

AN

INAUGURAL DISSERTATION,

ON

Intra Uterine Life

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BY

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OF

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To

J. M. Watson M.D.

The able professor of Obstetrics

This thesis

is respectfully inscribed

Intra Uterine life

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Intra uterine with all its phenomena, ^{of} ~~with~~ all its operations for the maintenance & development, like many physiological questions yet remain Subjudice. Take the whole system of physics, physiology & anatomy e., I believe I am correct in saying, there is none upon which there is ~~so~~ many differences of opinions, so many antagonistic theories & so many hypotheses advanced.

What subject is there which can admit of such beautiful hypothetical reasoning as this?

Innumerable opinions have been advanced as regards the manner in which the foetus is nourished in utero.

And every one has had its advocates, arguments & experiments to sustain the same; but like man they serve their time & pass

away remembered only in obsolete histo-
 ry. From experience I can speak
 nothing in regard to my subject.
 And the only apology I could offer for
 venturing upon a theme about which
 there is no stereotyped opinion, is that
 I was allured thither, by its many theories
 the beautiful reasoning with which each
 advocate has endeavored to sustain his
 position, but more particularly, because
 if there be any one point in physiology from
 which we can view the beautiful, yet
 mysterious workings ^{of nature}, 'tis here in utero
 gestation
 Where is the beauty, the grandeur & sub-
 limity connected with intra uterine
 life? It is to be conceived that from
 an animalcule so small that the
 naked eye is unable to perceive it, springs
 into existence an animal the lord of creation

How is this done? by what process & 4

this Spermatozoa is converted in to
an ~~infertile~~ ripe is yet unknown;
& 'tis more than probable will ever be
hid from the Knowledge of man.
All we know is, it is so; yet we can
not unravel the mystery, cannot com-
prehend nor explain its metamorphosis.

We know that the giant oak of the
forest is germinated from an acorn;
here we are forced to stop, because we
are unable to explain the Transfor-
mation.

Mathematics is the only perfect Science.

Her hypotheses are advanced, but unlike
in medicine, by these a tangible point
can be arrived at, a fact can be estab-
lished & demonstrated.

The Medical mind must have something
to which it must cling, & for this reason

So many Conjectural (I think the term said)
theories are brought forward.

How this Spermatozoa Comes in contact with
the female ovum, I will not discuss; but
mention the manner by which some obstetri-
cians account for it.

1st that the male sperm comes in con-
tact with the female ovum in the cavity
of the uterus; 2nd the Spermatozoon (which
according to some is the fructifying part of the
Sperm) possessing the power of locomotion
crawls up the Fallopian Tube, where it
fixes itself upon an ovum, which becom-
ing fecundated is borne back to the uterus
by the same Tube.

3rd that the Semen is absorbed by certain
vessels which pour their contents upon the
ovaries &c &c

Let us suppose the fecundated ovum has
passed into the uterus bearing before it

the Caduea (Cazeaux, 171) forming them-
by the Caduea reflexa.

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During the earliest days the foetus evidently
is nourished by the Vitelline of the ovum
& also, I believe by the Caduea, ~~which~~ ^{that} con-
tains within its cavity a liquid, which can
perform no other office than that of nour-
ishment. & as up to this time the placenta has
not made its appearance & there is no direct
communication existing between the mother &
embryo. And in further proof of the nourishing
powers of the Caduea is its atrophy & almost
total abrogation as soon as the placenta is
formed. It certainly performs some other office
than that of protection to & retaining, the foetus
within the uterine cavity, & it must be the
one I have mentioned above.

^{or vesicle}
The next membrane of the uterus which
deserves attention is the Allantois. It makes
its appearance about the tenth day, springing

from the inferior part of the intestinal canal.

It takes on a rapid growth, attaching itself to the face of the Chorion, having the terminal capillaries of the umbilic arteries & vein ramifying upon its walls. The inferior part of the Allantois is the Murchus, which is supposed by some to form the urinary bladder, while others consider it as a suspensory ligament of the bladder. Some anatomists regard the allantois as a receptaculum urini of the foetus, basing this opinion upon the taste & smell of the fluid contained within.

The allantois certainly serves some greater & more important function than as a receptacle of urine. In proof of this is its vascularity. And still more it contains the ramifications of the umbilic vessels, which subsequently become the umbilic chord & more over it is by the prolongation of the allantois, that these are brought in contact with

the vessels of the mother through the Villi
of the Chorion. Its function is one of
early nutrition. Does it not in part
fulfill the office of the placenta?

If not, why is the annihilation of the
one attended by the Superabundance of the
other? If not, for what purpose do the
Terminal branches of the umbilic vessels
which are spread upon the allantois
plunge through the Villi of the Chorion
& come in contact with the Maternal
Vessels. Its function will ever remain
in doubt on account of its sudden
appearance & exit

The most important of all the organs of
the uterus is the placenta, It is the
principal Connection between the mother &
foetus, & according to some obstetricians it
performs the same office to the foetus as the
lungs do to the adult.

By means of this the embryonic blood is
animated & also I suppose it one of the chief
means through which the child receives
nourishment from the womb, through the
umbilic vessels.

It is a soft spongy body, formed by
the penetration of the villi of the chorion
into the decidua vera. It is divisible
into two parts of fetal & Maternal

The former is formed by the umbilic ves-
sels, which diverge in every direction from
the point where they enter its surface, or
in other words it is generated ^{by} the exten-
sion of the vascular tufts of the chorion,
forming the terminations of the umbilic
arteries & veins. The latter is made up
by an enlargement of the decidua
verna vessels, & these assume the char-
acter of sinuses against which the
fetal tufts project so as to form out

of it a sheath for them called (Morton 362)⁷⁷

The placenta is attached to the uterus by simple apposition, either one or both layers of the decidua being interposed between the two surfaces.

There is no adhesion in the natural condition of the parts & if there be any, it must be caused by disease. We have seen that the allantois & Caduca have a part in the nourishment of the embryo prior to the formation of the placenta.

What are the functions of the placenta? the decarbonizing & oxidation of the embryonic blood. How is this change accomplished? by bringing the blood of the mother which is transmitted into the maternal placenta, in close contact with that of the foetus. Having only the the delicate walls of

~~with~~ the maternal vessels & foetal
 Capillaries intermingling. To be more
 explicit & assuming the position that
 there is no direct communication
 of the maternal & foetal blood;
 the child's blood after having made
 its transit through the foetal circulation
 is borne back to the Placenta by the um-
 bilic arteries; at their point of entrance
 they are divided into innumerable branches
 which come in contact with the mater-
 nal vessels containing arterial blood.

This arterial blood is poured in to the
 maternal placenta by minute capillaries
 branches of the Ailias or it is absorbed by them
 from the womb by endosmosis. Then the
 foetal venous blood coming in contact
 with this arterial blood by a certain chim-
 ical action gains off its ~~in~~ carbon ^{Takes} to & from
 the mothers blood oxygen. This blood

becoming oxygenized is carried by the
Venous Capillaries to the umbilic vein
 hence back to the child. This ^{is} the ~~the~~ ^{is} the ~~the~~ ^{is} the
 opinion in relation to the placenta as
 an organ of hematosis.

By it in view of this almost universal opinion
 (which I have stated above, & which I adopt)
 I am forced to admit, that of all the
 theories which have been offered for our adop-
 tion or rejection, with regard to the oxida-
 zing ~~impowers~~ ^{impowers} of the foetal blood that of
 direct circulation is the most natural. & I
 might say, most plausible. I mean by
 direct circulation either a continuation
 of the maternal blood to the child or Rou-
 chault's theory, of transmission by absorp-
 tion, or that of Hunter, that the maternal
 blood was poured into sinuses & there
 deprived of whatever was nutritive to
 the child by the foetal vessels.

Now is it not possible, aye, is it not
 was enable to suppose that the umbilic
 Capillaries pierci^{ng} & ramifi^{ng} through & over
 the whole fixed placenta may not take
 up the maternal blood from uterine sinuses
 or those capillaries inscutate with absorbents?

The injections of Mr. Bonami demonstrated
 the fact that a fluid injected into the ma-
 ternal arteries was found in the capilla-
 ries arteries of the uterine placenta.

Now if I understood Prof. Watson aright
 he said: "the foetal capillaries coming in contact
 with the uterine arteries absorb both oxygen
 & nutriment from ~~the~~ ~~the~~ ~~arteries~~"

Now if the foetal vessels absorb nutriment,
 which must be liquid; in the same way cant
 it absorb blood or a fluid, ^{analogous to blood?} which contains ~~both~~
~~nutriment & blood?~~ Cannot vessels be so
 small, that no injection however nice, can be
 detected ⁱⁿ them? Are there not

vessels whose Caliber is so small that no fluid however thin can enter ^{by injection}? Is the blood in the most minute Capillaries transmitted by a vis a tergo?

Hunter's theory of foetal circulation is: "The arteries which are not employed in the nourishment of the organ (uterus) make two or three spiral turns upon themselves & pass obliquely through the decidua in to the placenta, without any diminution of Caliber, & then terminate by open mouths in to Cells. From these arise veins with patulous mouths & bear back the blood to the mother. And while this blood is in these Cells or Sinusoidities, the foetal Capillaries deprive it of what ever is necessary for the maintenance of the Child" He holds that the maternal & foetal circulations are distinct. This thesis could be extended into almost infinitude upon the

But 'tis deemed sufficient to enumerate some of the opinions of authors in regard to the manner by which the foetal blood is oxidized.

I have endeavored to show that the Caecum & allentis play a part in the early development of the embryo, prior to an arterial circulation. All now remains is to show from what source the foetus derives its food after the formation of the placenta. All physiologists are unanimous in admitting that the nutriment is derived from the mother. But by what means it reaches the child is the great source of dispute. Am I not correct when I say that it (nutrition) is borne to the child in one of the following ways? By direct circulation; by Hunter's mode; by being secreted & absorbed by the Villi of the Chorion & transmitted to the amniotic waters

and then absorbed by the foetus; it is
 being secreted in the form of a fluid anal-
 ogous to ^{blood} & absorbed by the umbilical capillaries
 All these different modes have their ad-
 vocates. Carcaux, in part enters the
 field in favor of the amniotic waters
 having the power of nutritive, "thus far atleast"
 he says, "that the choroid villi (among which
 the placenta is formed) are not all concerned in
 forming the radicles of the umbilical vessels, but
 that a certain number still retain their
 primitive function & continue to absorb
 the fluid secreted by the internal walls
 of the uterus, which fluid reaches the amni-
 otic cavity by transuding through the am-
 nios." In proof of this fact & also that extra-
 neous substances do not first enter the foetal
 circulation through the placenta, but that
 it first penetrates to the waters; the case
 of Otto is instanced of a pregnant woman

who was poisoned by sulphuric acid, which ¹⁸
was detected in the ammoniac waters

Now if this be the true story, that the
nourishment is poured into the ammoniac
Cavity; the question arises how does it get in
to the circulation? It must be by absorption
Yet some physiologists teach that it is
swallowed & digested. This seems both un-
reasonable & unphilosophic. What becomes
of the effluvia matter? It is not certainly
the Ammonium; for this is a mixture of
the intestinal secretion & bile.

If this nourishment which is, according to
Bozcaux & others, poured into the waters
it is taken into the circulation only by
cutaneous absorption. Does the skin
absorb? of course it does. Thirst has
often been quenched by plunging the body
into water; Ptyalism, emesis & purging
can be produced by cutaneous absorption.

Let us examine for a moment Cazeaux' 20

theory. He says: "all the villi of the chorion (among which the placenta is formed) are not concerned in the formation of the umbilic, radicals, but that a certain number will retain their primitive function & continue to absorb the fluid of secreted by the internal walls of the uterus. We, or I am, forced to admit if these villi do exist in their primitive function after the formation of the placenta is fixed, Cazeaux must be right in part. He evidently contradicts himself at page 184 & 5; he says: the chorion is enveloped in a great measure by the Caduca & hence comes in contact with the uterine walls at a very restricted point. ***

These villosities becoming interlaced & studded with the umbilic vessels contribute to the formation of the placenta

After the development of the Placenta
 the Chorion becomes a thin transparent & color-
 less membrane, united outwardly to the Caducea by
 short delicate filaments, the remains of the atrophied
 villi. It seems to me a plain contradic-
 tion. If a portion of the Chorion villi enter
 into the formation of the Placenta, with
 the umbilical vessels ramifying & piercing
 the map, it is no longer a part of the
 Chorion but of the Placenta. At one time
 the Chorion is vascular, after the Placenta
 is formed it becomes atrophied.

I cannot coincide with Cazeaux
 The amniotic waters must alone
 perform the function of protection to
 the Child from external violence & by
 sustaining equal pressure.

I am forced to endorse Meigs & Welles
 who deny direct circulation & Cazeaux's
 theory & teach that the "evolution of the

is dependant upon a fluid more or less
analogous to blood, which is elaborated by
the placenta from blood absorbed from
the womb, & this pabulum is taken
up by the umbilic vessels & transmi-
ted to the child."

Jan 12th 1858.