

Chemical examination of the liquor amnii / [George Owen Rees].

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CHEMICAL EXAMINATION
OF THE
LIQUOR AMNII.

BY G. O. REES, M.D. F.G.S. &c.

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THIS secretion has been examined by several continental chemists, with a great diversity of result, not only as to the quantities, but likewise the quality of its constituents.

Buniva and Vauquelin make its specific gravity 1004; and its solid contents, 11 to 12 parts in 1000. Frommhertz's experiments differ from the late observations of Dr. Vogt of Bern; who attempts to explain the discrepancy, by supposing that the fluid, as examined by Frommhertz, was not obtained pure.

In a Paper on Albuminous Fluids, by Dr. Bostock, published in the Fourth Volume of the "Medico-Chirurgical Transactions," the solid content of a specimen of liquor amnii is given as 16.6 in 1000 parts; which would make the specific gravity of the fluid to be about 1008.6. This observation is in close accordance with my own; the four specimens I have examined varying in specific gravity between 1007 and 1008.6.

The analyses I here bring forward were performed on specimens of liquor amnii procured for me by my friend Mr. C. W. Lever, to whose kindness I am indebted for the particulars I shall prefix to each analysis. Great care was taken by that gentleman that no extraneous matter should become admixed with the liquor, which was drawn off either by a canula or a female catheter.

CASE 1.

C—— W—— has been delivered of three children. In the two first labours, the perforator was employed, to effect delivery. The third labour was brought on at $7\frac{1}{2}$ months—the child born dead. On examination, the brim and outlet of the

pelvis were found by Mr. Lever to be contracted: he therefore again induced labour at $7\frac{1}{2}$ months, by passing a female catheter into the os uteri, and drawing off the liquor amnii. Labour pains came on twenty-four hours after the operation, and in forty-one hours a female child was born alive: it lived only half an hour.

EXAMINATION OF LIQUOR AMNII.

Strongly alkaline.—Sp. grav. 1008.6.

Contained in 1000 parts:

Water	983.4
Albumen (traces of fatty matter)	5.9
Albuminate of soda }	6.1
Chloride of sodium }	
Animal extractive soluble in water and alcohol, urea, chloride of sodium	4.6
Traces of alkaline sulphate.	

CASE 2.

R—H—, a patient admitted into Bermondsey Workhouse, had been in great distress previous to admission: had had three children: supposed herself about five months advanced in pregnancy: was greatly emaciated, and suffered from colliquative sweats, coughs, and expectoration. She sunk gradually. On post-mortem examination, large vomicae were found in the apices of the lungs: the abdominal viscera were healthy. The liquor amnii was carefully drawn off; and the foetus (a female) appeared to be at about the seventh or eighth month of utero-gestation.

EXAMINATION OF LIQUOR AMNII.

Strongly alkaline.—Sp. grav. 1008.

Contained in 1000 parts:

Water	984.98
Albumen (traces of fatty matter)	1.80
Extract soluble in water { Salts 2.80 Organic matter, principally albumen, from albuminate of soda, 3.22 }	6.02
Extract soluble in water and alcohol { Salts 2.80 Organic matter, principally lactic acid and urea, 4.4 . . . }	7.20

The third specimen examined, was taken from the same patient as specimen 1. The liquor was abstracted in the same manner, and at the same period of utero-gestation ($7\frac{1}{2}$ months). The fœtus was a female, and still-born.

EXAMINATION OF THE LIQUOR AMNII.

Strongly alkaline.—Sp. grav. 1007.

Contained in 1000 parts:

Water	986.8													
Albumen (traces of fatty matter)	3.2													
Aqueous extract	<table><tr><td>{</td><td>Salts 3.2</td><td></td></tr><tr><td></td><td>Organic matter, viz. albumen,</td><td></td></tr><tr><td></td><td>from albuminate of soda, 1.2</td><td></td></tr><tr><td>}</td><td></td><td></td></tr></table>	{	Salts 3.2			Organic matter, viz. albumen,			from albuminate of soda, 1.2		}			4.4
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	from albuminate of soda, 1.2													
}														
Alcoholic extract	<table><tr><td>{</td><td>Salts 3.8</td><td></td></tr><tr><td></td><td>Organic matter, viz. lactic acid</td><td></td></tr><tr><td></td><td>and urea, 1.8</td><td></td></tr><tr><td>}</td><td></td><td></td></tr></table>	{	Salts 3.8			Organic matter, viz. lactic acid			and urea, 1.8		}			5.6
{	Salts 3.8													
	Organic matter, viz. lactic acid													
	and urea, 1.8													
}														

CASE 3.

Mrs. W—, advanced $7\frac{1}{2}$ months in utero-gestation, of diminutive stature, being only four feet four inches in height, has had one child, which was brought away by using the perforator. She has suffered from rachitis in early life. There is considerable abbreviation of the antero-posterior diameter of the pelvis. The liquor amnii was drawn away from the membranes by a female catheter. The child was brought away by using the perforator.

EXAMINATION OF THE LIQUOR AMNII.

Strongly alkaline.—Sp. grav. 1007.

Contained in 1000 parts:

Water		986.8
Albumen (traces of fatty matter)		2.4
Aqueous extract	{ Salts 4.2 Organic matter, viz. albumen, from albuminate of soda, 2.0 }	6.2
Alcoholic extract	{ Salts 3.0 Organic matter, viz. lactic acid, and urea, 1.6 }	4.6

The fatty matter procured from the liquor amnii differs from that of the blood, in not assuming a deep purple tint when digested in strong sulphuric acid.

The salts, both of the aqueous and alcoholic extracts, consisted of chloride of sodium and carbonate of soda, with minute traces of an alkaline sulphate and phosphate. In the salts of the aqueous extractive, the carbonate resulted from the incineration of an albuminate; and in the alcoholic extractive, from the decomposition of a lactate, by the same operation.

The salts obtained from the aqueous extractive in analyses Nos. 2 and 3 were not entirely soluble in water. The insoluble matter, on examination, proved to be phosphate of lime; which must either have been held in solution with the albuminate of soda, or have resulted from the decomposition of an alkaline phosphate at a red heat; some soluble earthy salt being present, to effect such decomposition. I lately observed the existence of phosphate of lime in the aqueous extractive of a specimen of blood drawn from a diabetic patient; and am inclined to think that further observations will shew a similar result in other albuminous fluids. I should be inclined to ascribe the presence of the earthy phosphate to the existence of some soluble earthy salt in the aqueous extractive, which, when fused with phosphate of soda, yields phosphate of lime; and I am strengthened in this opinion by the fact, that when the salts, after incineration, were not allowed to fuse, no earthy phosphate was observed; and traces of an alkaline phosphate were detected in the aqueous solution of the salts, which was not the case when the earthy phosphate was present.

Urea was proved to exist in the liquor amnii, by its characteristic crystallization with nitric acid, and the re-actions of its nitrate. A further evidence was obtained in the analysis of Specimen 3, by the crystallization of chloride of sodium in octohedra, from the alcoholic extract, when allowed to evaporate spontaneously. Specimen 3. contained urea, in greater proportion than the other specimens.

The albumen procured from the liquor amnii yields a trace of oxide of iron and earthy phosphate, on being incinerated.

The flocculi which are observed floating in the liquors are composed of caseous matter, containing cholesterine.

On examining the analyses, it will be observed that the

liquor amnii varies greatly in proportional constitution in different individuals, at the same period of utero-gestation; which shews, that, like perhaps all the secretions of the body, it is affected by the temperament and diathesis of the mother. The specific gravity of the secretion, however, varies but little in the four specimens; which is possibly a precaution on the part of nature to preserve a medium of fixed power, to oppose the motions of the fœtus in utero.

Whether or not the liquor amnii varies in concentration at different periods of utero-gestation, remains to be shewn: it is certainly pretty constant at $7\frac{1}{2}$ months.

The experiments of Dr. Vogt of Bern would lead us to suppose that there is great variation in the density of the fluid at different periods. At six months, that chemist asserts that he has found 9.71 parts of solid matter in 1000 of the liquor; and at $3\frac{1}{2}$ months, 20.55 parts in 1000. There is, however, a want of proper relation between the solid content and specific gravity of the fluids, as given by the Doctor, that prevents me from regarding his experiments as conclusive.

