeruli: The capsular space was distended by material stained pink with eosin. In the majority of glomeruli this material formed either a net or a net together with a little granular material; in other glomeruli the material was globular, the masses often being about the size of erythrocytes.

Tubules: The majority of the tubules throughout the cortex and in the medulla contained material similar to that found in the glomeruli. In many tubules in both cortex and medulla there were casts of granular brown material, and in some a few clumps of erythrocytes.

In frozen sections no trace of fat was found either in the tubules, cells, or capillaries. These sections did, however, show that the pink material in the tubules and glomeruli filled the spaces more completely than it appeared to do in the paraffin sections. Many stains were tried in an attempt to identify the material in the tubules and glomeruli, but without success apart from a positive stain for fibrin (Weigert's fibrin stain). The material giving a positive stain appeared only in the distal part of the tubules and never in the glomeruli in this kidney. The brown material did not give a positive reaction for free iron.

Other Organs.—Spleen, myocardium, pancreas, adrenal, thyroid, and pituitary were all normal. The lungs contained focal haemorrhages, patches of oedema, and slight acute inflammatory infiltration. The liver showed parenchymatous degeneration and also oedema in the region of the portal systems with dilated lymphatics. In the stomach there were minute haemorrhages in a congested mucosa. In the brain there was a little old and recent haemorrhage in wide perivascular zones in the white matter beneath the cortex in the left temporal lobe. In the voluntary muscles of leg histiocytic reaction was found in the periphery of degenerate partly calcified muscle bundles from the thigh.

Our thanks are due to Mr. W. H. C. Romanis for permission to publish this case.

Although the activities of the National Smoke Abatement Society have had to be limited owing to the war, it has been found possible to continue some of the work and to issue publications, and the financial position is satisfactory. After a meeting held at Manchester the executive committee put forward a comprehensive resolution pointing out that in view of the need to eliminate all forms of waste, attention ought to be directed to the gross and expensive waste causing and caused by the smoke nuisance—a waste not only of fuel and power, and of money, labour, and skill, but of health and amenity; the society viewed with anxiety the deterioration in atmospheric conditions which had occurred during the war. The intensification of the war, however, soon after this resolution was framed, prevented any considerable action upon it or any campaign on the ground of fuel economy against industrial smoke. The president of the society is Dr. H. A. des Vœux, and the British Medical Association is represented on its council by Dr. G. Clark Trotter and Mr. Bishop Harman. The society's eleventh annual report has just been issued.

A CASE OF LIMB COMPRESSION ENDING FATALLY IN URAEMIA

BY

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AND

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In this issue of the *Journal* (p. 427) Bywaters and Beall report four cases of renal failure in air-raid casualties, three of which received blood transfusion. The pathology of these cases is very similar to that resulting from incompatible blood transfusion. The following case is reported because, though it is clinically similar to and in its essential pathology identical with the cases of Bywaters and Beall, there is the vital difference that blood transfusion played no part in its treatment.

Case Report

A girl aged 11 was pinned under bomb debris for about three hours on a night of October. Members of the rescue party stated that she was lying on her right side, body tilted head downwards at an angle of 45 degrees, the legs acutely flexed at hips and knees. In this position she was compressed, though not actually crushed, by the dead bodies of her parents; a heavy beam lay upon her left thigh.

On admission to hospital she was conscious and rational, as she had been all the time rescue work was proceeding. Though rather pale and complaining of pain in both legs, she seemed comparatively unhurt. Full examination revealed no evidence of injury save some swelling of the left thigh. The blood pressure was not taken, but the pulse was said to be of normal rate and fair tension. During the early morning she passed 4 oz. of smoky red urine which was said to have given a positive result to the tinct. guaiac. test for blood. Radiography showed no evidence of bone injury. The swollen thigh was thought to be due to a deep-seated haematoma from injured muscle.

Next night she was first seen by one of us (O. M. S.). She presented a typical picture of uraemia. She was drowsy and irritable, her skin was dry, her respiration deep and sighing. Her mouth was dry, the tongue covered with brown fur, and the lips cracked. The left thigh was very much swollen, pitting oedema extending from the hip to the toes. The greatest swelling was in the thigh; there was no discoloration of the skin to suggest an underlying haematoma. The left arm was also oedematous. During the next five days the oedema increased and spread till the whole body below the level of the nipples showed pitting on pressure; the swelling was always greater on the left than on the right side. There was no oedema of the face. The patient was nursed throughout in a semi-sitting position, this being the only one she would tolerate. The bladder was never palpable. There was complete anuria save for a few cubic centimetres passed incontinently on the nights of October 30 and 31. Attempts to collect a specimen of urine by catheterization proved the bladder to be empty.

Her condition progressively deteriorated. She became more and more irritable, being much troubled by thirst and later by her inability to move her oedema-bound legs. She was conscious, though increasingly stuporous, until an hour before her death. She died at 4.30 p.m. a week after admission. At no time was the patient jaundiced, nor was there an icteric tinge to the plasma of any blood sample taken for haematocrit readings.

Treatment.—In an endeavour to cause a diuresis 3,000 c.cm. of 5% glucose in normal saline was given by intravenous drip over a period of thirty-six hours from October 29 to 30. In view of the increasing oedema and decreasing plasma

proteins (from 6.4 to 4.8—see table), and since no diuresis had ensued, this was abandoned. Mersalyl 1 c.cm. was injected intramuscularly on October 31, and a similar dose intravenously on November 2.

Table Correlating the Treatment, Blood Pressure, Urine Excretion and Blood Estimations

Date	Blood Pressure	Blood Urea mg. per 100 c.cm.	Hb %	Haemato-crit (% R.B.C.)	Plasma Protein gm. per 100 c.cm.	Treatment	Urine Out-put
Oct. 28	—	—	—	—	—	—	4 oz.
" 29	132/100	154	124	54.0	6.4	{ 3,000 c.cm. 5% glucose—	Trace
" 30	125/90	210	94	42.0	4.8	{ saline 100 c.cm.	"
" 31	140/100	295	—	—	—	4 × N serum	None
Nov. 1 (a.m.)	140/100	295	98	42.5	4.3	400 c.cm. 4 × N serum	"
(p.m.)	140/110	309	90	40.0	4.9	—	—
" 2	150/110	327	88	39.5	4.3	—	—
" 3	145/110	369	76	35.5	4.6	200 c.cm. 4 × N serum	"

To raise the plasma proteins and because of its diuretic action (Anderson and Boyle, 1940) concentrated human serum was given intravenously. The serum used was the dried serum supplied by the Medical Research Council's serum-drying unit. It should perhaps be emphasized that the serum from Group A (II), B (III), and AB (I) donors is pooled before filtration and drying, and that the effect of this pooling is to render the agglutinin content negligible (Levinson and Cronheim, 1940). A solution of four-times-normal concentration was made. Intravenous injection of 100 c.cm. on October 31, and 400 c.cm. (by intravenous drip) on November 1, produced a rise of plasma protein from 4.3 to 4.9. Coincidentally the patient seemed more comfortable. A further infusion was started at 11 a.m. on November 3. 200 c.cm. had been administered by the time she died. (On this last occasion 0.5 gramme of evipan intravenously was necessary to restrain the patient while the cannula was inserted. Anaesthesia lasted twenty minutes. On November 1 sodium amyltal grains 1½ by mouth was sufficient.) No reaction was caused by the serum. The patient's temperature remained subnormal throughout her stay in hospital.

Pathology

The post-mortem examination was performed by Dr. J. V. Dacie. The chief findings were as follows:

General: Symmetrical oedema of body from nipples to feet. Arms oedematous below mid-point of humerus.

Thorax: No excess of fluid in pleural cavities. Slight excess of clear fluid in pericardium. Heart normal. Fluid blood in great vessels.

Lungs: Pale and bulky. Slight basal congestion (detached portions floated in water).

Abdomen: Slight excess of peritoneal fluid. Stomach, liver, spleen, and mesentery normal. Considerable injection of the mucous membrane of the bowel from the duodenum to the sigmoid colon. Kidneys large and pale, foetal lobulations well marked. On section the kidney cortex seemed paler than normal. The differentiation between cortex and medulla was very clear. The capsule stripped readily. Ureters normal, bladder empty. No other abnormalities were found.

High muscles: Oedematous but otherwise normal. No extravasation of blood, no microscopical evidence of necrosis.

- It is the microscopical appearance of the kidney that is the chief point of interest in this case. Most of the tubules contained a granular debris that stained a brick-red colour with eosin. This material could be found in all parts of the tubule from the capsular space to the duct of Bellini. Proximally it was small in amount and was often embedded in an albuminoid substance, but in the collecting tubules the granules were tightly packed, forming a solid cast of the lumen. At first sight some of these

granules seemed to be red blood corpuscles; on closer inspection and comparison with intact corpuscles in the vessels it was evident that the tubular contents were frankly granular, though "ghosts" of broken cells could be seen in some places. In an unstained section the tubular contents were the golden-red colour of unstained red cells. The tubular epithelium in some places showed evidence of degeneration. Some of the cells had lost their outline. There were some pyknotic nuclei. This degeneration seemed to bear no constant relation to the amount of material in the tubule. The glomeruli were normal; the capsular space was not dilated. Special staining showed no fat and no free iron in the kidney substance or in the tubules.

Summary

The case is reported of a patient who died from uraemia following a type of injury that often produces shock. The micropathology resembles that of incompatible transfusion. Unlike similar cases reported in this issue there can be no possibility here of incompatible transfusion, since no blood was given to our patient. Herein lies the importance of this case and the reason for reporting it.

We wish to thank Dr. A. T. Moon for allowing us access to his patient and Dr. J. V. Dacie for performing the necropsy and preparing sections of the kidney and other organs.

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ANTIBODY RESPONSE AND SYSTEMIC REACTIONS AFTER INOCULATION OF A NEW TYPE OF T.A.B.C. VACCINE

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An account was given in last week's issue (p. 391) of the experimental work that led to the preparation of a new type of typhoid vaccine killed and preserved with alcohol. The object of the present paper is to record the results of comparative trials in man, carried out with the new and the old types of vaccine. Observations were made on the local and general reactions produced by the inoculations, and the immunity response was measured by the estimation of the Vi and O antibody content of the sera.

From the experiments described in the preceding paper it seemed justifiable to expect that alcohol-killed and alcohol-preserved vaccines would stimulate Vi antibody response in an outstanding manner and could, by this property, be distinguished from ordinary heat-killed and phenolized vaccines. To test this point, and also to ensure the unbiased reading of the agglutination tests, the first three trials were so arranged that the samples of serum reached one of us (A. F.) labelled only with serial letters and numbers, without indicating which of the vaccines tested had been used for the inoculation of any particular group of volunteers. It will be seen from the following tables that in each of the three trials the group