

THE SIS

ON



LACTATION

&

The causes influencing the health of the child.

BY

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MDCCCLI

Lactation.

Nature, perfect in all her works. Has not produced the young of animals helpless, & the human infant the most so of all, without a cause, or without providing for them a sure & suitable nourishment.

In making the infant dependant upon its mother for everything it requires, an opportunity is given for producing & promoting those feelings of attachment in the young towards its mother, which are of the deepest interest in the human family. & which could not so well be produced if all interest in either party were lost from the moment of birth, while at the same time it allows the mother to experience & gratify those feelings which have naturally been created during gestation, & without which again, it is improbable she could be induced to perform the arduous task to which she is called. & one of so much interest to the child.

If then it be advantageous to have such feelings of mutual attachment produced, by dependance on the one hand & the ability to supply wants on the other, how is it brought about? Thus. The child at birth unable to.

move its body from the position in which it is placed cannot obtain for itself any protection from the chilly air surrounding it for the first time, & which although it may be warm, never in ordinary circumstances equals the temperature of the uterus whence the child has just been expelled. To shelter it from this cold the mother with a flow of love, folds her child in her bosom, & there by the reflex nervous power, its little mouth grasps at once the nipple which touches its lips, & from it obtains the food which nature has provided.

Such is the conduct of man in his infant state & such we see in the lower animals; when once begun, the process is continued till the child has advanced in development so as to require & be able to assimilate other food.

In order that we may understand the phenomena of lactation seen in its healthy performance and attribute to their proper causes the symptoms produced during any deviation from that, it is necessary to study the anatomy of the organ keeping in mind at the same time its relations & sympathy with other functions.

The secretion is the product of glands peculiar to a large class of animals, known for that reason

by the name of mammalia. In some there are as many as six or eight on either side, but in the human race, one only is found, on the pectoral region of both sides. They are not called upon to perform any function in the males, but only in the females, & in them, at certain times only. When first they begin to be developed into a useful state, the process is accompanied with many other changes in the female constitution, both bodily & mental, which correspond to the transformation of the girl into the woman.

The gland itself is lobulated in appearance, dense & firm to the touch; Its ultimate structure or of that portion of it, which is essentially active is in the form of cells or follicles adhering in bunches & opening into a duct, which is joined by that from the neighbouring mass of follicles; as this duct proceeds through the gland, it receives others on all sides until all the primary ducts have united to form 15 or 20 tubes, which open on the surface of the nipple. Corresponding to these tubes there are a number of apparent divisions of the gland, which again seem subdivided into many more minute parts, all of which are bound together by a strong fibrocellular investment, in

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which ramify the blood vessels & nerves.

Like all other excreting surfaces, the gland is lined by a mucous membrane, continuous with the integument at the orifices of the tubes.

Such is the internal arrangement of the gland we need not dwell upon its external configuration; one part only deserves attention, which is that portion of the skin surrounding the nipple as it undergoes a curious change of colour on the occurrence of pregnancy. In the virgin it is rose coloured, but in the woman who is, or lately has been pregnant, it is dark brown & irregular on the surface, on account of the development of a number of small glands which exist in it. The colour is darkest during lactation, & gradually arrives at its deepest tinge as gestation advances, fading after weaning.

It has been said that this gland undergoes a process of development into a condition of utility, this we must investigate as well as the product of this condition, for that is, what essentially constitutes lactation. About the time of parturition or immediately after that, the mammae receive through some sympathy which exists between them & the uterus, a stimulation to activity, so

that milk is secreted by them in abundance.

The nature of the stimulant would appear to be nervous, & dependant upon the intimate connexion of these organs (the uterus & mammae) in the same process, & conveyed from the one to the other by means of the ganglionic system of nerves. Some suppose the action capable of being conveyed through means of the fluids of the body, and conceive as the most direct means of communication between the organs, the anastomosis of the internal mammary with the epigastric arteries; But the anatomy of these vessels would preclude all idea of any direct communication between the uterus & mammae, for the epigastric has no connection with the uterine vessels, & if it had, a retrograde motion of the blood would be required, to convey any influence from the uterus to the breasts, or else the veins must be the channel of communication, which is the general circulation & which if the fluids be invested with such power, would be quite sufficient for all purposes in the present instance. Both doctrines partake more of theory than fact, but it is sufficient for us, to know, that such does take place, whether we employ the nervous or vascular system as the agent of conducting the sympathy, or attribute

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it to a general action of the entire system, which attracts from the now inactive uterus, the flow of blood to the mammae, conducing to produce the phenomena of lactation. The purposes of these phenomena are to perform those conditions, which we see to be the chief distinction between animate & inanimate nature, namely the supplying of nutriment to support the process of growth & supply the waste, caused by the activity & exercise of the body to which it is given: & for such a purpose, it is, as we might have expected, being a work of Omniscience, admirably suited. The milk is nothing less than the blood of the mother, altered slightly in form from that which she supplied to the fetus while in utero, of which indeed all was not taken into the system of the child, but only those parts essential to its growth; Such a selection was then made by the placenta, which now is taken up by the mammae, in order that it may be more convenient for both mother and child. It is probable too, that the mammae separate other materials, which the placenta was not intended to do, & which may be more necessary now on account of the inde

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pendent vitality of the child. In order however that we may understand exactly the part which the milk performs, we must know its physical & chemical qualities.

The general appearance of milk is well known to all, & therefore we need not describe its external characters, but merely mention that human milk agrees in all respects, with that of the lower animals, in forming a cream when allowed to remain at rest for a short time, which may be converted into butter by the ordinary process; that cheese may be obtained from it, by expripping the curd or coagulated casein or albumen, which is precipitated from the serum by organic & mineral acids. Some authors have expressed doubts, as to the ready formation of a cream upon human milk, but in all the specimens which we have examined, even the very poorest (Fig III) a cream has easily formed perhaps this was made more apparent by the milk being kept in narrow tubes, but even when only a few drops of the fluid could be obtained the cream was always evident. A woman is mentioned by Dr Kennedy who rubbed her breasts with butter made from the cream of her own milk. I

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When examined microscopically milk is found to consist of two elements; The one fluid the other like a solid. The fluid portion consists of serum, having in solution various salts, the casein & sugar; The apparently solid part is made up of small globules, called the milk cells. These two elements are intimately mixed, or rather the globules are regularly diffused through the serum, when the milk is newly drawn from the breast, but when allowed to remain at rest, the largest & more fully developed globules, being lighter ~~being lighter~~ than the fluid, rise to the surface & thus form the cream, while the smaller & those at a less advanced period of development, remain diffused through the subjacent serum. (Figs III & XIII.)

The white colour of milk is owing to the presence of globules, which exist in it in such numbers as to render the fluid opaque. These globules are perfectly round & smooth, have a pearly aspect & strongly refract light; they vary in size very much, some large milk, or cream globules measuring too of a millimetre, while others can be observed in all stages of development from that size down to mere points. The circumference of each globule is dark, but the centre is light. (Fig XII.)

In healthy milk, these globules float freely about in the serum; the smallest are seen in active molecular movement; the larger however appear only to float about & over each other.

Great difference of opinion exists in reference to the organization & structure of these globules: some denying & others maintaining, that each globule is surrounded by a distinct membrane, but as these doctrines & the arguments & experiments made to prove the correctness of each statement, do not bear upon the subject of the present essay, we will not stop to discuss their merits, but merely mention that they have been supposed to be formed by the contact & mixture of the oily with the albuminous elements of the milk. Such perhaps is too mechanical a theory, & the only other admitted by Physiologists, is, that the milk cells resemble those cast off by all other secreting glands, & only differ from them in remaining longer unbroken. I do not propose a nucleus; certainly this agrees better with nature, & perhaps a medium between the two, may approach the truth. But is it not also possible that they may be the offspring of the colostric bodies in the first instance?

In a microscopical examination of milk, we can

only observe one, & no doubt a most important constituent, in its structure, namely, the globular portion but although unobserved while its fellow is so highly magnified the fluid part is not to be overlooked, & therefore to gain a knowledge of its constituents & properties we must examine it chemically.

The Serum then or fluid portion of milk is composed of water, holding in solution an alkaline Lactate, & Chloride, with traces of a sulphated phosphate Lactates of Lime & Magnesia, Sugar of milk & animal extractive. Although these may be said to be the general ingredients of Serum, yet they must differ in quantity & in the compounds which they form with one another, according to the condition in which the specimen under examination is at the time of analysis; for it must be remembered that the state of the person from whom the fluid is taken, exercises a great influence over the secretion, in so much so, that many articles of diet & medicine, speedily pass through the circulation, into the secretion & taint it with the peculiarities by which they ^{are} characterized, but the quantity of the active principles of these materials, although often so small as to escape detection under the most minute analysis, is frequently

so powerful, as to affect the child nursed upon that milk, in a serious manner. Now if these substances are so potent on an organized vital structure, is it not very probable, that they may have some influence over the combinations of the natural ingredients, regulated by very delicate laws of affinity, more especially, as they will be brought to act on each other in the nascent state, which is the most favourable condition for the formation of new compounds? So delicate indeed seem to be the powers regulating the combinations of the principles of milk, that even the state of the mind influences them, for if the passions be suddenly or greatly excited or depressed, the secretion is vitiated, as shown by the symptoms produced in the child.

No doubt these changes are caused, by the effect of the disturbed nervous system, acting on the stomach, & deranging the process of digestion, whereby vitiated elements are taken into the blood, & thus are conveyed to the mammary gland. Another cause of fallacy in the analysis of milk, may lie in the readiness with which important changes are effected in the fluid after it has been drawn from the gland, for if it be allowed to stand for any time, before

it is analysed, it undergoes a process of spontaneous alcoholic fermentation, at the commencement of which acids are produced, which clearly shows how prone these compounds are to change their conditions. As another proof of their easy decomposition, it is well known that, milk, butter, & even newly made cheese, are soured when a thunder storm happens to visit the vicinity of the dairy. Although these changes are of great importance towards the wellbeing of the child, yet they do not materially affect the results of analysis as we are enabled to make them, by the present state of our chemical knowledge, & by taking milk from a healthy woman & subjecting it to analysis immediately, or before it has soured, we can arrive at tolerably definite results & very important information.

Milk when newly secreted is ordinarily slightly alkaline, has a specific Gravity of from 1.030 to 1.035 but which varies according to its age, or rather according to the date of the persons confinement. being of less Spec. Grty. immediately after that event, than at any other time, & increasing, up to a period from that date, which has not yet been strictly determined. & it is natural to suppose

Notes

I Cyclop. Anat. & Physiol. art. Milk by Dr. Rees.

this to be the case for immediately after parturition there is a greater abundance of oil globules (Figs IV & V) in proportion to the fluid in which they float, & as the period of lactation advances the fluid increases, (Figs XI & XII) very slightly to be sure, but quite in proportion to the increase of Spec. Grty.

The Analysis of Human Milk given by Payen in three cases is as follows I

Butter	5.18	5.16	5.20
Caseous Matter	24	18	25
Residue of evaporated lohey containing Extractive Salt & Sugar of Milk	7.86	7.62	7.93
Water	85.80	86.00	85.50

There seems to have been a defect of casein in these cases, for as given there it is by no means so great as in another analysis given by Simon.

Analysis of human Milk by Simon. II

Water	88.06
Casein	3.70
Sugar	4.34
Butter	3.40
Saline Matter &c.	0.30

Of these analyses the latter would appear to be the most correct, at least on comparing the quantities of casein, the mean of the one = 0.225. the other

3.70, the latter would seem more consistant with
 Notes I Cyclop. Anat & Physiol. art Milk. II ibid.

what is seen to take place in the manufacture of
 Cheese from the milk of the cow & other animals, for
 there more Casein, although not pure, is obtained from
 100 parts than 0.225. Berzelius accounts for the
 deficiency of Casein in the analyses of Payen by
 supposing, that a considerable quantity of Caseous
 matter remained in the whey & was calculated
 in the residue, by this reasoning the tables are
 made nearly equal, for Simon gives Sugar as
 4.54 & Saline matter &c as 0.30 which two = 4.84
 may be considered equal to Payens residue of
 evap- orated whey, the mean of which is 7.803. The
 difference between the two is 2.963, which added
 to the mean of Payens Caseous Matter, gives 3.1883
 nearly equal to Simons Casein 3.70. There are
 other evident differences between the two tables, but
 considering the variableness in the conditions of
 the secretion, they correspond as nearly as could
 be expected. The Sugar of milk is left in the whey
 after the separation of Cheese by Rennet & exists in solution
 with the salts of milk, lactic acid, & animal extractive.
 It is a hard, sweet, gritty powder under the teeth.
 In fermenting milk, the casein converts part of the
 sugar of milk into lactic acid & the rest into alcohol.
 The quantity of salts in milk has been stated

by Meggenhofen as from 0.5 to 1.25 in 500 parts & by Paff & Schwaltz as 4.40% in 1000 parts, which was composed of

Phosphate of lime 2.300

Magnesia 0.500

Iron 0.007

Soda 0.400

Chlorate of Potassium 0.700

Soda from decomposition of Lactates. 0.300

4.40% entire solid contents.

It has been remarked that no Sulphates are given here, which seems strange, from their constant occurrence in all albuminous principles, & considering the analogy between albumen & casein, we must look upon the absence of Sulphur & its compounds as an omission, or included perhaps under the head of Soda.

On reviewing the composition of milk & considering the elements necessary to the formation of the tissues of the body, it will be seen that a great similarity exists between them, or rather that the necessary elements exist in the fluid under such conditions, as to be easily resolved into the form most advantageous to their absorption & transformations. Thus we have for the support of the muscular tissues, Casein

yielding Nitrogen, & for the support of respiration & animal heat, we have Carbon in the form of oil globules, or butter. Water too, a most important article for the support of life is in abundance yielding its Oxygen & Hydrogen to the various tissues requiring them, & no doubt influencing in a high degree the secretions of many, if not of all secreting surfaces & glands. No structure indeed is forgotten for consider the quantity of Salts in Milk, the Phosphates necessary to the bone & the Sulphates to the Albuminous tissues. All are provided in their due proportion, as they are required, & under the circumstances in which they can be made most available to the young animal, which at this period is being developed & increasing in size more rapidly than at any other time of its life.

& it is not more natural than necessary that these elements should be found in milk, for if they were not, how could these essentials be conveyed into the structures of the infant? who so rapidly & efficiently assimilates & builds them up into the formation of its own body.

Indeed Nature seems to have had in view, in the formation of milk, the elimination of a fluid

which would be at once, the most pleasant & most nutritious to the infant, & for that purpose she seems merely to have modified the fluid by which all the adult structures are maintained namely the blood, & in so doing has given us a proof of her omniscience in procuring for the infant, through the means of its mother, those elements which are necessary to its wellbeing but which if left to the infantile powers of assimilation could never prove of any benefit to it & which therefore, have been assimilated by the mother, & through the means of her circulation are conveyed to the mammary gland, & there by her vital powers, are converted into the forms most appropriate to the infant's sustenance.

That such is the case & that milk is the most nutritious excreted animal fluid, may easily be proved by comparing its elements with those of the blood, when we remark, not only identical physical changes to take place, but also the existence of a set of proximate elements, which though proper to each, still possess many chemical properties in common. This resemblance is shown in the comparative table on the following page as taken from Dr. Rees' paper on Milk in the Cyclopaedia

Of Anatomy & Physiology.

Blood separating into		Milk separating into	
Clot	Fibrine	Casein	Cream
	Red Corpuscles	Butyraceous Matter	
Serum	Albumen	Casein	Milk or Skim Milk
	Alcoholic extractive viz. lactates.	Alcoholic extractive viz. lactates & lactic acid	
	Aqueous extractive viz. Albuminates of Soda &c.	Aqueous extractive with Sugar of Milk	
	Alkaline Salts.	Alkaline Salts	
	Fatty Matter.	Fatty Matter	

Thus we have the blood altered slightly in its composition, but retaining its chief & most important elements to nutrition, changed into milk, by its elaboration. Still greater resemblances may be traced between these two fluids by examining more minutely into the saline & oleaginous principles contained in both.

If the following analysis of the principle contents of Blood, be compared with the table of Simon (Page 13) showing the contents of milk, a great although not exact similarity is at once perceived between the two fluids

I Average proportions of the principle contents of Blood, per 1000

Water	784	Saline Matter	6.03
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Red corpuscles	131	Extractive fatty matters & other	6.77
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Albumen of Serum	70	Fibrine	2.2
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Notes I Kirk's Physiology, Page 53.

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Again, if the Saline matters of both be compared, a like concordance is found to prevail. Thus the saline matter given in the foregoing table as 6.03 in 1000 parts, is found to consist of

Chloride of Sodium	3.6	Sulphate of Soda	0.28
Potassium	0.36	Phosphate of Lime & Magnesia	0.25
Tribasic Phosphate of Soda	0.2	Oxide & Phosphate of Iron	0.5
Carbonate of Soda	0.84		6.03 ±

Now looking at Page 15, the table of Paff & Schwaltz, of the salts of milk, will be found, which, although it gives a smaller proportion, yet mentions the same salts.

The Oleagineous principles if not identical, are very much alike: Thus, in blood besides some peculiar fatty principles, as, Cerebrine Cholestearine &c we have Oleic & Margaric acids, corresponding to the Butyric & other fatty acids found in milk,

It is probable that these may be capable of being converted into the peculiar fatty principles found in blood; for they are as much required by the infant as the mother, & as there are no other means of its deriving them from another source, it is in accordance with the laws of Nature that she should take the simplest mode of fulfilling her intentions; & thus converts the fatty acids & principles

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of the milk, like the rest of its constituents, into those peculiar & necessary to the various organs, during its passage through the chylipoietic or pulmonary circulation.

Now all that remains to be proved, with regard to the nutritious qualities of milk, after having shown its alliance to the blood, is to prove that the blood is itself the source of nutrition, a fact on which every one is agreed, but merely for the sake of completing our evidence, we shall quote an analysis of Playfair & Boeckman. Showing the analogy between Blood & muscle.

Elementary composition of dried Ox Blood. II

Carbon	57.9	Nitrogen	17.4	Ashes	4.4.
Hydrogen	7.1	Oxygen	19.2		

The same gentlemen found also, that the same elements exist, in so nearly the same proportions in the flesh of the Ox. that the elementary composition of the organic constituents of both may be considered identical & represented by the formula

$C_{45} H_{39} N_6 O_{15}$ II

Milk in its normal & most nutritious condition, we have seen consists of globules separated & distinct from each other, & floating freely in the serum (Fig. XII)

But if examined before, & for some time after parturition
 as well as during disease or engorgement of the gland,
 a number of conglomerate bodies may be seen; these
 are known as the "corps granuleux" of M. Donne, or
 colostric bodies, (Figs II. & XV) Their appearance is, as
 if, a number of small milk globules had gathered them-
 selves together, & were retained by some glutinous
 substance, they have generally a darker colour
 than the rest of the fluid varying a little from a
 greyish to a pale yellow colour (Figs. III. & V) Sometimes
 they present the appearance as if they were surrounded
 by a distinct cell wall (Fig V) at other times
 this is not so distinct, when they are not defined
 by a clear outline, but seem like clusters of cells
 (Fig X). On account of their sometimes appearing
 surrounded by a distinct wall or envelope, they
 have been considered as perfect organized cells
 by some, as by Gueterbock, while others look upon
 them as mere aggregations of granules, agglomerated
 together in an amorphous & mucoid substance,
 Hensle & Hapall are of this opinion, but whatever
 may be their organization, their presence although
 natural at certain periods, indicates at others,
 a diseased state either of the gland itself or of the
 constitution of the mother, from which important

conclusions may be drawn, regarding the health & treatment both of nurse & suckling.

For a long time prior to parturition, even so soon, in some instances, as the third month of pregnancy, milk may be found in the breasts which presents the elements of good milk; but it may be more particularly remarked, that the globules appear to congregate into masses, that few large butyraceous globules are present, & that an abundance of colostric bodies exist, (Fig I & II) There seems also to be less of the serous element in proportion to the number of globules.

These characters go on changing slightly in degree up to the hour of parturition, when the fluid is rapidly developed into normal milk by the secretion of more fluid, & the development of the small milk globules into large oil, butyraceous, or cream globules. But the colostrum although for a day or two it seems to increase in quantity after that time, gradually disappears, the colour becomes fainter the investing membrane less distinct & the body seems to fade or dissolve away, (Figs III, IV, V, VI, VII, X.): but whether it is reabsorbed into the system or becomes developed into milk globules has not yet, that we are aware of, been determined.

but it may be, that, besides performing, another important office, presently to be mentioned, that these bodies serve as depots for formed, but undeveloped milk globules; to be set at liberty when required & developed into perfect ones, by the increased determination of blood to the glands which takes place during & after parturition; in order that a more abundant & immediate supply may be obtained for the infant, soon after birth.

this notion is supported by the fact that, they are found in proportionally the largest quantities before parturition (Fig. I & III) & when the gland is in a comparatively passive state. It is evidently not intended that they should be reabsorbed into the system, as in that case they would not be present so regularly in the excreted milk; besides they have all the appearance of a concentrated rich milk globules, & we feel convinced from many observations, that the colostric bodies are made up of globules or cells, which after a time are developed, & separate from each other, the whole mass becoming dissolved as it were, & converted into oil or milk globules. in fact nothing could be more evident that such takes place than what was observed in the demonstration of which Fig. VII is a drawing,

which is a drop of milk taken the third day after delivery, in which were seen the remains of a colostric body, the cells on the edges & circumference were much more developed than those in the centre, which appeared darker & more dense, the globules as they became ripe. & as their glutinous attachment to the body was dissolved, separated & floated freely about & assumed at once the characters of milk globules.

This indeed would tend to show that the milk globule is an organized cell, & not, merely a drop of oil enclosed in casein, for it is evident they are formed, developed & matured, but the want of a nucleus, warrants us in supposing that they cannot beget cells like themselves, but that they are the offspring of some former nucleated cell, probably the colostric body, such indeed may be their primary history, but such does not seem to be their mode of development, subsequent to the disappearance of the "corpus granulea", for then they are formed in far greater numbers for very long periods without the slightest appearance of a colostric corpuscule.

But another & principle object which the colostrum serves, is acting as a natural aperient.

on the bowels of the infant, at least it has been found that the first drawn milk of the mother has that effect, which has been attributed to the presence of the colostric bodies in it. That such an effect is requisite or to be desired is apparent when we know that the large intestine of the infant contains a great quantity of excrementitious matter: probably the debris of the textures consumed during foetal life, mixed with mucus & some think a little bile. It is known as the Meconium, & acts as an exceedingly acrid irritant if not removed.

The milk retains its Colostric character for a period varying from 4 to 20 days after parturition, & the presence of these bodies may be looked upon as natural during that time, but if they should continue to be formed after that, we must look upon it, as the effect of a diseased action, which will prove deleterious to the infant, attempting to obtain its nutriment from such milk possessed of purgative properties, which during the first days of the infant's existence, are necessary; but which after that cannot but prove deleterious to its health if continued, & the cause of this disease itself, will slowly but certainly undermine the health of the mother if allowed to progress, without means being taken to correct the vitiated

tendency, This character although so important cannot be determined by the naked eye, for no physical change takes place in the milk even loaded with colostrum, by which we might say whether it existed or no; but immediately on subjecting it to the microscope, the "corps granuleux" are discovered or the characters which ^{accompany} reveal a tendency to their formation can be distinguished. These characters may be said to exist, when we find a tendency in the milk globules to run together into patches & adhering to one another; the molecular movement of the smaller globules is not so distinct, nor are the globules themselves so well formed, but are rather smaller, & have a more viscid appearance; this has been attempted to be shown in (Fig. IV) Many local & constitutional derangements seem to produce this state of the milk.

Thus if engorgement takes place in one breast the milk of that side is apt to become colostric; If the natural monthly discharge should return upon a nursing female, then generally the milk assumes this character; Fevers likewise, whether that known as the milk fever or any of the ordinary fevers, to which women after delivery are subject (Fig. VII) as well as epidemics have the same effect upon the secretion. It often happens too that after

the expiry of the time when the colostric characters of the milk, should have disappeared; at the commencement of lactation, that they recur at different periods, or continue to be formed during the whole process of lactation; owing apparently to some constitutional weakness on the part of the mother, but sometimes depending upon more visible causes, as irregularities of diet & regimen, sudden emotions, exposure to cold & damp. are all well known to produce Sourness of the milk, which affects the child with diarrhoea, vomiting, & even fatal convulsions have followed when the exciting cause was continued; Such being the known effects of temporary derangements of the system, how much more grave may we expect the consequences of continued irritation to be, which is kept up by the persistence of colostric bodies in the milk!

Closely connected with the subject of lactation is one of its most common forms of derangement, & which consequently demands a little of our attention.

It always was the habit, until lately, among both professional practitioners, & nurses, to delay applying the child to its mother's breast for 24 or 36 hours after birth; a practice which must be considered injurious to both parent & child, but

especially to the former. Indeed this practice seems to have been the cause of the frequent & aggravated appearance of what is called the Milk Fever.

In fact for the very reason that it was so frequent a concomitant to lactation, it at length became to be looked upon as a necessary to the formation of milk. But although the practice has been improved & the affection become more rare, yet it does sometimes appear in the grave form it formerly did; & for that reason we must be aware of its characters.

It is generally dependant for its cause upon the retention of the milk in the breasts, & its apparent reabsorption into the system, which causes the mammae to swell, become hard & knotty, & if not relieved, inflammation & suppuration will supervene. The pain & dragging sensation, spreads from the breast to the axilla, the glands of which are also swollen & painful. The complaint seems to commence with a shivering fit, cold down the region of the spine, & other febrile symptoms, varying according to the vigour of the attack, which is developed in a hot fit which follows, & is carried away by a very active natural action of the skin; then if the breasts have not proceeded to suppuration

the hardness, pain & swelling disappear gradually & the secretion flows freely. Such is the ordinary course of a milk fever in its mitigated form, but sometimes the constitutional or local symptoms become so acute as to require medical or surgical assistance; thus the fever may run so high, as not to disappear with the sweating, but if allowed to continue, would remain upon the patient for some days & then slowly & gradually disappear.

But in order to hasten its removal, & prevent in some degree the weakness resulting from a fever of any continuance, & the misfortune of having the other breast rendered incapable of affording sufficient nourishment to the child; we can by promoting the secretions, combat & generally overcome the febrile symptoms. Again the local inflammation of the breast may be so great as to lead to suppuration forming what is known as milk abscess, but which may be produced by local inflammation independent of the constitutional excitement attending the commencement of the process of lactation.

These abscesses of the mammae are similar to abscesses in other parts of the body, in their progress, & treatment, but as a general rule applicable to them, when situated above the nipple, they ought to be

opened as soon as their existence has been ascertained as from their situation it would take a long time before the textures could be sufficiently thinned to allow the abscess to point, which would rather tend to burrow through the substance of the gland from the gravitation of the fluid. But when they exist below the nipple, more time may be allowed them to point, as the dependent position of the part will prevent the matter from penetrating further into the substance, & incline it to seek the surface. It is, in cases of this kind that pus & blood are found in the milk, a circumstance which rarely, if ever happens if the gland is not cut into; for the texture of the milk tubes is fibrous & resists the process of ulceration, which takes place principally amongst the textures which surround & bind together the lactiferous tubes; besides the calibre of the tubes is so small, that if there was no chance of their being closed up by lymph, it is hardly likely that the pus could find its way into them. But it is certain that nature would here avail herself of the whole process of inflammation as in other parts of the body, & if the tubes had been ulcerated through, she would effectually plug up the orifices, left by the destruction of the tube, by the

same power with which she had caused them, & thus prevent the evil effects which it would doubtless produce upon the child, if pus were allowed to mingle with the milk. Blood however may find its way out at the nipple or appear on its point by the laceration of any of the capillaries connected with the minute structure of the gland & nipple but which is generally caused by the rude exertion of unskilled persons in attempting to bring the milk by means of artificial suction.

The presence of milk in the breasts has popularly, long been a sign of pregnancy, but is looked upon now, by the profession, as of little value in determining the existence of that condition. The neglect of this sign may have arisen from its improper application, or because of the supposed proofs of its fallibility, in the cases of abnormal lactation which have been recorded by different authorities. But giving due weight to these evidences, we would endeavour to support the credit of this sign, by analysing the proofs brought forward by both parties. In the first place then it has been objected, because we see lactation in cases unconnected with pregnancy, that lactation could be no sign of that state. Certainly that is a grave objection, but can

be answered satisfactorily to ourselves at least. Thus it is not lactation, which means a flow of milk, to which we look as a sign: it is to the presence of milk in the breasts, which will be overlooked unless it be sought for & the fluid brought to the nipple, by a process described thus, by those who make use of it. The finger & thumb are pressed firmly upon the gland, a little beyond the margins of the areola, & are drawn with a stripping & expressing movement to the point of the nipple. By this means, a drop or two of fluid can be obtained in cases of pregnancy, which when subjected to the microscope is easily distinguished to be milk possessing the colostric character & containing a large amount of oil globules.

It is an undoubted fact that cases have occurred where there was a copious secretion of milk independent of pregnancy, & even in the male;[†] & frequently in newly born children milk can be expressed from the breasts.

Notes

References to these cases may be found in *Carpenter's Physiology* Page 666. In the *Phil. Trans.* vol XVII. Page 813. A collection of cases will be found in the *Medico-Chirurgical Review* vol XVIII. Page 201.

I believe cases have been recorded by Franklin & Humboldt, in their narratives. & Dr. Dunglison has mentioned several cases. Dr. Montgomery has related & referred to several in his work upon the Signs & Symptoms of Pregnancy. Page 69 following.

But these cases of the former kinds are extremely rare, so rare indeed, that I have been unable to find more than 8 or 9 original cases on record. Besides ^{their} rarity, these cases have all been recorded of persons in whom pregnancy could not naturally have been expected, & were all produced by the excitement of the stimulus natural to the part, namely by the application of a child. So that giving all due importance to these anomalous cases & even supposing them to be much more common than they really are, yet they do not interfere with the practical bearing of the question or application of the test. The exceptions to this rule are not more, if so numerous, as may be raised against many of the signs of pregnancy, generally admitted in the present day with the profession. Thus we could not deny the importance of the sign of suppressed menstruation, because, we often find women unwell during pregnancy, & even some who menstruate at no other time. It is possible also that some of the cases recorded of lactation might not have been so, but the fluid mistaken from the want of the microscope & supposed to be milk, when it was only mucus from the follicles of the areola or from the tubes.

We may now be asked for our proof that milk can be obtained in the manner we have described. In answer to which, we must borrow the testimony of others, as entitled to credit as those from whom we take the evidence of cases of praeternatural lactation. Thus Dr. Peddie says, he has never found the milk test fail, in cases of pregnancy for the first time.^I That such is the case we have every reason to believe, arguing from the consistency of other phenomena, & would it not be as unnatural, as unrequired, if we found the milk formed when there was no pregnancy & no necessity for its presence.

Besides we have another proof of the existence of milk or its chief principles, in the Hiesteine formed on urine during the earliest months of pregnancy. It is however in primiparae only that this test can be relied upon with any degree of confidence, for after milk has once been secreted, a tendency exists to its re-formation so that in cases of disease, where the uterus is distended, it often happens that milk is formed.

This is more apt to take place in those who have been pregnant, perhaps because of the more frequent occurrence of disease in the uterus after.

pregnancy, but it is possible also that it may take place before that event. The milk is retained for sometime in the breasts after weaning, so that in some cases, although generally gone in 2 or 3 months, for years after a small quantity of fluid could be obtained from the gland, although no subsequent pregnancy had occurred. In these cases then the test is not altogether useless but must be applied with caution, for differences can be made out between the milk of a new pregnancy, & that after weaning. Thus the former consists of well formed milk & oil globules in a large proportion with abundance of colostrum; while the latter is composed of ill formed globules, few oil globules & of less size than in the other case, adhering together & at the same time to mucous or epithelial scales or other foreign matters often present in abundance. The one indeed presents the appearance of a new & vigorous undeveloped element, proposing all the essentials of the future & matured fluid: while the other seems like what had served its purpose & was undergoing

Notes I Records of such cases may be found as follows

D. Montgomery. Signs & Symptoms of Pregnancy Page 91

J. Blundell. Observations on the Animal Economy Page 116

J. Francis. Human Page 229 &c.

a process of disintegration & absorption.

On the whole, whether what has been stated be correct or not, the milk test appears to be worthy of a more extensive trial, than what has yet been made of it, by the plan recommended by those who allege that they find it to be of so much service, and certainly it would be an immense advantage to have a sign of pregnancy in which we could place confidence, & which would enable us to determine with accuracy the existence of that state in its earliest months: in the case of primiparae this would be doubly desirable. & to these cases it is, we can apply this test with the greatest degree of certainty.

Amongst other signs of pregnancy & closely connected with the milk test, are the changes undergone by the urine voided during that state.

Nothing different from urine at ordinary times can be seen when first passed, but if allowed to remain at rest for 30 or 40 hours a pellicle will be found floating on its surface, at this time also, the urine has a most peculiarly sour smell, which is quite characteristic of pregnancy.

In appearance the pellicle, at first resembles

the skin formed upon lime water when exposed to the air, but becoming much more dense & of a slightly yellowish tinge. When examined by the microscope it is found to be made up of granules adhering together, & maintaining the form of flakes (Fig XV). here & there often in clusters may be seen crystals of a prismatic form generally regular & well formed. (Figs XVI) composed of the triple Phosphate of magnesia. When subjected to a higher magnifying power, the granular appearance of this skin becomes more distinct (Fig XVII) & by still increasing the power, the ultimate structure of this Kiesteine is found to be molecular. (Fig XIX)

There seems to be an evident relation between the milk & this Kiesteine: its appearance, when this secretion is formed but not excreted, and its disappearance when the flow from the Mammas is established, seem to point out the cause of its existence, which is explained by Dr Golding Bird as follows. "It is evident" says he "that the imperfectly formed secretion of milk not having a ready exit by the mammas, is taken up into the circulating mass, is separated by the kidneys, & eventually escapes from the body in the urine."

In structure too the ultimate molecules of Kiesteine
 Guy's Hospital Reports, Vol. V. Part 2. p. 22.

resemble much the granules of casein, which has been precipitated from filtered serum (Figs XIX & XX)

Another proof of the derivation at least of this substance from milk, is afforded by the appearance of a pellucid of the same nature, upon the urine of children, who derive their whole nourishment from milk, which substance is similar to the kiesteine of pregnant women in microscopical & external characters.

The kiesteine may be found in the urine of women in the second & third months of pregnancy & if, what is believed to be its origin, really be so, it proves the existence of milk in the breasts at that early period, & thus enhances the value of that test as a sign of pregnancy. But while it adds to the proof, of the value of the milk test, it at the same time, diminishes its own infallibility, for seeing that it is formed from the reabsorption of the milk, it is evident that it will be found in the urine of those who are weaning, or have the secretion retained in the breasts from any other reason. Arguing thus we were induced to look for the formation of kiesteine in such cases & succeeded. This in (Fig XVII) is represented a small quantity of the substance, which formed upon the urine of a woman

2 weeks after delivery, in whom the milk could not be drawn off by the child, on account of the nipples being depreped. But the peculiar smell, characterising pregnancy was entirely wanting in this case. After standing a few days, & the film remaining as an almost invisible pellicle, it suddenly, & mostly during one night, became developed into a white, & much thicker skin, not confining itself to the surface of the urine, but was developed irregularly on the sides of the vessel, above the fluid. When microscopically examined, it was found to consist of well developed cells (Fig. XXIII) much larger & more distinct than the Nistene molecules, and crystals were found in it now (Fig. XXIV) but none could be seen when first formed, & before it became developed into this apparently denser structure.

Lastly, this as the other samples, broke up, after a few days, & fell to the bottom of the fluid, confirming its nature. This fact has a practical bearing upon cases of Albumen Urea after pregnancy, but which we cannot here investigate.

Note. Since writing the above I find that I have been anticipated in my conclusions as regards Nistene and peculiarly of pregnancy, by F. Kane of Philadelphia whose observations are published in the American Journal of Medical Science, for July 1842. It is gratifying however to find the great similarity of the conclusions. A hint at the same is given by Dr. Reid in Guy's Hosp't Repts. Vol V. Pages 23 & 24.

10

The causes which influence the health of the child.

As we have seen that provision is made by an Omnipotent Providence, for the supply of nourishment to the child, & that this supply is regulated by fixed laws, so we find, laws existing, which govern the actions of all the processes intended for the fabrication of this general nourishment, into substances proper for the formation & maintaining the growth of each tissue, as well as, those constituted for the expulsion of those materials unfit for such purposes. Such being the case, then, does it not imply a knowledge of these laws before we can properly comply with their requirements? or will they go on performing their several parts, whether we take any heed to them or no?

Certainly, we see in the uneducated of our race, as well as, in the lower animals, a perfect fulfilment of these arrangements, where none but an intuitive knowledge of their existence can exist. These living after the dictates which nature has implanted in them, are not so liable to be affected with the abnormal performance of these functions, as those living in what is called a highly civilized state, which can only refer to the state of their minds, for certainly they often subject

their bodies, to actions much more distant from their original intentions, than even the inferior animals. & so by neglecting the proper laws, or instituting false ones, they produce disease in themselves, nor is the injury confined to themselves, for often we see ignorant parents subjecting their children to gross cruelties, all with very good intentions for the future benefit of the child, but with no consideration of his present state, & thus their ends are frustrated.

In fact they being ignorant of the proper way, take a wrong one, & thus undo what they intended to do. We need only instance the miserable object often seen on our streets exposed to the cutting blasts of spring in a half naked state, look at that child, at his long bare limbs, mottled & shivering, his purple ears & contracted countenance, & can you persuade yourself that he is comfortable, One would think that such a picture could not escape a mother's attention; but even that, backed with the remonstrances of the child seem to have little effect on some. If such a mother knew the effects of such treatment, & how far it is from the object which she wishes to attain, she surely would desist, if the child's present comfort, & future health had any weight in her intentions. Such is the benefit then, of knowing the simple laws of nature, not confining itself to

this case, but extending to every action which we perform: that alone, is sufficient argument why we should be acquainted with them; but it is especially necessary that the mother thoroughly knows & acts upon them, for she is entrusted with the lives of her family, she is the great means through which the young have their natural wants supplied, & all their other functions kept in a natural & healthy state. Continually, will a mother have opportunities to exercise this knowledge with benefit, both to herself & her offspring; often will she be able to cut short, or prevent the occurrence of diseases, which might otherwise have proved disastrous in their issue, for the ailments of children are mostly produced by the neglect of these laws, & are specially under the influence of their operation, so that, by attention to their requirements, many of these troubles may be escaped, or if they have commenced may be materially alleviated. In order that a mother may possess qualities so desirable, she must learn the workings of nature upon our economy, she ought to be acquainted with these however, before she undertakes the responsible duties of a mother, & not wait to learn, when she is required to act.

Of all periods of life, infancy is attended with most

dangers, the delicate organism of the child makes it liable to suffer from causes far more slight in their nature, than what have any effect upon the more matured frame, & still, it is even wonderful how many children survive, considering the maltreatment to which they are unwittingly subjected by those, who if they thought themselves to be the cause of one hour's pain to their children would be glad to make any sacrifice to relieve them. So numerous indeed do the causes affecting the life of the child appear to be, & so susceptible is the infant of their influence, that in England, more than 1 in 3 of our race are cut off before they reach the age of 2 years. If such happened in lands shrouded in the darkness of ignorance, we might not be so much surprised; but when we reflect that this alarming mortality occurs at our own doors, in the midst of plenty & comfort, in a climate subject to no great extremes of temperature, in a land where science & knowledge have attained their greatest height, & where we might naturally expect the greatest protection against such evils to be found, then we must be convinced that some most destructive cause reigns where it ought not.

for we will not for a moment suppose that such

mortality is, & ever will be, the unchangeable decree of Providence, but will seek for the cause amongst our ordinary & everyday dealings with ourselves & one another.

Upon investigating the annual report of Registrar General for England, for the year 1838. it is found that the number of deaths under the second year, in proportion to the whole deaths, was, as 342.54 to 1000.^I A similar fatality occurred in Belgium, & the reports of various public boards & hospitals gave on an average 1 death during the first month to 10 born.

The following is a table to show the proportional number of deaths during the first year.^{II}

Country	Date	Deaths per 10,000 living at the end	
Prussia	1820 to 28	26 944	----- of their first year
France	1802	21 457	-----
Amsterdam	1818 to 29	22 735	-----
Sweden	1821 to 25	22 453	-----

Making thus upon an average of the whole 2 deaths to 9, who survived till the end of their first year. There is thus a gradual decrease of the number of deaths, as the child advances from its birth to the end of the fifth year. for we find the

following ratio of mortality to happen.

in the first month,	first year	2 years.	5 years.
2 in 20	2 in 18.	2 in 6.	2 in 7.

Although the numbers apparently increase, the times to which they respectively refer increase also in a greater ratio. & thus make the deaths fewer in proportion to the term.

This great mortality is caused chiefly but not wholly, by ignorance or mismanagement, a fact which however startling it may appear is never the less true, as will be shortly shown.

It is caused by ignorance or neglect of those principles by which the body & its functions are preserved & regulated in a state of health. & as we are completely unacquainted with many of those principles it cannot be wondered at that we should infringe upon them, & by thus violating the laws which govern the healthy actions of the body, disease is produced; although, other morbid influences exist which at present we are unable ~~at present~~ to attribute to this cause. The want of a knowledge of the true laws, leads us to substitute others of our own creation, which by chance may correspond with those of nature, but are more likely not to do so, & thus by acting upon spurious prin-

ciples we are guilty of mismanagement which is no less an infringement of the true laws, than a direct violation of them. But as we are daily gaining knowledge we may expect, as we advance in the discovery & fulfilment of the laws of nature, for our guidance & preservation, a corresponding decrease in the mortality not only of infancy but throughout life.

If the present & past mortality be fixed & unavoidable, we cannot expect any diminution of it to take place by any exertions of ours, but that such is not the case, & on the contrary, that our own lives & the lives of those under our care, are in a great measure, in our own keeping, is proved by the decrease of mortality that has taken place in Hospitals where a more perfect attention has been paid to the dictates of nature in the management of the inmates. Thus formerly in the London workhouses 23 deaths happened every 24 children under 1 year. but now under a better system of management, the mortality has been reduced from 2600 to 450. annually.

It is in the power of the mother before the birth of her child to increase the chances of its surviving the perils of infancy. The state of her circumstances

during pregnancy, as influencing her health, & the means which she takes to preserve it good, act apparently upon the child nourished within & by her. Thus amongst the poor in large cities, who are subjected to poverty & all its train of miseries to the fullest extent, the mortality is much greater than amongst the higher classes, & three times more still births happen to illegitimate mothers, who are generally subjected to many causes predisposing to the derangement of health, than to legitimate.

And when born the influence of good or bad treatment upon the chances of the child's surviving, are admitted by all, & are evident by the records of foundling hospitals, where the unfortunate child is deprived of the care & nourishment which ought to have been supplied to it by its natural mother. Thus in Brussels the deaths were more than 3 times, & in Vienna upwards of 4 times more numerous than in private life, between the years 1811 & 17.th Another proof of the same is afforded by the records of the Orphan Asylum of Albany; for the first two years after it was opened in 1829, there were constantly from 4 to 6 children on the sick list, & one death happened monthly. But after an improvement in their treatment had been effected,

2 years passed without any case of sickness or disease taking place, & during the succeeding twelve years only 3 deaths occurred, & these of newly admitted and already diseased inmates. ^I

From these statements & from the undeniable proof of statistics, it must be evident & allowed, that infant health & life, depend essentially on the kind of management to which the young being is subjected, & the circumstances by which it is surrounded: when these are favourable, the child will enjoy the highest degree of health, & when unfavourable, health will be proportionally precarious & death premature; which must lead us to the conclusion, that in order that we may secure health, & lessen mortality, as far as is in our power, we must study the mechanism by which the body is preserved in health, & the conditions ^{necessary} for the natural action of its functions, & having found out these, study & act up to the means best adapted for retaining our bodies in the conditions where these actions can be carried on in health & freedom.

Besides the manifold & important causes of disease arising from ignorance or mismanagement there are others originating in the parents which

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influence most materially the health of their offspring, many of which they can, in some degree control; but there are others over which they have not so much influence. Of the first, or those which can sometimes be controlled, are, The union of two persons, either of whom, or both, are predisposed to the same or ~~an~~ equally formidable disease.

Premature marriages, & between parties too nearly allied in blood. Great disproportion in age between parents; the state of the parents at the time of conception; & the state of the health & conduct of the mother during pregnancy.

That the child inherits the peculiarities of the constitution of its parents, is forced upon our belief by every day's experience & observation, & if such did not hold good with regard to its physical constitution, in rendering it liable & predisposed to the same kinds of disease, as well as in the outward bodily & mental peculiarities of its parent, with which each child is stamped, if it were not so, we might be tempted to charge nature with inconsistency. But no such flaw exists in her works, for the offspring as surely has for its inheritance the predispositions of its parents, as the lineaments of their outward form. Nor is it necessary for the

development of any particular disease in the offspring, that the parents should have had the same disease apparent in them, but it is sufficient that the tendency should have existed in them, derived from their forefathers; & in this way is accounted for, the appearance of diseases generally held to be hereditary, in the children of those, who never have suffered from such disease, but in whom, the predisposition which they have transmitted must have lain latent in their system, only wanting the concurrence of similar circumstances to have developed it in them.

Such would seem to be the tendency of hereditary disease to transmit itself from one generation to another, rendering it impossible for a parent possessing any predisposition to disease, to beget an offspring without endowing them with the same peculiarities; but which tendency may not necessarily be developed into actual disease, but may lie dormant until the application of some exciting cause arouse it to action & development.

Such an exciting cause is necessary, for however powerful the predisposition may be, yet it is not believed to be sufficient in itself to develop the disease, to which the individual has a tendency

but so slight may this exciting cause be, that what are considered conditions necessary for the support of the functions in some individuals, considered healthy, may be sufficient to light up a most deadly disease in others, predisposed to such. But still it is consolatory for us to know, to what an extent we can by proper management keep in abeyance these morbid tendencies, when they are known to exist.

From the preceding it can easily be perceived how the causes we have already mentioned, as influencing the health of offspring, act. Thus in the union of two persons predisposed to disease, the result must evidently be, that the children of these parents inherit a double tendency to the same disease to which the parents are predisposed, but if only one of the parents should be affected with a morbid tendency, & the other be healthy, then the predisposition in the child will be correspondingly less in amount, & less likely to be called into action by slight exciting causes, for by the same reasons that the one parent inoculates it with a diseased tendency, the other endues upon it a healthy constitution, which will so far tend to counteract the diseased.

In like manner also, the premature union of parties, & of those too nearly allied in blood, will of

necessity, entail upon their offspring a delicacy of constitution, for although the female of our race can become impregnated at a period long anterior to the time when she arrives at her full development, yet when such takes place, she does not, & could not be expected to, produce so well developed a child, when her own constitution is not thoroughly confirmed, & her vital powers at a lower standard, than when she has attained her full development; & when her energies are at their prime.

The production of idiots & feebly constituted children, by the marriage of parties nearly allied in blood is admitted by all, & the effects of such connections are well seen in the descendants of our royal families, who are deprived of the privilege of choosing a consort from any but a nearly allied family: The fact is well known also to breeders of animals, & has given rise to the generally accepted maxim, that a cross improves the breed, of course this can only hold good when the stock chosen for the cross is not inferior to the original breed. Great disparity of years in the parents, may give rise to a cause of delicate health in the children, for as the human constitution is constantly undergoing changes, it is evident, that

the peculiarities of constitution in a father of 50, & a mother of 20 must be vastly different, & the effect of two conflicting dispositions, must necessarily be to produce children of insufficient Stamina.

The state of the parents at the time of conception would seem to exercise a remarkable influence upon the future child, for there are cases on record where, when conception had taken place, when either parent laboured under very excited nervous action, as intoxication, children have been born idiots, even where no hereditary tendency existed on the part of either parent. Seeing that during gestation the fetus is entirely dependant on the mother for supplies to form its textures, any derangement of health on her part, must also influence that of the child, & if a continued deranged state ^{of the system} be kept up during this process, the fetus must be, but imperfectly developed in structure & weakened in constitution. All these are causes which the parent can in some degree control, or avoid, but the natural infirmities of their own constitution, which have been handed down to them with life itself from their parents, cannot be so much influenced by their discretion, except in avoiding alliances with those similarly predisposed. & by careful attention

to all measures calculated to improve their general health & prevent the innate tendency being stimulated to produce disease.

A much greater influence over the future health of the child, is exercised by the conduct of the mother during gestation, than is generally supposed. Vulgar belief even admits that such an influence exists, but as usual has misinterpreted its mode of action & endowed it with effects which have no existence in nature, when it is supposed that anything affecting strongly the imagination or feelings of the mother, will imprint upon the skin of the child, the figure of the object or something having relation to it, which has caused the excitement of the nervous system.

Some very remarkable cases are on record which would go far to prove, that the maternal feelings do influence in some degree the general conformation of the child, & even extend to the formation of particular parts of the body. For instance, a case of a lady related by Dr Montgomery of Dublin, who while pregnant, had her attention particularly directed to a mendicant with a very remarkable malformation of his limbs, & she was so much struck by this deformity, that her imagin-

ation dwell upon it, & in her proper season she bore a child with the same malformation.[†] In the lower animals too the influence seems even to be greater upon the progeny. A most remarkable instance happened under the observation of a friend of my own in Perthshire.[‡] A mare working habitually with a gelding was impregnated by a Stallion of quite a different appearance from either the mare or horse. but the foal resembled so exactly the gelding with which she wrought, that after it was grown, they could not be distinguished at a short distance. The same thing happened a second time, with the same mare & Stallion, but a different gelding which the foal this time almost as closely resembled.

Such cases as these are by no means of unfrequent occurrence, in the lower animals, but are seldom so strongly marked as the preceding, which are well authenticated & admit of no measure of doubt in the facts. But allowing that they do occur & are regulated by some determinate laws, which are not as yet unfolded to us, it by no means sanctions the supposition, that the impression of certain objects on the sensorium of the mother will leave its image on the infants skin in the shape of a *navus maternus* or some discolouration.

Notes I Taken from Edinb. Monthly Journal Mar 2 1831. Where many other curious cases are recorded. [‡] Mr. Munroe of Kithlasne.

The easier & more probable explanation of such marks taking the shape of objects presented to the mother's imagination, is, that the shape of the mark is accidental, but when it assumes the resemblance of a particular object, the mother & relatives conjure up from their memories any circumstance, no matter how trivial, so that it is connected with, or has any relation to the figure of the mark, which may have occurred to the mother during gestation, & even the figure itself may be modeled by the assistance of a fertile imagination, so as to resemble almost anything, the friends may think fit. & thus by adjusting cause & effect to one another, one who has willingly blinded himself, & who wishes, may find supposed facts to found a firm belief in a doctrine altogether groundless.

It is certain however that the state of the mother during pregnancy influences the future health of the child. but it is impossible that this can be explained by the effect of any direct nervous influence, for as yet no nerves have been traced from the maternal structures into the umbilical cord of the infant, the want of which cuts off entirely the possibility of any exchange of nervous influence from the one to the other. The only

possible means of communication therefore, must exist in the circulation, the blood being the only material common to both, & that only in a very limited degree. But the power of the nervous system over the blood, is known to be great in influencing its quality as well as its motion.

As in any person labouring under any morbid nervous irritability the digestive powers are speedily impaired, & as it is by this process that the blood is supplied to the system, any derangement in the function of digestion or absorption must directly impair the quality of the circulating fluid, which taking place in the mother will be conveyed to the fetus & thus impair its development - for we could not expect healthy textures requiring a supply of healthy blood, to be formed from unhealthy.

So then it is evident that if a mother labours ^{under} unhealthy nervous action, during gestation, she cannot produce a child so well developed as a mother free from such morbid cause. This maldevelopment may perhaps be visible generally in the whole frame of the child, or confined to some particular portions of its body.

There might also be expected derangement in the textures, or functions of the fetus, if any.

mortific poison existed in the blood, or if any of its principles as the Urea or Bile failed to be excreted by the mother, on whom they act as poisons of a deadly nature, & consequently might be supposed to act similarly upon the foetus.

The possibility of cases of the former kind is proved by the occurrence of intra uterine small pox & other skin diseases. But it is highly improbable that a case of the latter kind could occur, for in order that any of the principles of the blood could affect the child so as to interfere with its development they must be retained in the system of the mother for a longer period than her vital powers could resist.

The effects of Labour, with its complications & accidents, upon the child's health, & chance of survival, are not entered upon here, as they are numerous & important enough in themselves to form a subject of separate investigation. But there is still another circumstance, connected with the relation existing between the foetus in utero & the mother, which we feel tempted to mention, although it has little relation to the present subject, namely the influence of the foetus in inoculating the maternal with the peculiarities of the Paternal parent.

This circumstance is peculiar & marked in its effects & many instances of it are given by undeniable authorities as occurring both in the human species & among the lower animals.† We will not quote any of these cases, but merely state the facts which they illustrate; which are, that when a female has become impregnated by one male, & afterwards bears a progeny to another, the offspring of the latter male resemble in some points, both in constitution & form, the former male; likewise that the mother acquires in some degree the peculiarities of his constitution. These remarkable phenomena have been attempted to be explained in three ways, by different authors. 1st That held by Haller; that a permanent influence on all the ova of the female is exerted by the seminal fluid of the male. 2nd The influence of the imagination of the female on the fœtus. & 3rd That lately brought forward by Mr. Mc Gillivray, that a kind of inoculation is produced upon the mother by the fœtus. All of these hypotheses are founded more upon theory than observation. But of the three explanations, that of Mr. Mc Gillivray appears to us to be best founded, & tends to explain most satisfactorily the facts. Although

† See Mr. Mc Gillivray's Paper in *Edinburgh Monthly Journal* vol. III. 1834

at the same time we cannot deny that all of these ideas may be in some measure true. But in proof of the possible veracity of the third hypothesis, let us consider that the foetus is endued primarily with the peculiarities of the male, which however small they may be at first, do not remain so, or wear out, as the foetus becomes developed, but keep pace with it in its growth. & that as the blood with which the foetus is supplied is influenced by that in the maternal structures, so it is possible that the blood of the mother may be influenced by any peculiarity existing in that of the foetus, even supposing that no inter change of the fluid portions took place. And if we admit as is generally done that the fluids do interchange, then the likelihood of the mother becoming affected with the peculiarities of the foetus & consequently of the male parent, is increased; & if such a peculiarity be once established it is in accordance with the laws of Nature, that she should transmit such in some degree, to succeeding offspring, even although impregnated by a different male, for now they have become part of her own constitution.

From the preceding it may be observed, that the

life of the child is very precarious & the maintaining
 it in health a very fickle thing to manage, surrounded
 as it is on every side, by tendencies to, & exciting causes
 of disease, to which its delicate structure renders it
 more susceptible than the adult. But it may be
 also seen, that, a great deal may be done to obviate
 & divert these causes, especially if the mother thoroughly
 understand & act up to the principles which reg-
 ulate the healthy actions of the body, in rearing
 the child both in its intra & extra uterine
 existence, & by doing so, she will add materially
 to her own health & comfort, & to the health & happiness
 of her offspring, which will amply reward her
 for the pains which she may have taken in
 acquiring the necessary knowledge.

John C. Meeker.

November 14th 1830.

Description of Figures.

Figure I. Represents milk two months before delivery, in it can be seen the great amount of Colostrum and oil globules, & shows, as well also Fig III, the appearance of milk, formed during gestation, which contrasts with that found in the breasts after the suspension of lactation as seen in Fig XIV.

Figure II. This is the same as Fig I treated with weak acetic acid, the effect of which is to dissolve the oil globules, & set loose the less adherent parts of the colostric bodies, causing the remaining to appear more circumscribed & distinct, which are the centres of the masses, & ^{what} seemed most dense, before the addition of the acid. An increase in the relative quantity of the fluid is evident, depending partly upon the dilution of the milk with the acid, & now the solution of the oil globules.

Figure III. Represents ^{the cream of} milk during the ninth month of pregnancy, which is evidently approaching the characters of normal milk. When contrasted with Fig I the principle changes which have taken place, are, The diminution of the colostric bodies, both in size & number. they appear more circumscribed & distinct, resembling the appearance given to them by the action of acetic acid, in Fig II. The oil globules

still exist in like quantity, but a development of the most minute cells, seems to have taken place, & formed more of the ordinary milk cells, although they are still small in size.

Figure IV Shows a drop of the first secreted milk. 4 hours after delivery. The gradual change from the viscid colostric state is evident; the formation of oil & milk cells; & the approach to the natural secretion of advanced periods of Lactation.

Figure V. Shows the appearance of milk taken 20 hours after delivery. The colostric bodies here, are well defined, have the appearance of being contained within a distinct cell wall, they are fewer in number, & the whole shows a higher step towards the normal state, represented in Fig. XII.

Figure VI Here we have the secretion at the 3rd day. The colostrum disappearing, & still advancing in development. The largest of the globules here measured too of a millimetre.

Figure VII Is also a representation of the milk at the 3rd day, but was taken as affording a good example of the colostric bodies, being dissolved & giving rise to milk globules, for in the centre of the figure is seen one of these bodies. At two different points seemingly denser, & the cells of which it

"is made up, less developed than those on the circumference which as they attained the seemingly mature state became loose & floated independantly in the fluid, where they could not be distinguished from the milk globules.

Figure VIII Milk at the fourth day. Shows a near approach to the normal condition. Patient feverish.

Figure IX Milk at the sixth day, which has been diluted with water, accounting for the apparent paucity of globules. but shows the almost complete disappearance of the colostrum, & also an epithelial scale the presence of which may be accounted for, by the feverish symptoms, under which the patient laboured from whom this specimen was obtained.

Figure X Represents milk on the seventh day after delivery, but only four days after its first appearance at the nipples. As the labour was premature in this instance, taking place in the seventh month, the secretion has not attained so high a degree of development as other cases show even at an earlier period. which may be partly owing also to the delay in its formation, after delivery. An epithelial scale is also present here.

Figure XI Represents milk at the ninth day. Having almost attained its full development. The colostrie bodies have disappeared, but a slight

tendency to congregate in groups is still evident
Figure XII Shows healthy milk at the tenth week
which may be taken as the standard of milk in
its normal condition, & its highest state of development

Figure XIII Gives the appearance of milk ^{of the ninth month, prior to parturition} after
it has been allowed to stand. Here few large oil or
milk globules are seen, they having floated to the
surface to form the cream which has been removed.

Figure XIV Represents milk taken from an over-
gorged breast, eight days after delivery. The globules
here are seen to be ill developed, deficient in quantity
as well as quality, running together into masses
& adhering to portions of epithelial scales, & other debris
of the internal textures of the gland

Figure XV Shows the appearance of Kiestine
taken from the urine of a pregnant woman.

Originally it consists of one unbroken sheet, but
by transferring it from the fluid to the glass, it
becomes broken & divided into a number of flakes
which have a granular structure, & float in fluid
seemingly filled with bodies of a similar character
with the component cells of the flakes. These in
the fluid seem to be moved in currents through
between, & round the edges of, the fields of Kiestine

Figure XVI Shows a different character of Kiestine

with crystals of the Triple phosphate of Magnesia.

Figure XVII In this figure are represented, appearances which have been observed in some cases where it seemed as if the crystals were in the act of forming. The edges or outer angles being the first formed, in the shape of laminæ, intersecting each other, & the spaces or internal angles becoming gradually filled up. These changes, as well as the gradual formation of an entire crystal from merely two intersecting plates, can be traced here.

Figure XVIII Is a portion of Kiesteine more highly magnified than in the preceding figures, & shows its granular appearance.

Figure XIX Represents a portion of the same, still more highly magnified, & shows the apparent ultimate structural appearance of Kiesteine, as a mass of molecules, which much resembles the appearance given in the next two figures.

Figure XX Caseine coagulated by acetic acid from the filtered serum of milk.

Figure XXI The same in a more condensed form with a few milk globules still undissolved.

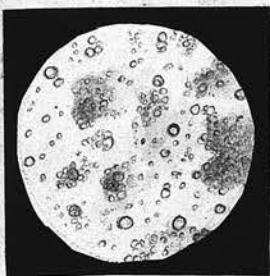
Figure XXII Kiesteine from the urine, two weeks after delivery, of a woman in whom the mammae were congested & the nipples depreped, so that the child

could not draw off the milk.

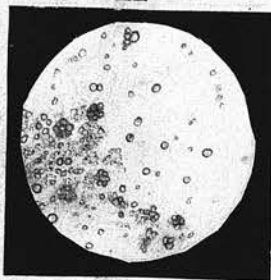
Figure XXIII Represents the same after a sudden increase in its quantity had taken place, seemingly a development of its granules into cells.

Figure XXIV. Represents crystals which were found in the same sample of kiesteine at a later period.

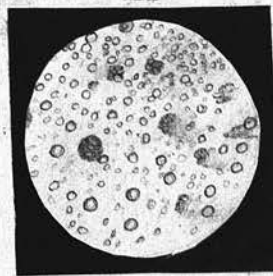
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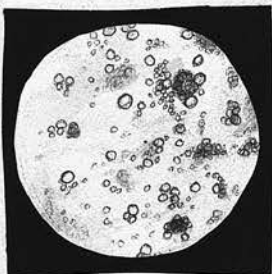
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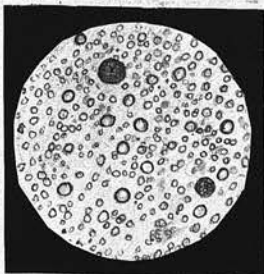
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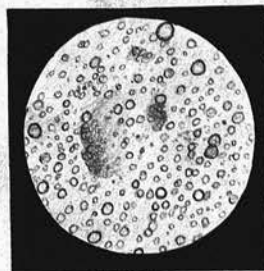
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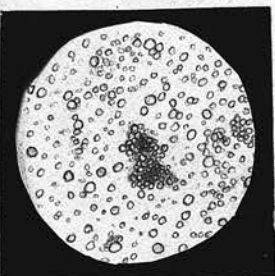
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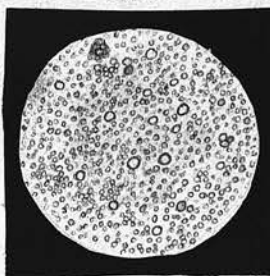
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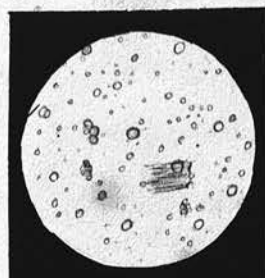
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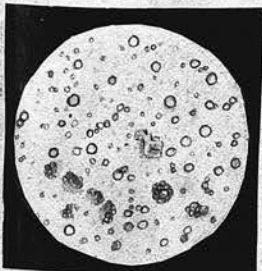
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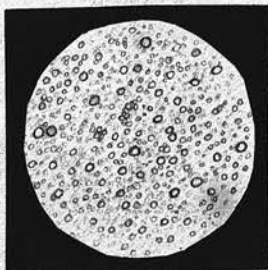
IX



X



XI



XII

