ITALIAN ACADEMIC (UNIVERSITY OF BOLOGNA) AND PHYSICIAN. REGARDED AS FOUNDER OF EMBRYOLOGY AND MICROSCOPY. AUTHOR OF *DE ANATOME PLANTARUM*; IMPORTANT WORKS ON CHICK EMBRYOLOGY PUBLISHED THROUGH ROYAL SOCIETY OF LONDON. IMPORTANT ENTOMOLOGICAL WORK ENTITLED *DISSERTATIO DE BOMBYCE* (1669), WRITTEN AT ENCOURAGEMENT OF BRITISH ROYAL SOCIETY. MALPIGHI’S WORK SEPARATED ANIMAL ANATOMY FROM MEDICINE. (ROSE 1850, *NEW GENERAL BIOGRAPHICAL DICTIONARY* 9: 450.)

MALPIGHI, MARCELLO (1628-1694) FROM THE HUTCHINSON DICTIONARY OF SCIENTIFIC BIOGRAPHY

PLACE: ITALY

SUBJECT: BIOGRAPHY, BIOLOGY

ITALIAN PHYSICIAN WHO DISCOVERED, AMONG OTHER THINGS, BLOOD CAPILLARIES, AND PIONEERED THE USE OF THE MICROSCOPE IN THE STUDY OF TISSUES.

MALPIGHI WAS BORN IN CREVALCORE, ITALY, ON 10 MARCH 1628. HE ATTENDED THE UNIVERSITY OF BOLOGNA 1646-53 AND GRADUATED AS DOCTOR OF MEDICINE AND PHILOSOPHY. HE FIRST LECTURED IN LOGIC AT BOLOGNA, AND THEN ACCEPTED THE CHAIR IN THEORETICAL MEDICINE AT THE UNIVERSITY OF PISA IN 1656. THERE HE MET AND BEFRIENDED THE MATHEMATICIAN GIOVANNI BORELLI. MALPIGHI FOUND THAT THE CLIMATE IN PISA DID NOT SUIT HIS HEALTH AND HE RETURNED TO BOLOGNA AFTER THREE YEARS, TO LECTURE IN THEORETICAL AND PRACTICAL MEDICINE. IN 1662 HE TOOK UP THE OFFER OF THE CHAIR IN MEDICINE AT THE UNIVERSITY OF MESSINA, BUT FOUR YEARS LATER WAS BACK IN BOLOGNA. IN 1667 THE ROYAL SOCIETY INVITED HIM TO SUBMIT HIS RESEARCH FINDINGS TO THEM AND MADE HIM AN HONORARY MEMBER - THE FIRST ITALIAN TO BE THUS ELECTED - AND ALSO SUPERVISED THE PRINTING OF HIS LATER WORKS. IN 1691 MALPIGHI MOVED TO ROME AND RETIRED THERE AS CHIEF PHYSICIAN TO POPE INNOCENT XII. HE DIED IN ROME ON 30 NOVEMBER 1694.

IN MALPIGHI’S TIME THE MICROSCOPE WAS A NEW INVENTION AND HE BECAME ABSORBED IN USING IT TO STUDY ANIMAL AND INSECT TISSUE, AS DID ANTON VAN LEEUWENHOEK. ONE OF MALPIGHI’S EARLY INVESTIGATIONS, IN 1661, CONCERNED THE LUNGS OF A FROG. THESE ORGANS WERE PREVIOUSLY THOUGHT TO HAVE BEEN FLESHY STRUCTURES, BUT MALPIGHI FOUND THEM TO CONSIST OF THIN MEMBRANES CONTAINING FINE BLOOD VESSELS COVERING VAST NUMBERS OF SMALL AIR SACS. THIS DISCOVERY MADE IT EASIER TO EXPLAIN HOW AIR (OXYGEN) SEEPs FROM THE LUNGS TO THE BLOOD VESSELS AND IS CARRIED AROUND THE BODY. MALPIGHI TRACED THE NETWORK OF CAPILLARIES AND FOUND THAT THEY PROVIDE THE MEANS OF BLOOD TRAVELLING FROM THE SMALL ARTERIES TO THE SMALL VEINS. THESE FINDINGS FILLED THE GAP IN THE THEORY OF BLOOD CIRCULATION PROPOSED BY WILLIAM HARVEY.

MALPIGHI ALSO INVESTIGATED THE ANATOMY OF INSECTS AND FOUND THE TRACHEAE, THE BRANCHING TUBES THAT OPEN TO THE OUTSIDE IN THE ABDOMEN AND SUPPLY THE INSECT WITH OXYGEN FOR RESPIRATION. TURNING TO THE DISSECTION OF PLANTS, MALPIGHI FOUND WHAT HE TOOK TO BE TRACHEAE IN THE STEM - LONG TUBES WITH RINGS OF THICKENING. IN FACT HE WAS LOOKING AT YOUNG VESSELS IN THE XYLEM. HE ALSO DISCOVERED THE STOMATA IN LEAVES BUT HAD NO IDEA OF THEIR FUNCTION.

MALPIGHI INCLUDED THE VARIOUS STRUCTURES AND ORGANS OF THE HUMAN BODY IN HIS EXAMINATIONS. HE IDENTIFIED THE SENSORY RECEPTORS (PAPILLAE) OF THE TONGUE, WHICH HE THOUGHT COULD BE NERVE ENDINGS. HE
also investigated the spinal cord and nerves and found them to be composed of the same fibres, but did not put forward a correct theory of their function. He proved that bile was uniform in colour, not yellow and black (as had been believed), and also indentified the urinary tubules in the kidney.

Chick embryos also fascinated Malpighi and in his microscope studies he recorded their neural folds and neural tube, the aortic arches, the optic vesicles, and feather follicles.

Malpighi was a pioneer in the field of microscopy, and studied such a wide range of material that the curiosity of many scientists was aroused. Their combined efforts laid the foundations for further studies in a number of directions including histology, embryology, and the anatomy of organisms until then too small to observe.

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