

Review

THE ROLE OF MATHEMATICS ON HUMAN STRUCTURE
by Swapan Kumar Adhikari,

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The book *The Role of Mathematics on Human Structure* in concretizing physiology and anatomy in terms of mathematical expressions in general and geometrical deductions in particular is new and original. It has also an objective to facilitate modern treatment with mathematical precision. The book author's main interest in the subject was first aroused by Leonardo da Vinci's statement: "*An investigation cannot be strictly called scientific unless it admits mathematical deductions*".

The book contains twelve papers entitled:

Leonardo da Vinci – The Anatomist of Great Ability; Ref. 3;

Physiological Concepts of René Descartes; Ref. 3;

Mathematical Explanation of Descartes' Conception of Pineal Gland and its Modern View; Ref. 10;

Mechanism of Movements of Heart – On Mathematical Concepts; Ref. 9;

Cervical Deformations – Its Causes and its Deductions on Mathematical Basis; Ref. 10;

Mechanism of Skeletal Shoulder Joint – Analyzed by Mathematical Process; Ref. 8;

Vertebrae and its Efficiencies – Expressed in Mathematical Procedure; Ref. 4;

Pelvis – Distribution of Forces Through it by Mathematical Deduction; Ref. 9;

Human Femur and Mathematical Examination; Ref. 4;

Structure of Femoral Condyles Distributing Weight to Lower Part of the Leg; Ref. 13;

Structure of Bone Lamellae and Distribution of Forces on the Hip-Joint; Ref. 7;

Role of Ligaments on the Movements of Femur in Comparison with Hip and its Mathematical Examination; Ref. 12;

The author has started with the Chapter-paper: "*Leonardo da Vinci – The Anatomist of Great Ability*" and he has incorporated Leonardo's words where they have modern relevance. In the present book the structure of Human Body and movements are expressed in terms of mathematical process. The interdisciplinary methods were used to express some operations and distributions of weights of human body during the movements.

This part includes: Egyptian Anatomical studies for surgery in Sixth Dynasty B.C.; Comments on Leonardo's Life; Leonardo's note and its Geometrical Interpretation of Pronation; Order of the Book an Anatomy by Leonardo.

The next part is: *Physiological Concepts of René Descartes*. In this part Physiological concepts of René Descartes in terms of Mathematical basis is estimated. This article includes: Embriology and Blood Circulation; Formation of Body; Glands; Muscular Activities; Neurophysiology; Motion; Physio-Chemical Structure; Sensation; Motion of Heart.

The article entitled: *Mathematical Explanation of Descartes' Conception of Pineal Gland and its Modern View* contains the following: Expression of formation of Pineal Gland as Poinso's Spiral; Deduction on secretion of Pineal Gland; Energy absorbed; Ellipsoidal Motion applicable to Pineal Gland; Actual method of secretion as Polhode, Her-

polhode. In this part the hypothesis of Descartes on the Pineal Gland is established in the most scientific way.

Under the title: *Mechanism of Movements of Heart – On Mathematical Concepts*, the Heart of Human Body is considered to be the main Pump to circulate Blood, the essential Fluid of Human Body. It has the shape of Double Helix with Muscular appearance. The movement of Heart is a Thermo-Dynamical movement causing Contraction and Expansion due to the variation of heat carried by Blood into Heart. The use of Doppler-Effect on velocity of Blood and also of Fluid-Mechanics on Blood-circulation is introduced.

In the article entitled: *Cervical Deformations – Its Causes and its Deductions on Mathematical Basis*, the author has tried to locate the deformations in the Cervical region and to explain the deformities by Geometrical and Mathematical deductions. The article also includes the following between ten parts: Parts of the Cervical Region; its articulation and its stability; Three dimensional divisions of Human Figure by planes of movements; Deformities of the Cartilages expressed Mathematically; Rotational movement of Head operated by Ligaments; Translational and Rotational movements of Cervical Region; and other.

Mechanism of Skeletal Shoulder Joint – Analyzed by Mathematical Process is the title of the next part of the book, and contains the part: Activities of Shoulder joints and their efficiencies through Mathematical processes with Geometrical angulations and Mechanism.

The next consideration in the book, by using mathematical procedure and Mathematical Deduction, is pointed out in the next two papers: *Vertebrae and its Efficiencies – Expressed in Mathematical Procedure* and *Pelvis – Distribution of Forces Through it by Mathematical Deduction*. The different types of movements of skeleton and Mathematical expression of the traversed by Circumdction and examination by Centre of Gravity are also considered.

The article *Human Femur and Mathematical Examination* contains author's consideration and result on researching the forces applied on the Femur and expresses them Mathematically. The capacity of absorbing Stress and Strain by the Shaft of the Femur due to its Spiralic/Helical formation is considered and studied too.

Structure of Femoral Condyles Distributing Weight to Lower Part of the Leg contains the author's study how to show mathematically the Bone Lamellae of the Femoral Condyle Weight distribution of the upper part of the Body properly and rapidly due to the Mathematical Structure of the Condyle.

The structure of Bone Lamellae and Distribution of Forces on the Hip-Joint are also studied and pointed out under the same name. The Role of Ligaments on the Movements of Femur in Comparison with Hip and its Mathematical Examination is pointed out in the last article of this book.

The author's intention in this book is to help the management of physically handicapped or disabled persons. The book will help mainly the researchers, physicians and medical surgeons to calculate physiological movements on the basis of degrees of freedom and replacement of bones to avoid properly the shortening and extension of limbs and other parts of human structure, to make a human being restored to absolute normalcy as well as the original position. The book contains also many figures and graphical presentations.

I warmly recommend this book, as very useful to researchers in the field of Biomechanics, medicine and corresponding interdisciplinary fields.

Katica (Stevanović) Hedrih