An Address ON RELIGIO OBSTETRICAL.

Being a Third Graduation Address delivered at the University of Edinburgh,

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[ABSTRACT.]

[AFTER some introductory remarks on his resignation of his chair, and after referring to the advances in obstetrics, to his experiences as a student and an assistant, and to medical examinations as they were conducted fifty years ago, Professor Simpson proceeded:]

When you compare your own experiences with these, which must appear to you primeval, you will begin to see that stupendous changes have swept over all the fields of medicine during the intervening half-century. You will know that in the pursuit of your profession your mind will be kept engaged with themes of perennial interest, and your present attainment will be an incentive to further effort. And because your diploma bears the honoured seal of a great University, you will never forget that the range of your interest is not confined even within the expansive bounds of medicine, but has a horizon co-extensive with the universe.

Now, the era I have spanned has been one of those "once more" epochs which the Hebrew mind has taught us to discern, when we see the Supreme Power "shake the heavens, and the earth and the sea, and the dry land" (Haggai), "that those things that cannot be shaken may remain" (Epistle to the Hebrews). I do not know in what mood of pessimism I might have stood before you to-day had it not been that, ere the dew of youth had dried from off me, I made friends with the sinless Son of Man who is the well-head of the stream that vitalizes all advancing civilization, and who claims to be the First and the Last and the Living One, who was dead and is alive for evermore, and has the keys of death and the unseen. My experience compels me to own that claim. For to me, as to the Reformers who founded this University, and to a countless throng throughout the centuries of all sorts and conditions of men, He has established a vivid and vivifying correspondence with our super-sensuous environment. He has made us "see" that at the heart of all things there is a Father's heart. He has made us "know" that in the complex play of circumstances the reins of progress are in the hands of a Circumstant who makes all things work together for our good. Held by His pierced hand, I have witnessed on my way through the shifting panorama of a shaking time some tremendous transformations. These have taken place under the influence of two factors. There is, first, the extended range of observation that has been opened to sense, largely by electricity and the spectrum; and, secondly, the guidance that has been given to imagination by the doctrine of evolution. The outer man has acquired instruments of precision, the inner man has been given a clue to guide him through the maze of thought. As science has been seeing more clearly into the constitution and course of things, philosophy has been able to give a clearer interpretation of their meaning. Let me try in seven paragraphs to reproduce and throw on the screen of imagination some of the transformations I have been made to see.

A PHYSICAL TRINITY.

1. There has emerged from the laboratory of the latter half of the century a luminous trinity. When I first heard of ether it was as of a finer air around our atmosphere that came to us rippling with the rays of light. You have been taught to think of it as the something which no man has seen and that yet fills all space, is present in all things and holds all in its embrace. This basal postulate of modern science is arrived at from the study of matter, which in its ultimate analysis is ether becoming embodied, and which in its turn displays itself under the influence of the third member of the trinity that we recognize as power or energy. When I attended a class of physics we were told of various forces which were each distinct and capable of producing their specific changes. In 1862 the wife of an Anglican dignitary rewarded me for such attention as an assistant may give to one of his master's patients by giving me a copy of the fourth edition of Grove's *Correlation of*

Physical Forces—a work that marked the transition from the age of diverse powers at work in Nature to the conception of one continuous energy with varied operations. If I lengthen this paragraph by adding that our textbook in geology was written by Sir Charles Lyell, who was then leading the uniformitarians in their battle with the catastrophists, and leading them to victory, and that at his side rose up Charles Darwin to replace the intrusionism that had reigned in biology with the more thinkable theory of evolutionism, you will see that it is now as impossible for my mind to be satisfied with the thought that suited it in my student days, as it would be for my body to put on the jacket I laid aside when as a boy of 15 I left school for the university.

THE EARTH GROWN OLD—

2. I have seen the earth grow old. Brought up to believe that it had been in existence only some six thousand years, I know to-day that its age is to be reckoned by thousands of thousands not of years but of ages.

AND STILL IN THE MAKING.

3. We believed that in six days out of chaos it had been given its final form and furnishing. If one poet could sing how all "at once the lion and the worm sprung from the teeming earth," another could picture the lion as he emerged rampant from the clouds, "pawing to get free his hinder parts." The mountains passed for everlasting, and time wrote no wrinkle on the ocean's brow. You have arrived on a planet that is still in the making. From some nebula in the far dateless past your world has slowly taken shape and course among other worlds, whose interstellar spaces the photograph shows you to be full of stars unseen by earlier generations. Not the sea only but the solid land, all that is of them, and all that is in them and on them, and in the air around, are subjects of incessant change, till we can project our thoughts to a far-off future when all may be resolved again into the mist from which could be evolved another cosmos.

THE ELEMENTS DISSOLVED.

4. The very constitution of the world has changed. In the Chemistry Class-room in 1852 a printed board showed a list of the several elements of which the material world was made, with their atomic weights. We were told that some of these might yet be decomposed and their number added to. But we were also taught that, whatever new elements might yet be found, they were each distinct and intransmutable, compacted of a crowd of particles of the last imaginable degree of minuteness—the atoms. The atom, the indivisible unit of matter brought from the very verge of thought to guide the chemist in his research, has itself been atomized, and presents itself to us now as an object built up of many parts. It is no longer a solid block, but an edifice—a laboratory, if you will—into which we can go and see business transacted among the multitude of ions and electrons where physics is fain to borrow the language of biology for its expression. We seem to ourselves to have come into the borderland where the homogeneous first becomes heterogeneous; where the invisible takes on visibility; where ether clothes itself with matter; and where we are definitely told we may see the mutation of one element into another, so that when we have entered an atom that bore over the entrance the sign of a radium workshop we emerge by a door called helium.

PARTHENOGENESIS OF LIFE.

5. The unit of biology has also been transformed. The cell was becoming visible under the microscope about the time when I was born. My master, John Goodsir, was one of the first to see and state its place in the economy of Nature. Another of my teachers, Rudolf Virchow, gave currency to the doctrine of *omnis cellula e cellula*, especially through his epoch-marking work on *Cellular Pathology*, which was "Englished" by a man who listened to his lectures at the same time with me. For a generation the cell, with its wall and its contents, its nucleus and nucleolus, its dividings and differentiations, was the ultimate object of research and reasoning for the biologist. It has not abjured its dignity in the category of thought and observation; but we see the simplest expression of life to-day in a speck of life-stuff that we call bioplasm. In thought we pass with ease through the cell wall to look more closely at its kernel. Right into the substance of the nucleus we press and see threads of a life-web resolving into chromosomes, which hold and can transmit the peculiarities of various forms of life; and the plasm dot of a chromosome again resolves itself into ids and biophors with their determinants, till we

may well imagine we have come into a vast cathedral from whose roof there echoes to us the sound of the voice of one of our brethren of the centuries B.C., of whom Addison tells us that he called his treatise on anatomy "a hymn to the Supreme Being."

THE CONTINUITY OF LIFE.

6. It is here, perhaps, that we find the most thrilling of all the transformations that have taken place in the thoughts of those who have the gift, the right, and the responsibility to think. Man, "servant and interpreter of Nature," soaring among the stars to analyze their elements, or searching out the secrets of the atom and the cell, has found himself an item in a social cosmos, subject through all its bounds to the reign of law. A composite being, formed out of the dust, yet capable of communing with the Spirit, who has not, at any time, anywhere, among any people, left Himself without a witness, he finds that there is nothing alien to him in all the universe. Standing on the summits of creation and summing up in himself the last results of the long processes of evolution, he looks to find his ultimate home in One who is, from everlasting to everlasting, God. He is the more encouraged to such lofty ideal when he traces his genealogy back—away back to where the foundations of the earth were laid. His mind reflects the mind that fashioned its materials, and somewhere among the ions and the biophors, where he can scarcely tell whether the ion is not already instinct with more than electricity, or the biophor holds less than life, he sees the narrow fissure between the unseen and the seen, between the not-living and the living, bridged by a kind of virgin-birth, with repetitions of which in some form natural science will make him familiar as he traces the various stages in his own evolution. For parthenogenesis is found not only among the early forms of life, where the distinction between plant and animal is hard to decipher, and where the non-sentient is passing into the sentient, but again and again in transition pages in the evolution story where we see changes taking place in the types with which the record has been written.

THE INDIVIDUAL LIFE.

7. Each individual from out the race is set before himself distinct from all, yet consociate with all. Our first sight of our individual selves as we emerge upon the field of being is as a microscopic speck of protoplasm. It may not differ in appearance or in composition from such another speck as would grow into a creature of another kind. It may resemble the creatures we call protozoa, because in the school of life they have never gone beyond the alphabet. But it possesses the attribute common to everything that lives of taking into itself what it finds needful from its surrounding elements. Let it respond to the impulses, the claims, of its environment and use the matter it assimilates to grow or multiply, and it will live on; it will develop and reproduce according to its kind. Let it at any stage of its history begin to assimilate for assimilation's sake, and it is ready to die; or worse, it may degenerate. The germ-plasm seen through the microscope was one of a cityful of more than seventy thousand primordial ova, only four or five of which are selected to pass through evolutionary processes that recapitulate at various stages the history of their pre-human genealogy before they come to claim a place in a nation's register. Each of the four, as his evolution still progresses, will find after he has come to himself, and so long as his self-consciousness abides, that the material part of him is subject to incessant change. He is continually putting off his mortal vesture and replacing it with a better-fitting garb. The seven pounds weight of matter that was laid in the infant balance passes all away, every atom of it; and if he reach the Mosaic term of three-score years and ten he is told, though he may not have noticed it, that he has ten times changed the fabric of the frame his spirit tenants. If he be wise, he will long ere then have pondered how the latest fashion of his vestment will be put off—whether in one way or another.

"NOT THAT I WOULD BE UNCLOTHED."

In one way. One of the heroes of my opening manhood, one of the most lovable of men, was so great a naturalist that when he died in his prime Sydney Dobell wrote me a note suggesting these four lines for his epitaph:

He courted Nature for his mistress; wooed her so
He won her, till, by love made bold,
She showed him more than mortal man should know—
Then slew him, lest her secrets should be told.

A few hours before his passing a friend came to his bedside

and asked him, "How do you feel now?" and was answered, "I feel just like a creature carried down a river."

In that way, or in this. When I went to practise in Glasgow, the man at the top of the profession, though still in middle life, had resigned the Chair of the Practice of Physic in the Andersonian University, being somewhat delicate in health, and had reached that busy eminence where his fellow-citizens could not let their sick friends die till he had seen them, and where his professional brethren were not quite satisfied that medicine had done its last and best till they had had a consultation with him. When Dr. Andrew Anderson was on his deathbed, one of his fellow-elders who was also ill sent to inquire how it fared with him. "Tell him," said Dr. Anderson, borrowing from Hopeful in the *Pilgrim's Progress*, "I'm in the very middle of the river, but I feel the bottom and it is good."

It may chance that some July day, far down the century, when I have been long in the ether, one or other of you will talk with child or grandchild of the years when the century was young. Among its unforgotten scenes there will rise before your mind the memory of the day when at last you burst the chrysalis shell of pupillage to lift free wings into the azure. You will recall the unusual concurrence of the simultaneous leave-taking of the University by the graduates and their promoter. "We came away," you will say, "a goodly company, all together, through the gateway that leads to the rosy dawn. He passed out, all alone, through the door that looks to the sunset and evening star. He was an old man like me," I fore-hear you say. "Not a great man, he had been a friend of great men, and came out of a great time in the nineteenth century 'when there was mid-sea and the mighty things,' and it looked to the men of his generation as if old things had all passed away and a new world begun. And he told us that the great lesson he had learned on his way through life was the same that the disciple who leaned on Jesus's breast at supper taught to the fathers, the young men, and the little children of his time when he said, 'The world passeth away, and the lust thereof; but he that doeth the will of God abideth for ever.'" Farewell.

ON THE BEHAVIOUR OF LEUCOCYTES IN MALIGNANT GROWTHS.

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In the present paper it is proposed to give an account of observations relating to the peculiar behaviour of leucocytes in very early examples of carcinoma occurring in various parts of the human body.

The phenomena described appear to be mainly—if not entirely—restricted to cancer in its earliest stages and not to occur in older growths, in metastases, or in grafts introduced into other individuals.

Our observations at the present moment refer more especially to (1) a small primary rectal tumour, (2) an early case of chimney-sweep's cancer, and (3) an early epithelioma of the penis. In all of these the essential details in relation to the behaviour of the leucocytes are identical and suggest that we are dealing with cytological phenomena peculiar to the earliest phases of the transmutation of normal tissue cells into cancerous elements.

It has frequently been noticed that around areas that are becoming cancerous there exists a marked activity among the leucocytes, and the fact that cells in a cancerous area may contain leucocytic bodies within their cytoplasm has frequently been observed. The latter cases have been regarded generally either as phagocytic invasion of the leucocytes, or as an indication that the cancer cells have assumed a phagocytic character with respect to the leucocytes. The results of the present investigations are not in accordance with either of these views.

It was found in the rectal carcinoma above mentioned, for example (a growth that had hardly attained the size of a bean), that there was a very distinct zone of transition from the normal to the cancerous elements around the periphery of the tumour; that is to say, a zone in which it was possible to pass, within the thickness of a few cells and almost insensibly, from elements that were merely actively dividing in the mucous