Introductory lecture to a course on obstetrics / by R.A.F. Penrose.

INTRODUCTORY LECTURE

TO A

COURSE ON OBSTETRICS.

BY

R. A. F. PENROSE, M.D.,

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PHILADELPHIA, Nov. 3, 1859.

DEAR SIR:—

Having listened to the Introductory Lecture to your Course with great pleasure, and regarding it as equally instructive and interesting, it has occurred to us that you might not be unwilling to afford us a copy of it for the purpose of publication. Should you kindly consent to grant our request, you will thereby add another obligation to those which you constantly impose upon us by your very valuable instructions. Hoping for a favorable reply, we have the honor to subscribe ourselves,

Yours very faithfully and respectfully,

EDWARD C. FRANKLIN,	B. L. MCINTOSH,
JOHN ASHHURST, JR.,	N. B. SADLER,
J. CAMPBELL SHORB,	WM. T. SUTTON,
WM. F. CORNICK,	E. D. ROACH,
ROBT. GALT,	H. A. ROBBINS.

DR. R. A. F. PENROSE.

PHILADELPHIA, Nov. 14, 1859.

GENTLEMEN:—

The Lecture which you request for publication is not altogether adapted for such a purpose. When delivered, it received careful demonstration, which could not be given in a mere pamphlet; and, in addition to this, being the first of a *Course*, it seems almost to require those which follow to make it complete.

Should you, notwithstanding these difficulties, desire it, I feel that I have not the right to refuse you, and therefore place it at your disposal.

Yours, with much regard,

R. A. F. PENROSE.

MESSRS. EDWARD C. FRANKLIN,
JOHN ASHHURST, JR., and others.

INTRODUCTORY LECTURE.

HUMAN intellect and human imagination have been busy in every age, endeavoring to solve the mysteries of nature. Success has attended their efforts; and the progress of knowledge has been one continued triumphal march, while at her chariot wheels we ever find, as she advances conquering and to conquer, some new captive. Now, some giant dogma, whose huge proportions, the growth of ages, seemed to render further progress impossible, is blinded by her light, and then, easily overcome, is bound and made a powerless captive. Anon some mighty superstition, which for centuries had exercised tyrannical sway over the minds of men, is shorn of its power, and, as an object of ridicule to its former subjects, swells the train of its all-powerful conqueror.

Human knowledge! Is it all powerful? Are there *no* bounds to its conquests? Shall mankind go on from victory to victory, until, like the "gods," they know all

things? Or is there a barrier beyond which finite understanding cannot penetrate? Are there mysteries, in nature and in life, which the human intellect, with all its vaunted powers, assays in vain? Is there fruit, fair, tempting, luscious fruit upon that wondrous tree of knowledge which, in the present state of our existence, we can never hope to pluck? Mortifying though it be, we are compelled to admit that there is a point beyond which our knowledge cannot go; that there are mysteries in nature which we cannot solve until we possess perceptions denied us in our present state of finite being.

In the survey of nature, the phenomenon most striking, most universal, is that of life. Living creatures, in numbers so great as even to defy computation, people the earth, the air, the waters. What is life? is a question which has been asked by each succeeding generation of men, as they have appeared upon the earth, and sought to solve its mysteries, and their only answer has been, the question echoed back to them again, as age after age has put it, and been answered in the same way, until death, the destroyer of that which they in vain attempted to comprehend, has explained its nature.

But, if the query "What is life?" life, in its most simple and primitive forms, as for example, the single vegetable

cell, if this cannot be answered by us, how much less the question, "What is *animal life?*" where we have in the higher series, a creature possessing not only vegetable life, but also reason and intelligence. And infinitely more mysterious still is the problem "What is *human* life? what is *man?*" How truly has it been said of him that he is "fearfully and wonderfully made." He seems a compound of life, of vegetable life, of animal life, and, lastly, of that of which our finite senses cannot give us even the *faintest* idea, of spirit life. Man, the "child of the dust," the creature of an hour, whose life may be destroyed by the most trifling causes, possesses in himself a *something* which all nature cannot injure, whose existence is measured only by eternity, whose likeness is fashioned after that of Deity. What is man? the question is appalling in its magnitude, in its mystery, because it relates to ourselves, and, above all, because death alone can answer it for us, by introducing us into a state of existence where we shall understand the wonders of our being.

But, though we cannot answer the question as to what we are, yet, there is much concerning ourselves that we can know, and to this we should direct our inquiries. Certainly a subject of much interest and importance in

the study of humanity, is its origin. How is it that it comes into being? Whence springs this glorious creature called man, the wise statesman, the profound philosopher, the eloquent orator, or the beautiful woman, who, by her charms, subdues them all, whence come they? And our investigations lead us back, and back, and back, until we reach a very point in space, a mere microscopic cell, differing apparently but little from the single vegetable cell, which, as mould or scum, we wipe away as foulness! Hence spring they! How literally, truly did the inspired prophet of old describe us as the very "*dust* of the balance."

Every living thing comes from an egg, is a truth long ago enunciated, but which the advance of science has proved to be absolute, and without exception. The doctrine of spontaneous generation is now no longer tenable; that is, we do not believe it possible for a living creature, or, to go still further, for even a living cell to originate from the action of ordinary forces. But, we do believe that every living creature, every living cell has had a parent, and that the original parent, in every instance, came into existence in consequence of an act of creation.

Thus with man. The first man came not on earth as the result of chance, neither was he produced by any

combination of subtle forces, but, God said, "Let us *make* man in our own image, after our own likeness." "So God *created* man."

The first man and woman, therefore, having been created by a direct act of Divine power, were placed on the earth, and told to "increase and multiply." Let us, then, study how mankind obeys this Divine injunction, and, as we started with the proposition "that every living thing comes from an egg," let us begin with the egg. The teachings of nature abound in lessons inculcating humility in men, but nowhere is it taught more forcibly than here. Man, originating from microscopic cells!! Pride *may* grace a creature endowed with attributes different from those of man, but the quality that sheds the softest and most beautiful radiance on human character, is this of humility; a quality essential to him who would make great advances in knowledge, in goodness, in the affections of his fellows.

Before proceeding further with our subject, we must pause, and notice those organs which secrete the germs or cells, whose union is necessary to produce the future man. Buried in the pelvic cavity of the female lies a mass of organs which, in our present investigations, are of vast importance. We call them the "internal organs

of generation;" they are the uterus and its appendages, the ovaries and Fallopian tubes. The uterus is the gestative organ, which receives, lodges, nourishes, and finally expels the ovum. The Fallopian tubes are the canals which convey the egg, fecundated or not, from the ovaries to the cavity of the uterus. We call them the oviducts in consequence of this function. The ovaries are the egg-secreting glands, the analogues, in the female, of the testes of the male. I shall not occupy your time in a description of the minute anatomy of these important bodies, merely remarking that they are covered externally with a fibrous tunic; within this is found the peculiar tissue of the gland, called stroma, and embedded in this stroma lie many small vesicles, varying in size from a degree of extreme minuteness up to that of a small pea. These vesicles are called the Graafian vesicles, after De Graaf, of Delft, in Holland, who first described them in 1673, and who considered them the actual eggs. The vesicular character of the ovary can be detected at birth, but it is not until the age of puberty that the vesicles begin to develop. When this important period in the life of the woman has been reached, these bodies mature in the following manner: Those vesicles most external develop first, and, as they successively reach the surface of the ovary

and discharge their contents, in a way presently to be described, their places are taken by others previously undeveloped in the more central parts of the gland, which, in their turn, accomplish the same series of changes witnessed in their predecessors. These Graafian vesicles contain within them the human egg. Let us now study this vesicle, and learn how ovulation is accomplished. It is composed of enveloping membranes, and their inclosed contents. With a description of these membranes I shall not burden your memories; it will suffice, at present, for you to recollect that the vesicle has an enveloping wall to inclose its contents. Within these envelops we find the contents of the vesicle, which consist of an external granular layer called the "granular membrane," inclosing and surrounding the fluid part of the vesicle, which is a limpid, albuminous fluid containing small granules, and some oil-globules, and in this we find *the egg*.

The granular membrane, which we have just referred to as the immediate envelop of the contents of the vesicle, is an extremely delicate membrane composed of granules. On some part of this membrane, viz., that corresponding to the free surface of the ovary, we find these granules collected into a mass or pile, and, embedded in this mass lies the egg. This granular mass is called the "prolige-

rous disk," from two Greek words, "Proles," meaning offspring, and "gero," I carry—an appropriate name, since, when the vesicle ruptures, the granules composing this disk adhere so firmly to each other, and to the ovule, that they accompany it in its journey through the oviduct, furnishing nourishment to it until they are exhausted. The Graafian vesicle is really nothing more than the ultimate tubule or follicle of a follicular gland, the ovary, differing from ordinary follicles only in being closed, except at the time when it discharges its contents. This formation of closed vesicles or follicles is also exhibited by the cervix uteri in the follicles of Naboth. Upon the surface of the ovary of an adult female several of these vesicles, some fifteen or twenty, in various stages of development, may be seen. As each menstrual period draws near, one of them becomes very much hypertrophied, in consequence of an increased secretion of its fluid contents, and the rapid maturation of the egg; it soon forms a prominence on the surface of the ovary as large as an ordinary sized cherry. The ovary itself now becomes considerably enlarged and much congested; the surrounding parts become engorged with blood, and blood finally is effused, sometimes, into the cavity of the vesicle, the walls of which now become greatly distended and ultimately rupture,

allowing their contents, the most important of which is the egg, to escape. In the meanwhile, the Fallopian tube or oviduct partaking in the general congestion and erethism, by an exquisite arrangement of reflex actions, has grasped, by its fimbriæ, the ovary, and applied its open extremity exactly over the spot from which the egg is about to escape, and thus furnishes the only means of communication between the ovary and uterus.

Let us now possess ourselves of this egg as it escapes, fully matured, from its Graafian bed, and examine it. It is generally called the "Ovule of Baer," because Von Baer, of St. Petersburg, in 1827, first discovered it within the Graafian vesicle, and ascertained its true nature. It is extremely small. Bischoff tells us that the largest human ovules he ever saw "did not exceed the tenth of a line ($\frac{1}{120}$ of an inch) in diameter, being barely perceptible to the naked eye." When we examine this minute egg under a microscope, we find it to consist of, firstly, an enveloping membrane, thick, transparent and without any determinate texture; this membrane *is* called the vitelline membrane, the transparent zone, the cortical membrane, vitelline, because it is the membrane that incloses the yolk, the Latin name for which is vitellus; Anglicize it, therefore, and you have vitelline membrane becoming yolk

membrane. The derivation of the other terms is evident, and requires no explanation. Within this shell or vitelline membrane we find the vitellus or yolk, a coherent, granular, transparent, viscous mass, corresponding to the germ yolk in the eggs of ovipara; contained within this vitellus or yolk, we see a very small colorless and perfectly transparent vesicle, first discovered in the eggs of birds by Purkinje, of Breslau, in 1825, and called by him the vesicle of Purkinje; but M. Coste, the celebrated French embryologist, after the discovery of the human egg by Baer in 1827, sought for and found this vesicle in it, and gave it the more appropriate name of germinal vesicle.

The germinal vesicle is about the $\frac{1}{60}$ part of a line in diameter; it is surrounded by a membrane, transparent, colorless, and extremely delicate, which incloses a limpid, transparent, and slightly granular fluid. If we take this germinal vesicle and examine it very closely, we will see on some part of its periphery an obscure rounded spot, first discovered by Rudolph Wagner, of Gottingen, in 1835, and called by him the germinal spot.

The matured human egg, then, prior to fecundation, consists: 1st, of an external membrane, the vitelline membrane or transparent zone; 2d, of the vitellus or yolk; 3d, of a little vesicle contained in the yolk called

the germinal vesicle; and, lastly, of a certain obscure spot on the periphery of this germinal vesicle, called the germinal spot.

If this matured ovule should now be subjected to those influences capable of producing fecundation, conception will occur and pregnancy result. If, however, this should not happen, it may pass into the abdominal cavity and be absorbed, or it may enter the Fallopian tube, and passing along its canal, through the uterus and vagina, make its escape from the body of the female.

And now we come to the most mysterious and incomprehensible part of this deeply interesting subject. Here we have a little egg, so small that we can scarcely see it without the aid of the microscope; it matures, escapes from its bed, and then dies; it is nothing—a grain of dust! so trifling that its presence excites no attention on that most sensitive of serous surfaces, the peritoneal, but falling upon it shortly, is absorbed back again into the system of the mother which produced it. Again, on the other hand, we have secreted by the testes of the male, a peculiar fluid, the spermatic fluid, with a description of which, however, I shall not now occupy you, taking it for granted that you are more or less acquainted with its essential constituents.

This secretion, like the unfecundated egg, *by itself*, is nothing; but, let this spermatic fluid be brought, under certain circumstances, in contact with the matured egg, and inconceivably wonderful changes occur.

Here, the pointing of our subject is so direct towards a *religious* question, of vital importance to all of us, that I cannot forbear pausing to notice it.

It has been urged, and I fear, sometimes, too truly, that a scientific education is apt to make men freethinkers in religion; that, as men advance in knowledge, particularly of the physical sciences, they become more and more prone to attribute everything to blind, unalterable, unerring "law," until, at last, they seem to forget the source from whence all laws proceed, and, losing themselves in the vague conceptions of their self-satisfied intellects, they come to believe in a species of indefinite Pantheism, that God is Nature and that Nature is God. According to this theology, God has revealed himself—*itself* would express the idea more truly—only in the manifestations and appearances around us, and *not*, as men love to believe and hope, also by the mouths of his prophets; in other words, it ignores entirely the existence of any supernatural revelation from God to man. Let me warn you against this most dangerous tendency, a disposition,

always manifested when human intellect, in its pride, attempts the solution of mysteries infinitely above its grasp. He who relies only on his intellect, in the study of the physical sciences, will often fail to see glorious truths as taught by them, most evident to him who, while using all his intellectual powers, also bears in mind that he is gifted with moral perceptions, which, sometimes, enable him to see clearly into mysterious depths where the light of intellect sheds not a single illuminating ray.

Let me warn you then against a belief, not uncommon among young medical men, a belief which leaves man the most desolate and forlorn creature of all the myriads of living beings which people this earth. I beg you, if, being thinking men, you would be happy—I beg you, in your investigations into the physical sciences, always to preserve your belief in the inspiration of the Bible, and, while you peruse the pages of God's wondrous Book of Nature, ever let its teachings serve to remind you of God's wondrous Book of Revelation. To my mind, nothing more strongly proves the inspiration of the Holy Scriptures than those earlier chapters in the Book of Genesis, so often ridiculed and cavilled at, where we find Moses, in that sublime "vision of creation" there narrated, giving us a system of cosmogony, which, of course, he

did not understand, but merely wrote under the prophetic spirit, a system of cosmogony which, in this, the last half of our *wise* nineteenth century, with the full blaze of the light of science upon it, is proved, as far as we are able to go, to be almost verbatim correct.

Let us see in these investigations, whether, as far as the origin of man is concerned, Moses in his cosmogony did not speak with the most scientific accuracy. "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul." Thus Moses speaks. What says the science of embryology? Why, it tells us, though in a different phraseology, precisely the same thing. These two secretions, this egg, this sperm, mere matter, only dust, which, if they do not meet, die, and revert again to the universe of matter; these two secretions, united, give rise to the most appallingly mysterious phenomenon among the many wonders of our being. These two secretions, mere matter, only dust, united, bring into existence —what? A living vegetable, capable of growth and reproduction? No!—this, it is true, would be most strange, and past our comprehension. What! an animal, possessing volition, reason, and intelligence only! No—though this would be yet more passing strange. No—

they bring into existence this animal, but with it comes into being a spiritual essence which all the agencies in nature cannot destroy! whose existence is an eternity! Do you ask me what it is? It is the Breath of the Eternal God in this dust! it is a human soul!

This must be a stopping-point in our investigations, a point where human wisdom should humbly bow itself in reverence before the almighty power of its Omnipotent Creator, and where human intelligence may recognize the truth that there are mysteries in our being, which, with all our vaunted powers, must, in this life, ever remain mysteries to us.

This phenomenon of human conception is, and must ever be, beyond our comprehension; yet, we are able to study the product of conception, and the changes which occur in it, from the moment when, as a fecundated egg, it leaves the Graafian vesicle, until, as a matured fœtus, it is ready to be expelled from the cavity of the uterus. When conception takes place, the spermatic fluid may have fecundated the egg either before it left the Graafian vesicle, or during its passage along the Fallopian tube, or, perhaps, even after it has reached the cavity of the uterus. Fecundation, however, most generally takes place before the egg has left the Graafian vesicle, the

impregnating principles of the semen reaching the surface of the ovary by a combination of movements on the part of the uterus and Fallopian tube, and also by, perhaps, the activity of the spermatozoa themselves; by some process, not clearly understood, these spermatozoa fecundate the ovule through the, as yet unruptured, walls of the Graafian vesicle, and conception, as it is called, takes place, and the new being begins its life. Numerous observations go to prove that impregnation takes place before the egg leaves the cavity of the Graafian vesicle, and the experiments of Bischoff, Barry, Wagner, and others, upon animals, remove all doubt on the subject, inasmuch as they have seen the spermatozoa on the surface of the ovary. Do not suppose, as has been believed, that in this process the mother alone furnishes the germ or egg, and the father merely the stimulus which develops its latent activities into life, or, that the father, *alone*, furnishes the germ in the spermatozoon, which, according to this theory, has been called an homunculus, and the mother merely the nidus in which it is developed; neither of these ideas is now held to be correct, it being universally admitted that each parent contributes germs for the formation of the new creature, and that their offspring

partakes of the mental, moral, and physical characteristics of both.

Here we must stop, closing at the period when the egg is fecundated—when the existence of a new being begins, and when that wonderful series of changes commence, which we shall study in our next lecture, and which, starting with a cell, culminate in the fully-developed fœtus.

When conception takes place, the Fallopian tubes erect themselves, and, by their fimbriæ, grasp the surface of the ovary, and thus furnish a canal, along which the product of conception will pass to the uterus. In a short time, the walls of the vesicle, which contains the impregnated egg, become distended to their utmost, and, finally, rupture, and a *living being* emerging, begins its journey of life; the Fallopian fringes grasp it tenderly, protectingly. What is this grasp of the Fallopian tube, as its fingers eagerly seize the egg? We may fancy it, if we please, as the *first* maternal caress, the mother embracing her new-born offspring, and clutching with joy her new-found treasure.