In the heat of your competition.

A. Ganger,

Fatal distraction.
Contributions to the Physiology and Chemistry of Foetal Nutrition

being an Inaugural Dissertation

Submitted to The Medical Faculty of the University of Edinburgh

by

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"Feci quod posui, non ut volui"
The cream-like fluid of the Coleoptera of Ruminating is not the result of decay, as Colin surmised. It is just 10 hours after meals in fairly weather.
On the Chemistry and Physiology of the Milking Fluid collected by the Placental Cysticles of Ruminants.

Does the maternal blood percolate unaltered into the foetal capillaries in the Placenta, or is a nutritive fluid first separated from the maternal blood to be afterwards absorbed by the foetal capillaries?

To this question no satisfactory conclusive answer can be given in the present state of our knowledge — it is in support of the second of these hypotheses that I offer the following observations on the Milking Fluid secreted by the Placental Cysticles of Ruminants.
1. Goodin Anatomical and Pathological Observations: Edinburgh 1845
Prof Goodsir in a paper entitled "The Structure of the Human Placenta" directed attention to some structures in the Placenta which had escaped the attention of previous observers to arrangements of cells in the maternal & foetal portion of the placenta which seemed adapted for the elaboration and absorption of the matter destined for the blood of the fetus. Such a nutritive matter elaborated by the maternal portion of the placenta cannot, owing to the peculiar structure of the organ, be shown to exist in the placenta of Woman; it therefore became of the utmost importance to inquire whether comparative anatomy and physiology supply us with any facts in support of Prof Goodsir's views.

Though constructed according to a general plan we find the placenta to differ considerably in the different orders belonging to that great system of the Mammalia, provided with a placenta. In the mammals e.g. the fox the mare the whole surface of the chorion comes into
intimate contact with the uterine mucous membrane and allows of nutritive interchange between the mother and embryo, to take place over the whole surface of the ovum.

In other the villi of the chorion only become developed at the point, as in woman, or in a circle round the ovum constituting the zone like placenta such as we see in the bitch.

In one great order, that of the Ruminants the villi become developed in patches all over the chorion and these villi dipping into the mucous follicles of the uterus give rise to those round or oval bodies which have been named Cityclads, and which are really small placenta. These Cityclads which differ in number, shape, weight, etc. in the different members belonging to the order, can be easily divided into a foetal and maternal portion. The foetal portion is seen to consist of the villi of the chorion beautifully developed; the maternal which is usually very white, consists of the hypertrophied uterine mucous membrane and is covered with
the openings of the much enlarged mucous follicles, a squeezing which
causes a considerable quantity of a creamy fluid to escape; this creamy fluid
noticed by some of the older authors has as yet been very imperfectly studied.

I shall in the following pages give to it the name which Hofmann designates it by viz. *Uterine Milk*.

That the secretion of the placental cotyledons of ruminants attracted the
attention of older anatomists and physiologists appears not improbable, and it is reasonable
that some considered it to play an important part in the nutrition of the foetuses.

We find Hofmann saying "Nitratus infusor medicus nunc temperato,
gelatino no metrica, quippe spongiosam utrinque
substantiam tenuis est et a secundarie
reaction, per eiusmod usus ad infantium
defctus." What more likely than
that the uterine milk of ruminants should
have suggested this passage to Hofmann?

(2) Colin. Traité de Physiologie comparée des Animaux Théristiques, p. 603.

(3) Mémo. de la Société Phys. et Nat. de Genève, Tom. IX.
Duvivier considered the maternal portion of the vestigialus to be true glands, whose function it is to separate juice which the placenta aborts for the nutrition of the foetus. 1.

Eichorn described the uterine milk of Ruminants as a white, thickish fluid, secreted by the uterine glands ( Macron folliculi B.) and which is absorbed by the bloodvessels of the chorion.

Rovot de Morin examined this fluid; these researches are referred to lightly by Schlössberger. According to Colin 2, they arrived at the conclusion that the uterine milk of Ruminants contains albumen, fibrin, casein, a gelatinous substance, blood corpuscles, mucus, albumen, fat and salts. I have been unable to procure the work in which these researches were published. 3.

Of Schlössberger of Tübingen, published in 1855 in the Arch der Chemie und Pharmacie a paper entitled "Die Uterusmilch der Wiederkühe." In this paper,
Fellows-berger gave the results of the quantitative analysis of two specimens of the uterine milk of the ox. These will be seen tabulated in the note at page 2. The results of Fellows-berger's analysis were the following:

Uterine milk is a fluid of creamy consistency exhibiting when examined microscopically many free nuclei, fat globules and epithelial cells. It has a decidedly alkaline reaction and contains albumen, fat, salts, but no sugar.

Colin (1) considers the uterine milk of ruminants to be simply the product of decomposition, and that it therefore does not exist during life. He says that it can be only obtained from the uteri of cows a considerable time after death, the period varying with the temperature and other embalming circumstances. To this assertion Colin thinks himself entitled to give a most unqualified denial. He obtained uterine milk which I examined from uteri which had been recently removed from slaughtered animals at the time that I was working on this subject.
1 Oct 0001
Thus my 2nd quantitative analysis of uterine milk was of 1 specimen obtained from the city lions within 2 hours of the death of the car. The quantity obtained from the city lions was 144.8 gns, and the quantity which could have been expressed from the whole of the city lions at this rate would be 3094.48 gns. Surely this could not be the product of decomposition, the temperature at the time being below 32º Cahr.

On the process adopted to obtain uterine milk in my experiments.

I obtained the uterine milk in which the experiments by squeezing firmly the maternal portion of the city lions involved in calcium. Employed my fingers to express the secretion, as found that by this means alone I could regulate the pressure to be used. I found that if the city lions were not fresh, or if too much force was exerted in squeezing, the tissue became hardened to a pulp which became mixed with the uterine milk. I never succeeded in expressing all the
uterine milk present in the cotyledons for 3. A considerable quantity was lost in the cachet in which the cotyledons were enveloped. 4. A force sufficient to express all the uterine milk could not be exerted without reducing the tissue of the cotyledon to a pulp which becoming to a certain extent mixed with the uterine milk would have vitiated the results of my experiments.
quantity of uterine milk to establish the nutritive value of the secretion.

**Microscopic characters of Uterine Milk.**

When examined microscopically this fluid exhibits an abundant molecular basis, in which float numerous fat globules and many cells. Many of the cells possess a very granular and fatty appearance and contain nuclei which are brought out by the action of acetic acid. The majority of the cells are evidently the ovoid or cubical epithelial cells of the mucous follicles of the uterine cavities, the contents of which have undergone in many instances a fatty change. Many of the cells seen in uterine fluid resemble very closely the cells of the Coleostenum which in the cows are the epithelial cells of the milk tubae which have undergone a fatty change and fatty matter which they have aspirated from the blood.

In the uterine milk of the cow I observe often two large nucleated cells lying side by side enclosed in one large cell wall. I am not aware what relation these bear to the mucous follicles.
On the Physical and Chemical properties of Uterine Milk.

Uterine milk is a fluid of white or very-white colour, and of creamy consistence. In the cow I found the specific gravity (as ascertained by means of the specific gravity bottle at 60° Fahr.) to vary from $1.033$ to $1.040$. In cows the specific gravity of two specimens of uterine milk of the cow I found it to be, 1031, 1033.

Reaction. Not only on exception I found the uterine milk of the cow in the cow to be alkaline, when fresh, becoming very decidedly acid as soon as putrefaction sets in. No one exception I have noticed to which I refer the reaction of the milk in question.

The results of the analysis quite differ from mine in so far as the reaction of uterine milk is concerned. He says, "Das Secret war geruchlos und magere in allen Beiseln deutlich wenn auch schwach, saures. Ich erwarte daher an die Läufir hier sehe reet die Kochmilch, beginnt 83."

The determination of the reaction of the.
organiC fluid apparently a most easy
flatt, is often in some cases really difficul-
ty. For many animal fluids are so extremely
 liable to undergo rapid decomposition that
unless they are examined very perfectly
from the results obtained are of no
desirable use. Again some fluids seem to react both
in the same both alkaline & acid reactions.
It is only by bearing these different things in
mind that we can explain the contradictory
statements which have been promulgated
in this reaction of mullen (indicating the
mammalian fluids). While Romere, Bezeleny
and the others considered mullen as a slightly
acid fluid, Gay-Lussac & d'Castle
were of opinion that from an acid, while
steadily the experiments of Chervelle, Bouchard
& Quevenyu have shown that mullen affords
the vegetable coloring matter both as a
slightly acid and slightly alkaline
fluid - the acid being better marked
than the acid reaction, these experimenters,
have concluded that mullen is every slightly acid
fluid. I return from this direction
to state that I did not see Mr. Schleusner,
After until I had been deprived of the opportunity of prosecuting any further experiments on uterine milk, and that I did not therefore make as extensive a series of experiments to determine this point as otherwise I should have done. I found in my experiments that fresh uterine milk destroyed the blue colour to tincture paper and that tannic paper when dipped into the secretion assumes a brownish tinge. Perhaps had I used more delicate paper coupling the greater force of the experiment I might have found that uterine milk had tannic acid properties, a double reaction.

When uterine milk is evaporated we observe if the temperature be sufficiently elevated, first a jelly-like to form over the surface, as when milk is burnt (a jelly-like such as was formerly supposed to indicate the presence of casein in the fluid, although it occurred). The liquid that solidifies from coagulation of the chief of its constituents is will be afterwards shown. If the drying be continued a brownish brittle
The solid residue left on drying the butter in the retort, varies amount
as 1/10 or 1/13 ptv in 100 of the ultimate milk of the cow, from 1/6 or 1/7 in that of the beef.
If the dried residue be pulverized and treated with boiling water this will dissolve a certain
amount of fat which when examined after having been allowed to evaporate spontaneously can be
observed to possess the colour and taste of the fatty
matters of milk. The quantity of fatty
matter in a specimen of the ultimate milk of
the cow was 12.8, in that of the beef 14.0 ptv per 1000.
In two specimens of the ultimate milk of the
cow, I found the quantity of fat to be respectively 10.5 and 12.0 ptv per 1000. If the dried residue be
beaten after being treated with water it will
be boiled with a little water and an aqueous
solution be tested for sugar, no reaction will
be obtained. This proves the absence of sugar.
If dried butter is to be burned in an crucible
at a red heat, a very small amount of
ash will be left. I have found it to contain...
to 3.7 and 4.0 pt. a lb. in the uterus milk
of the cow. The quantity of the albumin so
small as to render even a qualitative analysis
of it almost very difficult.
Having ascertained that uterine milk contains
a considerable proportion of solid matter that is
not in all amount of fat & salt, we must
inquire what is the composition of the so-called
froth of uterine milk.
To ascertain this I first boiled one of
the uterine milks; it soon solidified almost
entirely. Then diluted another specimen with
an equal bulk of water & boiled — a coagulum
was formed as in the last instance, over which
floated a considerable quantity of fluid.
In attempting to filter the solidified fluid so
as to separate it completely from the coagulum,
the process was soon arrested by the clogging of the
filter. I therefore added a few drops of
acetic acid to another specimen of the
uterine milk, where after boiling I found
that the precipitate separated quite readily
and admitted of rapid filtration. I found
that uterine milk was precipitated by
Nitric acid & other reagents which indicate
The presence of Albumen, of the presence of which in large quantities my experiments left no doubt. I naturally was anxious to ascertain whether utrine milk contained Casein or not.

The process which I attempted with this object was the following. Having diluted a considerable quantity of utrine milk, I added a solution of chloride of ammonium in amount more than sufficient to render the fluid neutral. I then boiled the fluid for a few minutes, filtered its filtrate which was quite clear, and then divided it into several parts.

To one I added acetic acid—it caused a coagulable precipitate.
To another I added a solution of chloride of calcium—precipitate. In boiling the fluid a precipitate formed.
To another portion I added a solution of sulphate of alumina—its precipitate. On heating the fluid a precipitate occurred.

The above results would formerly have been considered ample proof of the presence of Casein in an animal fluid. The researches of recent chemists have shown, however,
At the Alumminium of Peterborough, we first prepared the same way as in Caesia with nitric acid, Chloride of calcium and Chlorate of sulphate of alkaline. I therefore added to another portion of filtrate some rennet and placed it over a fire place where the temperature was about 100° Ther. No coagulation occurred.

Repealed all the above experiments several times with precisely the same results. What can be substances which react in so many particulars exactly like Caesia? Has it any alkaline albuminurate i.e. albumin upon a state of solution in 60 parts of water? I swear that I do so as the fluid was always readjusted to test paper when I examined it.

In order of my discovery, I always weighed the precipitate occasioned by nitric acid separately, having previously precipitated the albumen by means of its acid in water at

of ammonia. I have discovered the substance Caesiaiform substance (with a pretence of a tangential)

I having ascertained that it furnishes
contains Albumen, Fat, Salts, &c., determined to estimate as accurately as possible, the amount of these constituents. To ascertain as near as possible how much uterine milk could be obtained from the uterine of a cow, I shall first describe the process which I adopted in the Quantitative Analysis of Uterine Milk. I then give the results of my analyses with the amount of uterine milk obtained from the cattle used.

On the Quantitative Analysis of Uterine Milk.

1. A quantity varying from 200 to 500 grs. was evaporated on a clyster in a porcelain capsule. The evaporation was carried on a clyster in the hot water over 2 or 3 in the bell-jar oven at a temperature of 220° C. Lastly the residue was allowed to cool in a receiver of over fiallic acid and another weighing. By this means the amount of water which was ascertained.

The dry residue was pulverized in water with successive portions of boiling Ether. The Etheric solution was allowed to evaporate spontaneously, then taken gently in the
But even though by this means was found the amount of fatty matter.
The residue was incinerated until the organic matter was quite burned away, leaving a white ash which was weighed. This was found the quantity of the organic salt.

2. About 300 gms of Potterite sticks were accurately weighed. Diluted with an equal bulk of water & a considerable quantity of a saturated solution of chloroide of ammonium added. The liquid was then boiled for some time. The coagulum, which was thus formed, was collected on a porcelained filter, dried in the room oven. Then cut into very small pieces with a knife & these further dried in the hot-air oven. Finally, weighed. The weight minus the filters gave the amount of Alumina.

The filtrate was treated with acetic acid. The heavy precipitate thus formed was collected on a porcelained filter, then dried & weighing carried as is described above. Thus, was found the amount of Acidumiform substance.
All the results were then corrected to 1000 ps at 20°C. It will be seen that in many cases there is a very slight loss in evaporation, but this I found it impossible to avoid.

Analysis No. 1. Uterine Milt of Cow.

Amount obtained from the uterine milt not ascertained.

Reaction very slightly alkaline.

Specific gravity determined at 20°C., 1.033.

Water in 1000 ps. 879.10

Total 120.90

Albunin 104.00

Eccrine milt (?) 1.60

Fat 12.33

Inorganic salts 3.74

Note: The above analysis is the amount of solids ascertained separately as usual. To aggregate solids formed by evaporating the fluid.

Analysis No. 2. Uterine Milt of Cow.

(Weight of the costal hairs, + quantity of uterine milt which could be squeezed from them)
The cetyl isomers were 90 in number.

Aggregate weight of cetyl 44780 gms

Additional portion of cetyl taken 20990 gms

Total 24690 gms

The largest cetyl was weighed 1315 gms

Smallest 105-5 gms

Quantity of uterine milk which could be expressed from 1000 gms of maternal portion of cetyl was 149.8 gms

Quantity of uterine milk which could not be expressed from the whole of the maternal portion of the cetyl was 550.4 gms

Specific gravity of milk at 60° 1040

Reduction neutral

Water in 1000 pt. 861.2
Solids 138.8

Albumen 116.5

Yeast-like substance 3.3

Fat 14.0

Tallow 4.0

Lan 1.0

During extraction the amount of uterine milk which could be obtained from the
By means, the proportion of the secretion we can easily calculate how much albumen, fat & salt were contained in the milk & available for nutritive purposes. 

Water in 300g: 48gms = 2591.74

Total = 417.74

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<td>Albumen</td>
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<td>Casein from substance</td>
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<td>Fat</td>
<td>42.13</td>
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<td>Salts</td>
<td>12.02</td>
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Analysis No.3. Eutere milk of the Ewe.

Reaction alkaline.

Specific Gravity 1031 (at 60°)

Into 1200 parts = 883.0

Total = 117.0

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<td>Fat</td>
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<tr>
<td>Salts</td>
<td>4.8</td>
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<td>Loss</td>
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## Analyses of Utter's Milk

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<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
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**Utter's Milk of Ears**
Analysis No. 4. Uterine Muscle from
Drift of Uterus Alliuncus No. 2 14.77
Weight of Lamb 
0
Uterine Muscle removed from 
The Tertiary
Specific gravity of Uterine Muscle 1.033

Water in 1000 grs 918.8
Grav. 81.2

Uterine into Carnifiers
Grav. 61.20
1.20

Total 8.20
1.30

It may prove the result of new quantitative
Analyses of Uterine Muscle performed by myself
I think it will be interesting to compare them
with the only two which have as yet been
published or record — with those performed
by Dr. Fellocherger.
My analyses do not agree as closely with
each other as those of Fellocherger. This
is known not at all to be unusual at.
They very rare that two analyses of
Specimens of an animal fluid called *latex* agree so closely in the two analyses of *latex* which I performed by Geddes and myself. My analyses of *latex* both agree quite as closely as the same number of analyses of stomachal fluid could do.

Does a fluid resembling *latex* exist in any of the lower animals not belonging to the Ruminantia?

On cutting open the uteruses of a few 7-8 months pregnant Ruminantia, I removed between the various membranes of the uterine wall a considerable quantity of a fluid resembling in every way the *latex* milk of Ruminantia.

I only collected 237.5 g of this fluid by simply allowing it to drain away. Its reaction was alkaline.

For gravity 1017. I found that it contained much albumen & some fat. I did not make a quantitative analysis of this specimen, as I wish to prepare other uterine from this species of Ruminantia.

Not having been able to destroy the oblate to *latex* in one perfect donation.
Note: I must note that I had before this

Typhoid Norton of two or three hrs,

without any injury. I ate much

of this milky fluid. If it had been

present no small large quantity,
in this case I cannot explain. A. G.
in the uterine fluid of the Soul (N.B.)

My brother informs me that in his character of the living female, he has noticed considerable quantities of a clear fluid between the chorionic and uterine membranes. 

After the facts which I have adduced in this paper, I think it needless to insist on the importance just in the nutrition of the foetus. Still the uterine fluid my rumenants must play.

One of fluid is vital in the alimentary nature to act as an intermediate agent in the cotyledons, the importance in the nutrition of the foetus might be questioned; but by my observations that I think it clear proves this. I have known that in the cotyledons of one uterus, 350.48 g. of uterine fluid could be expressed with comparative facility. My analyses shows that the amount if the uterine fluid must have been 350.60 g. of Total albumen being 42.13 g. of Fibrin. 2 g. of Fattes. This is it will be seen a great disproportion between the cotyledons.
In closing, I close the account of my researches in Utterly Milk. I cannot help remarking that it was my intention to have extended these very much. The very tedious and long processes required in analyses makes some of which I have given the results in the preceding pages. The great obstacle towards my way by the Inspector of the Nutrition Bureau, have however prevented me fulfilling my original intention.

Arthur Gangee

March 28th 1862.
Some observations on the contents of the foetal stomach, including a consideration of the fitness of the Rennie amni to subsist for foetal nutrition.
(1) Hypocrates a. De Alimento
(2) De Carminis
(3) De nature maeri
(5) Galaen. Lib. 6. anim. vel et quod in utero est. Culp. 3.
Some observations on the Contents of the Foetal Stomachs including a consideration of the fitness of the liquor amnii to subserve purposes of nutrition.

Four theories have at different times been proposed to explain the nutrition of the foetus in utero. The first and oldest, propounded by Hippocrates and defended by Galen, Harvey, Bonetus, Davenant, and others, considered that the foetus was entirely nourished both by the ingestion of liquor amnii and through the Placentae. Its advocates pointed out the resemblance existing between the liquor amnii and the contents of the foetal stomachs and maintained that the liquor amnii possessed all the qualities requisite in a nutrient fluid. Although opposed by some of the most eminent anatomists and physiologists of all ages this theory has found most general acceptance — being defended in a modified form by most of our systematic writers on Foetal Physiology.
(1) Plutarch De platæi Retaeophrum
Lib V. C. 16.

(2) Adelard Physiologiae de l'homme
In IV. p. 388.

(3) Thulelæa Systen of Anatomy
(4) Masses primes. Works into an account
of his life by lie in — the essay
A the introduction of the poetisa.
(5) Billenger de poetis nutrimentis.
(6) Leveillee [invalid handwriting]
Sur la nutriment des poêles &
Achilles or Tectona maintained a 2nd
Theory which supposed the foetus to be
entirely nourished by the absorption of
Ligwtr amnii by the skin. We cannot
help in being amazed that Vieussens,
Buffon, Zoblein, Bianelle & Vandenborck
should have given their support to so
groundless a hypothesis.

The 3rd Theory was that the foetus
is entirely nourished by swallowing Ligwtr
amnii. Democritus & Epicureus as
Plutarch informs us, gave their assent
to this doctrine, which was afterward supported
by De Graef, Boecklaeve, Heinic &
J. Haller.

The 4th Theory was that of the Stoics, and in
more modern times has been held by
Chellesius, Monro, Priorus, Bellenger,
Lerwill & by a great many other eminent
Physiologists of the present century, it
supposes the nutrition of the foetus to be
entirely carried on through the umbilical
vessels.
Eminent physiologists of the present century it is believed that nutrition of the fetus to be entirely carried on through the umbilical vessels.

The first and third theories which I have enumerated have long since been given up; the arguments against the doctrine of salmoneus is so obvious that it is as difficult to understand how it was entertained for a moment. The doctrine of the fetus being entirely nourished as liquid amnion, more the nature of the fluid is taken into consideration, appears untenable. The great arguments of its advocates are that the fetus and uterine circulations did not communicate:
1. That the blood of the mother was unfit to nourish the fetus, which as Lyon remarks, undoubtedly an imaginary argument.

The two theories which have held their ground are 1. that of Hippocrates.
Dr. Philip MacBride closes that part of his elaborate treatise on nutrition (presented to the Medical Faculty in 1839) which discusses the question as to whether the digested amnii is digested or not, in the following way:

"Thus the question as to whether the digested amnii is swallowed as instrument or not is far from being as decisively settled in the negative as some modern authors seem inclined to maintain."
Which supposed the fortes to be nourished in two distinct ways, +2 3/4 part of the tree.
Many of the authors in forset physiology as before mentioned think it quite probable that the Lignum Amnicum contributes to the nourishment of the fortes +
On what is the better forset based?
On the fact that the forset of fortures is always found to contain some forset
Lignum Amnicum, which it has been argued would not enter the organism and it also plays some important part in nourishing the fortes.
What are the chemical elements of the contents of the forset, forset?
Lignum Amnicum present in the forset of dead forutes?
These are questions which must be first solved afterwards if it be proved in chemical grounds that Lignum Amnicum is present in the forset of dead forutes
The question will arise : Does ligero ammii pass into the stomach of the foetus during its foetal life?

The experiments which I shall detail in the following pages were performed on dead fetuses obtained from the slaughter houses. I always collected a sufficient quantity of ligero ammii and applied ligature to the cardiac and pyloric orifices of the stomach, which was usually weighed. The reaction and specific gravity of the contents of the stomach was always noted. The same chemical tests were applied to both fluids. The results were noted. In some cases a quantitative analysis was not complete.

Observation No. 1. I obtained the fetus of a ewe from the slaughter house. I pricked it carefully and collected some of the ligero ammii. I then weighed the foetus.

Weight of the foetus : 6 lbs.

I then cut the abdomen, applied a ligature to the pyloric and cardiac orifices of the

Stomach. From dissecting this organ from its attachments. It was then carefully emptied of its contents, which weighed 3 ozs. + 5 drachms.

The reaction of the Lig. Amnii was Alkaline.

Fluid from the

Stomach. Alkaline

The fluid from the stomach has precisely the same appearance as the lig. amnii. In allowing it to stand a mucus cloud fell. Microscopic examination reveals the presence of a large quantity of gastric epithelium, entangled in mucus.

An equal quantity of the fluid from the stomach, and of lig. amnii, an equal quantity of acetic acid was added. In both cases it produces a precipitate.

A small quantity of the two fluids under examination was placed in two test tubes, to each 3 drops of a strong solution of sulphate of copper were added. Acetic acid was added till the precipitate hydrated oxide of copper was re-dissolved. On tasting a very marked precipitate of oxide of copper fell. The precipitate
was of equal intensity in both cases showing approximately that the quantity of sugar was present in both fluids.
I poured 500 gms of Liq. ammonia in a
counterpoised steam-temperature it
to dryness in the water oven. The weight
of the solid residue was 6.4 gms or 1.28 fms. I
Evaporated an equal quantity of the
fluid from the stomach, to obtain a dry
residue weighing 7.1 or 1.42 fms. If
Observations 6 are every respect the fluid obtained from the stomach of the ligur
ammoni resembled. The difference in the
weight of the dry residue is to be accounted
for by the fact that the fluid from the
stomach ordinarily contains some gastric
epithelium mixed with a little precipitate
Mucin.

Observation No. 2. The uterus of a cow
was opened Ligur Ammoni collected.
It then weighed No. 12 gms. 11
Its contents of the stomach weighed 30 g 5 drs.
The examination of the two fluids was
conducted as in observation 1. The
A Practical Astronomy for Students. By
Dr. Tylor Smith. London. 1849
Page 194.
Observations may be seen in a tabulated form below. Figures registered at the time of the experiments.

<table>
<thead>
<tr>
<th>Contents of Stomach</th>
<th>Liquor Amnii</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid of a very muddy appearance. Contains very much Meconium which renders it very turbid and dirty looking.</td>
<td>This fluid in all respects resembles that obtained from the Stomach. Meconium detected as in the contents of the Stomach.</td>
</tr>
<tr>
<td>Meconium was detected by Microscopic and Chemical examination.</td>
<td>Unbition produced opalescence.</td>
</tr>
<tr>
<td>Birefringence in Arctic acid produces a dense precipitate.</td>
<td>Arctic acid produces a dense precipitate.</td>
</tr>
<tr>
<td>Presence of Tannins.</td>
<td>Presence of Tannins.</td>
</tr>
<tr>
<td>Specific Gravity 1.015</td>
<td>Specific Gravity 1.015</td>
</tr>
<tr>
<td>Neat Air含まれัน</td>
<td>Neat Air含まれัน</td>
</tr>
</tbody>
</table>
Observation No. 3. Uterus of ewe, opened.
Liquor albuminii collected.
Fetus weighed 0.5 lb.
Fluid consisted of liquor vaginal 4 oz, 2 oz.
Reaction in each case fairly alkaline.
Department with agent peculiarly similar in each case, but not within accuracy at the time the experiments were performed.

Observation No. 4. Furred the uterine
6 oz containing a secretion which weighed
10 pounds. I collected some of the liquor albuminii, in soil to compare it with the
fluid from the stomach.
I found the density of both fluids to
be 1.009 (at 60°). The reaction was
in each case slightly alkaline.
Chemical tests were applied to observation
1, 2, & 3 yielded the same results.
Suspension 100 grs. of liquor albuminii
and an equal quantity of fluid
from the stomach in unopened capsules
in the water oven & subsequently over
Sulphurous acid.
<table>
<thead>
<tr>
<th></th>
<th>Liquid from Stomach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water in 1000 pts</td>
<td>984.64</td>
</tr>
<tr>
<td>Solids</td>
<td>15.36</td>
</tr>
<tr>
<td></td>
<td>1000.00</td>
</tr>
<tr>
<td>Water in 1000 pts</td>
<td>985.00</td>
</tr>
<tr>
<td>Solids</td>
<td>15.02</td>
</tr>
<tr>
<td></td>
<td>1000.02</td>
</tr>
</tbody>
</table>

Marin in 500 g of Liquid. Marin in 500 g of Infus. of Stomach pump by action. 92 x 2 pump by A 72 x 2
Marin in milli. 1.84 Marin per milli. 1.44

Observation No 5

To obtain a male human foetus weighing 66.8.
To reflect lecture to the cardiac & pyloric orifice of the stomach then weighted stomach & contents.
Afterwards the contents were accurately weighed, when by subtracting their weight from the total weight of the stomach & contents, the weight of the latex was ascertained.

Weight of Stomach 174.5 g
weight of the contents of the stomach 54 ggs.
The contents of the stomach exhibited the physical
and microscopical character of mucus; they were
extremely tenacious. On analysis, their composition
was found to be:
Water in 2000 pts. 916.76
Tobacco (consisting of
alum, with trace of
sulphur) 0 83.24

Besides to above I performed a great
many experiments of which I kept no
accurate record. They all convinced
me that the contents of the foetal stomach
cannot of itself contain much with
some mucus derived from gastric glands.

(Commentary, 730) that the contents of
the stomach in experiment 1, 2, 3 & 4
consist almost entirely of Lagman
mammal does it follow that the juice
of its excreta into the stomach of the
foetus during its life? by no
means.
The Lagman mammal is a fluid in
no way adapted to purposes of nutrition.

As a liquid always present in the testa, it is known in some cases during the process of fruit development to increase from 0.55 to 1.48. Albumin is always present in proportions ranging from 0.1 to 0.2 per cent., but diminishes and sometimes quite disappears towards the end of fruit life (at all events in the human subject), and is replaced by a much like substance. Neither these cases nor protein exist in it. Tannin is found in considerable quantity (from 0.06 to 0.19 per cent.) in the capsules, and from 0.1 to 0.3 per cent. in the seeds; in the ligustrum album of herbaceous animals.

Wine is always present and increases with the age of the fruit, its maximum quantity being about 4½.

In almost every specimen of ligustrum album of the end which I examined I failed to detect any albumen, but always discovered a substance
reacting in every way like Mucin. Tissues and subcutaneous connective tissue of the animal's organs of the eye, in one of my experiments I found it absent, although its glycogen cells (described by Bernard) were better marked in this case than I ever saw before.

As can be seen in the result of my individual observations I found the considerable quantity of Mucin in almost every specimen of liquor Amnii. After being filtered, the liquor Amnii separated in great part from the liquor Amnii. After this fluid had been allowed to stand for some time it was identified by its appearance; it existed in some cases in little pellets corresponding to the shape of the intestine. It precisely resembled the shape of Mucinum, which could be easily squeezed out of the uterus of the female.
By microscopical examination this revealed the presence of an enormous number of epithelial cells beautifully tangled with bile, precisely resembling those which had been in the gall-duct of every specimen of Nectonim.

By chemical and microscopic examination, almost all the bile could be separated from the liver amnioc, corporated to dryness, and the residue was treated with mercuric nitrate, portions of ether - the mercurial solution was allowed to separate spontaneously in the washed glasses, and the residue then examined with the microscope was found to contain many crystals of cholesterol, a substance which all analysts know exists in large amount in Nectonim.

In every case in which Nectonim was ingested through the liver amnioc it detected it in the contents of the stomach.
By microscopical examination
this revealed the presence of an
immense number of epithelial cells
beautified towards with bile,
precisely resembling those which
are seen in the gall-nature as in
every specimen of meconium.

By chemical and microscopic exami-
nation the bile was detected from
the ligamentum flavum, corresponded to oxyphilic,
This residue was treated with numerous
portions of ether — the etheral solution
was allowed to evaporate
in the watch glasses, and these residues
then examined with the microscope
was found to contain many crystals
of cholesterol, a substance which all
animals have, exists in large amount
in meconium.

In every case in which meconium
was diffused through the ligament
amnii, detected in the contents
of the stomach.
I feel that it is quite unnecessary to insist that a fluid containing from 0.55 to 1.9 per cent of alcohol, that contains chiefly of a mixture of metals with a little sugar, some water and a considerable quantity of ammonium, is, to say the least, quite unfit to nourish the foetus.

I go further than that, that it is a fluid which we should not expect to exist in the stomach of the healthy foetus during intra-uterine life.

It has long been known that at the moment of the interruption of the utero-placental circulation, the foetus makes attempts at respiration — if at this time it be immersed in liquor amnioticum, it appears extremely probable that this fluid should be swallowed.

Asphyxia from interruption of the placental circulation is either by continuous constriction of the uterus, detachment of the placenta, or pressure on the umbilical cord, or the connexion from the bladder
death takes place in the foetus in the latter months of pregnancy, or during parturition. Without doubt whatever death occurs from this cause, its convulsive action and the respiritory movements of asphyxia precede it. Hence it was that the mature embryo appeared to Beclard to breathe in the Liquor amniaci and to inspire fluid instead of air. In his experiments, the respiritory movements of the foetus within the membranes were visible to the naked eye, and matter injected into the amnion by a small syringe was found in the lungs. Some cases have been placed a record by medical jurisprudents in which women having been delivered over water-close, the stomach of the foetus has been found full of fat and the subcutaneous matter in which it had fallen, showing that attempts must have been made at swallowing. These will be able to prove pigment animals in order to
but this was for myself.

...we must thus think adheres to the doctrine of the Stoics & believe it highly...almost proved that...the larger animal in the way...subject of the...particular infection.

March 31st. 1862. Arthur Ganjee