discoloured, the muscular tissue being yellowish and infiltrated with fat. There was marked dilatation of the coronary vessels. On the right side the endocardium showed some reddish-brown patches. There was some sort of erosion of the edges of the tricuspid valve, which appeared to be fringed and thickened, and showed a prominence composed of small granulations. The urine contained albumen and clumps of Höflich's bacillus.

Case recorded by Scherzer and Ernst.¹ Symptoms of pyelo-nephritis and endocarditis first appeared soon after parturition, which was followed by retention of the cleansing and metritis.

Post-mortem.—In addition to lesions in three of the lobules of each kidney, there was also observed verrucose valvular endocarditis, the tricuspid valve being greatly thickened. The lungs and liver were healthy. The spleen contained an encapsuled abscess. Microscopic examination revealed the presence of Luguiger's bacillus (*streptothrix valvulas destruens bovis*), which was apparently identical with the bacillus pyogenes bovis of Künnemann. Cultures made from portions of the heart and kidney contained a bacillus in a state of purity which was certainly identical with the bacillus of Künnemann.

Numerous experiments have been made with the object of discovering the method of infection, but none has so far had absolutely positive results. It is generally admitted however, and it is also my own opinion, that the bacilli reach the bladder by way of the urethra, multiply there, and by degrees reach the kidneys by passing up the ureters. Guillebeau² and the majority of French authors, Cadéac,³ Nocard and Leclainche,⁴ support the theory of ascending infection, while German authorities, Bollinger,⁵ Kitt,⁶ Friedberger and Fröhner, Hutyra and Marek,⁷ Ernst,⁸ are of opinion that the infection takes place by way of the blood stream.

NOTE ON THE CONDITION KNOWN AS "WHITE FLESH."

By A. M. TROTTER, M.R.C.V.S., Glasgow.

THE subject of this note was a Scotch bullock, four years old, in good condition. It was stalled in the cattle lairages for seven days prior to slaughter, and the *ante-mortem* examination revealed no evidence of ill-health. After the animal had been slaughtered the amount of blood drawn was normal, and to the naked eye it did not appear to differ in any way from that drawn under normal conditions. The following points were noted on *post-mortem* examination:—

All the internal organs, including the thyroids and adrenals, were found normal, with the exception of the liver, one lobe of which was extensively affected with cirrhosis, and numbers of the distoma

¹ Ernst: "Centralb. f. Bakt.," T. XXXIX., pp. 549-660; T. XL., p. 79. Scherzer: "Berlin. t. Wochenschr.," 1904, p. 445.

² Guillebeau: "Schweiz. Arch. f. Tierheilk.," T. XXX., 1888, p. 269; T. XXXII., 1890, p. 224; T. XXXIII., 1891, p. 157; T. XXXIV., 1892, p. 70.

³ Cadéac: "Pathologie Interne des Animaux Domestiques," First Edition, T. VII., p. 56

⁴ Nocard and Leclainche: "Les Maladies Microbienne des Animaux," T. II., p. 393, Paris, 1903.

⁵ Bollinger: "Zeitschr. f. Tiermedizin," T. XVII., 1891, p. 346.

⁶ Kitt: "Path. Anat. der Haust.," T. II., 1906.

⁷ Hutyra and Marek: "Spez. Patholog. u. Therapie der Haust.," Second Edition, T. I., Jena, 1909, p. 959.

⁸ Ernst: "Centralbl. f. Bakt.," T. XXXIX., pp. 549-660; T. XL., p. 79.

hepaticum were present in the bile ducts. The heart was of a red colour. The carcase weighed 666 lbs. Eighteen hours after slaughter rigor mortis was well marked, and the reaction of the muscular tissue slightly acid. The fat was abundant and of good quality; the bones, compact and cancellated, normal. All the muscles were of a greyish colour, possessed no distinctive odour, and were of a normal consistency. The lymphatic glands were normal.

Microscopical Examination.—*Blood.* No organisms were discovered in smear preparations stained with 2 per cent. gentian violet or methylene blue. *Muscle.* Striation was perfect.

Chemical Examination.—Portions of the muscle from the roast and shoulder were submitted for analysis to Mr Harris, the Corporation chemist, and the following is a copy of his report:—

Analyses of Samples of Meat.

	<i>Roast.</i>	<i>Shoulder.</i>
Moisture	67·84	71·59
Fat	11·89	6·04
Proteids	19·25	21·48
Ash	1·02	1·09
	<hr/> 100·00	<hr/> 100·00

Cold Water Extract—

Total extract	5·30	5·80
Total soluble proteids	4·20	4·25
Soluble albumen	1·10	1·20
Soluble ash	·92	·94
Collagene	·26	·23
Muscular fibre	16·45	15·84

Artificial Digestion—

Digested matter in percentage	90·09	93·07
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Emmerich devised a method of determining the nutrient value of any food material. He based his calculations on the fact that the actual market value of a gramme of proteids is higher than that of fat, and fat higher than carbohydrates. He therefore decided to regard 1 gramme of carbohydrates as the nutrient unit, and the gramme of fat and of proteids to represent 3 and 5 nutrient units respectively. If the amount of fat and proteids in any given sample be multiplied by these factors and calculated on a basis of a 1000 grammes the result indicates the number of nutrient units per kilo.

Calculating the nutrient value of this flesh by the method of Emmerich, it is found that the muscles of the roast and the shoulder represent $1319·2 + 1255·2$ nutrient units. For comparison an estimate calculated by Strohmer, based on an analytical examination of moderately fat beef, is here given: proteids, 21·0; fat, 5·5; nutrient units, 1215.

The chemical composition of muscle taken from different parts of a carcase varies materially, but if an average of the two results be taken then it will be seen that the flesh in question gives 1287·2 nutrient units as against 1215 of Strohmer, giving a difference of 72·2 food units in favour of the flesh in question. This, of course, is in all

probability due to the difference in the quality of the carcase, and cannot in any way be attributed to any increased nutrient value arising from this condition.

In order to ascertain what effect, if any, would follow the ingestion of such flesh, a roast weighing about 10 lbs. was prepared for the table by a professional chef. Fourteen persons partook of the roast, each consuming on the average about 6 oz. of meat, and no bad effects followed. None found it in any way objectionable; indeed, all gave it as their opinion that it was sweet and pleasant to the palate. There was, however, a diversity of opinion as to its flavour,—two held that it had the flavour of pork, seven that of fowl, two that of beef, whilst three would not hazard an opinion.

This condition is not often seen among animals slaughtered for human food. During the past fifteen years six or seven cases have come under the observation of the writer, and in every instance the animal was in good condition.

It would appear that this condition of the muscular tissue is simply due to the lack of pigmentation, and, therefore, it may be safely passed as fit for human food. In support of this contention the following reasons may be adduced:—

This condition does not appear to cause any systemic disturbance of the animal during life.

The usual *post-mortem* changes take place after death.

Chemical analysis fails to show any change.

When used as an article of human food it does not appear to produce any deleterious effect.

Reviews.

Serums, Vaccines, and Toxines in Treatment and Diagnosis. By Wm. Cecil Bosanquet, M.A., M.D., F.R.C.P., and John W. H. Eyre, M.D., M.S., F.R.S.E. Second Edition. London: Cassell & Co., Ltd., 1909.

THE first three chapters of this work, amounting to about one-fifth of the whole, are devoted to a general consideration of the nature of immunity, the methods of preparing and administering serums and vaccines, and the employment of serums and toxins in the diagnosis of disease. The remainder of the work deals in a special manner with the treatment of the principal bacterial diseases of man by means of sera and vaccines. The introductory part is very clearly and concisely written, and it probably contains just the amount of matter relating to the nature of the different kinds of immunity and the current theories put forward to explain them that the average medical student is likely to require. What may be called the special part of the work is also for the most part well adapted to the requirements of students, but some of the chapters are a little overburdened with descriptions of sera and other protective substances that are almost devoid of interest or importance.

The authors do not pretend to deal with immunity from the veterinary point of view, and some of their passing references to methods of immunising employed in veterinary practice are inaccurate. Thus, it is stated (p. 46)