CHAPTER -IV

SUÁRUTA’S CONCEPT OF SURGERY
INTRODUCTION


IN A COUNTRY LIKE INDIA WHERE LIFE ITSELF IS SIMPLY REGARDED AS AN ILLUSION, THE LIVES OF KINGS OR COMMONERS ARE DEEMED MATTERS OF LITTLE MOMENT TO THE VITAL ECONOMY OF THE RACE; AND ALL HISTORIES AND BIOGRAPHIES ARE LOOKED UPON AS THE EMBODIMENT OF THE FLIMSY VANITIES OF LIFE. LIVES OF SAINTS AND CANONIZED KINGS ARE MADE USE OF IN CERTAIN INSTANCES AS
THEMES OF NATIONAL EPICS. BUT THEY ARE INTENDED MORE TO ELUCIDATE OR ENUNCIATE THE DOCTRINES OF CERTAIN SCHOOLS OF ETHICS OR METAPHYSICS THAN TO RECORD ANY HISTORICAL FACT OR EVENT.

AUTHENTIC HISTORY CAN RARELY BE FOUND BEYOND CHRONICLES OF STATE EVENTS AND ROYAL NAMES IN SOME Instances; AND THOSE WHICH ARE USUALLY FOUND IN THE SANSKRIT PURÁS ARE STRANGE COMBINATIONS OF MYTHS AND LEGENDS, WHICH OFTEN CONTRADICT EACH OTHER. HENCE THE ATTEMPTS TO EXPLAIN A HISTORICAL FACT BY THE LIGHT OF A VOTIVE MEDAL OR TABLET UNEARTHED PERHAPS FROM THE RUINS OF ONE OF OUR ANCIENT CITIES IS AN UTTER FUTILITY. SUCH AN ENDEAVOUR SERVES, IN MOST CASES, ONLY TO MAKE THE DARKNESS VISIBLE, AND THE CONFUSION MORE CONFOUNDED.

SUÉRUTA, THE GREAT SAGE SURGEON, PHILOSOPHER AND TEACHER OF ANCIENT INDIA,
PRACTICED AROUND 600 B.C.. HE IS RENOWNED ALL OVER THE WORLD FOR HIS CONTRIBUTION TO SURGERY IN GENERAL AND PLASTIC SURGERY IN PARTICULAR RHINOPLASTY. HIS CONTRIBUTION TO SURGERY IS REVIEWED HERE.

THE GOLDEN AGE OF SURGERY IN ANCIENT INDIA RESTS LARGELY ON THE ACCOMPLISHMENTS OF SU¿RUTA. SU¿RUTA PRACTICED AND TAUGHT THE ART OF SURGERY AT THE UNIVERSITY OF BENARES IN THE ANCIENT CITY OF THE SAME NAME,² LOCATED ON THE BANKS OF THE RIVER GANGES.

HIS MONUMENTAL TREATISE ON SURGERY, SU¿RUTA SAÆHIT¡ ESTABLISHED HIM AS THE FATHER OF INDIAN SURGERY.³ HE WAS THE FIRST SURGEON TO SYSTEMATIZE SURGERY BY DIVIDING IT INTO SEPARATE FIELDS. HE IS KNOWN AS THE ORIGINATOR OF PLASTIC SURGERY, CATARACT OPERATION, LAPAROTOMY, AND VESICAL LITHOTOMY. SU¿RUTA'S FAME RESTS FOR THE MOST PART ON THE FAMOUS
Compilation known in Sanskrit as the Suñruta sañhita, or, the collection of Suñruta.

Suñruta sañhita is the first authoritative book on Ēyurveda. It has the distinction of being the only authentic text on ancient Indian surgery and contains the description of many wonderful surgical feats conducted by ancient Indian surgeons. Suñruta, the author of the book is the pioneer in performing repair and reconstruction of mutilated organs of the human body, known nowadays as plastic surgery.

His method of repairing the mutilated nose rhinoplasty has been adopted by European surgeons under the name 'the Indian method.' He was the first medical man to have conducted dissection of the human dead body and described the anatomy of the human being. He was the first surgeon in the world to insist on training the students in surgical
TECHNIQUES USING FRUITS, VEGETABLES AND ARTIFICIALLY PREPARED PARTS OF THE HUMAN BODY.

SUÁRUTA DESCRIBES ALL ASPECTS OF SURGERY, PRE-OPERATIVE MEASURES, METHOD OF OPERATION IN DETAIL AND POST OPERATIVE CARE. HIS METHODS OF BATTLE FIELD SURGERY WERE THE MOST SCIENTIFIC METHODS APPROPRIATE TO THOSE DAYS. HE HAS DESCRIBED MANY SURGICAL INSTRUMENTS WHICH HAD BEEN FABRICATED IDEALLY. SUÁRUTA OPENS A HISTORICAL WINDOW TO A SCHOOL OF PROFESSIONALIZED SURGICAL PRACTICE WHICH EXISTED ALMOST TWO MILLENNIUM AGO. IN ITS DAY WAS ALMOST CERTAINLY THE MOST ADVANCED SCHOOL OF SURGERY IN THE WORLD.7

MEDICINE IN PRE-SUÁRUTA PERIOD

THE HISTORY OF MEDICINE IN PRE SUÁRUTIAN INDIA GOES BACK TO REMOTE ANTIQUITY. THE EARLIEST DOCUMENTS OF INDIAN MEDICINE ARE FOUND IN THE VEDAS,8 THE OLDEST SACRED BOOKS OF

HINDUS BELIEVED THE VEDAS TO BE OF DIVINE ORIGIN. DESCRIPTION OF MOST OF THE EARLY VEDIC MEDICINE WAS FOUND IN ATHARVAVEDA, WHICH WAS AN AMALGAM OF RELIGION, MAGIC AND EMPIRIC ELEMENTS. MEDICAL HISTORIANS DISCOVERED WITH SOME SURPRISE THAT VEDIC PRIESTS WERE AWARE OF THE CONNECTION BETWEEN DROPSY AND CARDIAC PROBLEMS. THE LONG PERIOD OF ATHARVAVEDIC MEDICINE WAS REPLACED BY THE PERIOD OF RATIONAL MEDICINE AROUND 1000 B.C.

THE PERIOD OF RATIONAL MEDICINE

THE PERIOD BETWEEN THE SEVENTH AND FIRST CENTURY B.C. SAW AN IMMENSE CHANGE IN THINKING

THE AGE OF SUÁRUTA

AMONG THE MANY DISTINGUISHED NAMES IN INDIAN MEDICINE, THAT OF SUÁRUTA STANDS OUT IN PARTICULAR. UNFORTUNATELY, THE DATE OF
Suśruta’s lifetime, like those of so many other figures in India’s long history, is not definitely assignable.

The era before Suśruta is known as Vedic India when Indo-Aryans entered the region now known as the Punjab in 1500 - 2000 BC. From mention of his name by the famous Arab physician, Rhazes, as well as from accounts of the Chinese Buddhist pilgrim, I-tsing, and his inclusion among medical authorities mentioned in the famous Bower Manuscript (about 350 A.D.) found in Chinese Turkistan in 1890, there can be no doubt that Suśruta flourished prior to the fourth century A.D. Certainly this is the very latest period that can be assigned to him. However, several writers have placed him at a much earlier date sometimes as early as 400 B.C.

There is no agreement on this point Suśruta’s time has long been a controversial
SUBJECT AMONG MANY MEDICAL HISTORIANS. THE DATE HAS NEVER BEEN DEFINITELY SET FOR LACK OF DIRECT EVIDENCE. THE ORIGINAL AUTOGRAPHIC MANUSCRIPT OF SU₆RUTA SAÆHIT; HAS NOT SURVIVED.¹⁴ EXTANT ARE ONLY COPIES AND REVISIONS OF REVISIONS. ONE OF THE MOST IMPORTANT DOCUMENTS IN CONNECTION WITH ANCIENT INDIAN MEDICINE IS THE BOWER MANUSCRIPT, HOUSED IN THE OXFORD UNIVERSITY LIBRARY.¹⁵

IT WAS FOUND IN EASTERN TURKESTAN IN 1890 AND IS NAMED AFTER THE MAN WHO BROUGHT IT. HOERNLE EDITED THIS DOCUMENT CRITICALLY AND PLACED ITS ORIGIN AROUND THE FIFTH CENTURY B.C. THE FACT THAT SU₆RUTA'S NAME IS MENTIONED IN THIS DOCUMENT PLACES HIM IN THE FIFTH CENTURY B.C. OR EARLIER. LACK OF KNOWLEDGE OF THE SANSKRIT LANGUAGE MAY HAVE LED TO THE NEGLECT OF THE HISTORY OF INDIAN MEDICINE. INDIA
IS INDEED THE BIRTH PLACE OF MEDICINE AND SURGERY.

H.H. WILSON (1823) AND J.F. ROYLE (1837) PIONEERED THE STUDY OF INDIAN MEDICAL HISTORY. T.A. WISE’S COMMENTARY ON THE HINDU SYSTEM OF MEDICINE (1845) PROVIDED THE FIRST COMPLETE SURVEY.

BEFORE THESE INVESTIGATIONS, INDIAN THOUGHT HAD RECEIVED SCANT ATTENTION FROM MEDICAL HISTORIANS. SPRENGEL DEVOTED ONLY EIGHT PAGES OF HIS WORK TO INDIA, HAESER (1845) WROTE NO MORE THAN TWO, AND RENOUD, (1846) STILL CONSIDERED THE HINDUS AN INFERIOR RACE.

BECAUSE MANY LATER VEDIC HYMNS ARE ASCRIBED TO SUÑRUTA, it follows that he must have flourished during the latter part of the Vedic age, which would place him around 1000 B.C. HOERNLE CONTENDS THAT A LARGER PORTION OF THE ATHARVAVEDA ADMITTEDLY BELONGS TO A PERIOD AS EARLY AS 1000 B.C., since the hymn in
JOHNSTON SAINT SUGGESTS THAT SU\textsubscript{R}UTA WAS A CONTEMPORARY OF BUDDHA\textsuperscript{18} (600 B.C.) BECAUSE OF THE STYLE OF LANGUAGE USED.

HOWEVER, AFTER A THOROUGH STUDY OF THE SUBJECT, WISE CONCLUDED THAT SU\textsubscript{R}UTA SAÆHIT\textsubscript{i} WAS PREPARED IN AN EXTREMELY EARLY AGE, PROBABLY FROM THE THIRD TO THE NINTH CENTURY B.C. HE BASED HIS ARGUMENT ON THE ANCIENT FORM OF CONSTRUCTION OF THE SANSKRIT LANGUAGE USED IN THE MANUSCRIPT. THE SAÆHIT\textsubscript{i} WAS TRANSLATED INTO ARABIC BEFORE THE END OF THE EIGHTH CENTURY A.D. AND WAS NAMED _KITAB-I-SUSRUD_ BY ABILLASIABIL.\textsuperscript{19} RHAZES REPEATEDLY QUOTES SU\textsubscript{R}UTA AS THE FOREMOST AUTHORITY IN SURGERY. SAÆHIT\textsubscript{i} WAS TRANSLATED INTO LATIN BY HESSLER, INTO ENGLISH BY HOERNLE, AND INTO GERMAN BY MULLER IN THE LAST CENTURY.

THE TREATISE COMPILED BY SU\textsubscript{R}UTA, THE VARIOUS COMMENTARIES ON IT BY DIFFERENT
AUTHORS AND OTHER RELATED LITERATURE ARE USED AS PRIMARY SOURCES. SÜRUTA BELONGED TO A PERIOD BETWEEN 600 AND 800 BC. His conception of surgical instruments, the description of their quality, methods of manufacture and their usage are very unique, as there were no earlier comprehensive descriptions of similar surgical instruments by any surgeon, not only in India but also the whole world. SÜRUTA was perhaps the first surgeon in the world to describe different types of surgical instruments including endoscopes. This is far beyond the imagination of any other surgeon at that period of time and obviously he was far ahead of his time in this field.

SÜRUTA SAĒHITĒ

THE INDIANS GREATLY IMPROVED UPON AND SUPPLEMENTED THE PRIMITIVE BELIEFS ABOUT
MEDICINE IN THE ATHARVAVEDA, AND CAME TO APPLY TO THE ART OF HEALING THE SAME SUBTLETY OF INTELLECT AND PENETRATING STUDY THAT CHARACTERIZE MANY OTHER TECHNICAL BRANCHES OF INDIAN LEARNING. THE BODY OF LITERATURE THAT GRADUALLY GREW UP ON THE SUBJECT OF MEDICINE IS CALLED THE ËYURVEDA LITERALLY, THE 'KNOWLEDGE OF LIFE.'

THE MOST IMPORTANT MEDICAL MANUALS GROUPED UNDER THE GENERIC NAME ËYURVEDA ARE THE CARAKA SAÆHIT¡ OR 'COMPENDIUM OF CARAKA', AND THE SU¿RUTA SAÆHIT¡ OR COLLECTION OF SU¿RUTA.

SU¿RUTA SAÆHIT¡ IS MAINLY DEVOTED TO SURGERY,” IT ALSO INCLUDES MEDICINE, PATHOLOGY, ANATOMY, MIDWIFERY, BIOLOGY, OPHTHALMOLOGY, HYGIENE, AND NOT A LITTLE PSYCHOLOGY AND UNDERSTANDING OF WHAT WOULD TODAY BE CALLED THE ‘BEDSIDE MANNER.’ SU¿RUTA ATTEMPTED TO ARRANGE SYSTEMATICALLY EXPERIENCES OF OLDER
SURGEONS, AND TO COLLECT SCATTERED FACTS ABOUT MEDICINE INTO A WORKABLE SERIES OF LECTURES OR MANUSCRIPTS.

SUṆRUTA DIVIDES HIS SĀḤITĪ INTO SIX PARTS, COVERING ALL THE BRANCHES OF MEDICINE, INCLUDING HYGIENE, MIDWIFERY, OPHTHALMOLOGY, TOXICOLOGY, PSYCHOSOMATIC AILMENTS AND MATERIAMEDICA. SUṆRUTA CONSIDERS SURGERY THE FIRST AND FOREMOST BRANCH OF MEDICINE AND STATES: 'SURGERY HAS THE SUPERIOR ADVANTAGE OF PRODUCING INSTANTANEOUS EFFECTS BY MEANS OF SURGICAL INSTRUMENTS AND APPLIANCES.' HENCE, IT IS THE HIGHEST IN VALUE OF ALL THE MEDICAL TANTRAS. IT IS ETERNAL AND A SOURCE OF INFINITE PIETY, IMPORTS FAME AND OPENS THE GATES OF HEAVEN TO ITS VOTARIES. IT PROLONGS THE DURATION OF HUMAN EXISTENCE ON EARTH AND HELPS MEN IN SUCCESSFULLY FULFILLING THEIR MISSIONS AND EARNING A DECENT COMPETENCE IN LIFE.

CONTENTS OF SUÁRUTA SAÊHITÊ

THE SUŘRUTA SAËHITÊ IS IN TWO PARTS, THE PËRVÀ TANTRA IN FIVE SECTIONS AND THE UTTARATANTRA.²⁶ THOSE TWO PARTS TOGETHER
ENCOMPASS, APART FROM ḌALYA AND ḌILKYA, THE OTHER SPECIALTIES ALSO LIKE MEDICINE, PEDIATRICS, GERIATRICS, DISEASES OF THE EAR, NOSE, THROAT AND EYE, TOXICOLOGY, APHRODISIACS AND PSYCHIATRY. THUS THE WHOLE SAÆHITì, DEVOTES ITSELF TO THE SCIENCE OF SURGERY AND DOES NOT FAIL TO INCLUDE THE SALIENT PORTIONS OF OTHER DISCIPLINES TOO.

IN FACT, SūRUTA EMPHASIZES IN HIS TEXT THAT UNLESS ONE POSSESSES ENOUGH KNOWLEDGE OF RELEVANT SISTER BRANCHES OF LEARNING, ONE CANNOT ATTAIN PROFICIENCY IN ONE'S OWN SUBJECT OF STUDY. THE SAÆHITì IS THUS AN ENCYCLOPAEDIA OF MEDICAL LEARNING WITH SPECIAL EMPHASIS ON ḌALYA AND ḌILKYA. SÆTRASTHÌNA, NIDÌNASTHÌNA, ÁÌRÇRASTHÌNA, KALPASTHÌNA AND CIKITSìSTHÌNA ARE THE FIVE BOOKS OF THE PÆRVA TANTRA CONTAINING ONE HUNDRED AND TWENTY CHAPTERS. INCIDENTALLY, THE AGNIVEÇA TANTRA KNOWN BETTER AS THE CARAKA SAÆHITì AND THE
Aññi gahādaya of vīgbhāṭa also contain one hundred and twenty chapters in all. The nidānasthāna gives the student the knowledge of aetiology, signs and symptoms of important surgical diseases and those ailments, which have a bearing on surgery.

The rudiments of embryology and anatomy of human body along with instructions for venesection (cutting of veins), the positioning of the patient for each vein, and protection of vital structures (marma) are dealt with in the ṛṣiṇarasthāna.

This also includes the essentials of obstetrics. Principles of management of surgical conditions including obstetrical emergencies are contained in the cikitsasthāna, which also includes a few chapters on geriatrics and aphrodisiacs.

The kalpasthāna is mainly viāa tantra, dealing with the nature of poisons and their

PEDIATRICS IS THE BRANCH OF MEDICINE THAT DEALS WITH THE MEDICAL CARE OF INFANTS, CHILDREN, AND ADOLESCENTS (FROM NEW BORN TO AGE 16-21, DEPENDING ON THE COUNTRY).
GERIATRICS IS THE BRANCH OF MEDICINE THAT FOCUSES ON HEALTH PROMOTION AND THE PREVENTION AND TREATMENT OF DISEASE AND DISABILITY IN LATER LIFE.

IT IS GENERALLY AGREED THAT THIS SAAÆHITi IN THE PRESENT SHAPE IS THE OUTCOME OF THE EFFORTS OF NOT ONE PERSON BUT OF SEVERAL. SU¿RUTA, THE SON OF VI¿V¡MITRA AND STUDENT OF DIVODiSA DHANVANTARI, THE KING OF Ki¿Ji, SHOULD HAVE BEEN THE FIRST AUTHOR OF THIS SAAÆHITi AS A WHOLE OR OF THE PORTION SHORT OF UTTARATANTRA. A CERTAIN V¤DDHA SU¿RUTA OR SU¿RUTA THE ELDER IS ALSO MENTIONED BY SOME COMMENTATORS OF THIS SAAÆHITi. DALHA¿A SAYS THAT THE PRATISAMSK¤TA OR REDACTOR OF THIS SU¿RUTA SAAÆHITi WAS N¡G¡RJUNA. THE IDENTITY OF THIS N¡G¡RJUNA IS NOT CLEAR. THERE HAD BEEN MANY N¡G¡RJUNAS IN THE PAST. BRAHMAR¿RI VI¿V¡MITRA IS ONE OF THE MOST VENERATED pÀIS OR SAGES SINCE ANCIENT TIMES IN INDIA.
THE ENTIRE SAÆHIT¡ IS A COMPLETE WORK ON MEDICINE WITH SPECIAL ATTENTION TO ÁALYA AND Á;I:KYA TANTRAS. THE SUCCINCT AND SOMBRE STYLE AND THE OVERALL SUPERIORITY OF THE SU¿RUTA SAÆHIT¡ MIGHT HAVE LED TO THE EXTINCTION OF OTHER TREATISES WHICH PRECEDED THIS COMPILATION OR WERE CONTEMPORARY.

AS A TEXT BOOK, IT IS UNRIVALLED IN RESPECT OF COMPOSITE TEACHING OF THE SUBJECT OF SURGERY WITH REFERENCE TO ALL ALLIED BRANCHES OF MEDICAL LEARNING REQUIRED BY A SURGEON. IT IS A FORERUNNER OF V¡GBHÀTHÀ'S AÀTI:GA SA´GRAHA.

SU¿RUTA ORDAINS THAT ANYONE WHO WANTS TO ATTAIN SURGICAL SKILL SHOULD STUDY ANATOMY BY PRACTICAL OBSERVATION OF THE VARIOUS STRUCTURES COMPOSING THE BODY. THE STUDY OF ANATOMY IS DEALT WITH IN THE SÀRSTHÌNA OF THE SU¿RUTA SAÆHIT¡.²⁸ HE PROPOSED FIRST TO DEAL WITH EMBRYOLOGY AND THEN ANATOMY OF
HUMAN BODY WHICH IS AN EXTENSION OF THE EMBRYO. HE FURTHER DEALS WITH OBSTETRICS AND EMBRYOLOGY together. AFTER THIS, THE SAÆHIT describes the sequential development of the structures of the foetus. FOR THIS STUDY OF ANATOMY, SU₂RUTA ADVOCATES DISSECTION OF DEAD BODY.

Perhaps we could evaluate the status of surgery during any period by the type of instruments in vogue during that period. SU₂RUTA gives a list of blunt and sharp instruments and adds that a surgeon, by his own experience and intelligence, may invent and add new instruments to facilitate the surgical procedures. He points out that the hand is the most important and the best instrument but for which the operation of other instruments ceases.

The blunt instruments are meant for removal of foreign bodies, for sucking the
FLUIDS, FOR FACILITATING THE VARIOUS SURGICAL PROCEDURES AND FOR VISUALISING THE LESIONS. THE DOUBLE-ARMED AXILE INSTRUMENTS, WHICH HAVE TWO MOVING LIMBS TO HOLD AND PULL ANY OBJECT ARE CALLED SVASTIKA-YANTRAS AND THEY RESEMBLE THE VARIOUS TYPES OF FORCEPS. SÚRUTA'S CLASSIFICATION AND DESCRIPTION BECAME THE BASIS FOR THE DEVELOPMENT OF INSTRUMENTS.

IN FACT SÚRUTA HE CAN BE SAID TO HAVE BEEN THE FIRST PERSON TO INTRODUCE THE DIAGNOSTIC INSTRUMENTS AND THEIR PRINCIPLES, WHICH WERE MODIFIED LATER WITH THE INTRODUCTION OF OPTICAL SYSTEM IN THEIR CONSTRUCTION. FOURTEEN TYPES OF BANDAGING CAPABLE OF COVERING ALMOST ALL THE REGIONS OF THE BODY ARE DESCRIBED FOR THE PRACTICE OF THE STUDENT ON DUMMY. SOME IMPORTANT PROCEDURES, WHICH PRECEDED ACTUAL SURGERY, AS CAUTERIZATION BY KÀARAS
(ALKALINE SUBSTANCES) OR AGNI AND APPLICATION OF LEECHES WERE BEING PRACTICED EXTENSIVELY.

THERMAL CAUTERIZATION FOR THERAPEUTIC PURPOSES HAS BEEN ADVOCATED BY HEATING VARIOUS SUBSTANCES AND APPLYING THEM AT THE DESIRED SITES. THIS TYPE OF PRACTICE SEEMS TO BE QUITE OLD AND IS USED IN THE HIMALAYAN MEDICINE SYSTEM ALSO AND IS KNOWN AS TAU-DAM. SUKRUTA HAS COVERED THE ACCIDENTAL BURNS IN ITS FOUR DEGREES, THE EFFECT OF HEAT-STROKE, SUN-STROKE AND FROST-BITE DUE TO EXCESSIVE COLD AND ALSO THE EFFECT OF LIGHTNING WHICH HE CALLS Vidyut DAGDHA.

THIS CLASSIFICATION UNDERLINES HIS VIEW THAT ALL THERMOGENIC TRAUMA, WHETHER DUE TO EXTREME COLD OR HEAT, EITHER WET OR DRY, CHEMICAL OR INERT FLUID, PRODUCES DAMAGE ALMOST SIMILAR AND HENCE HAS TO BE MANAGED AS ONE ENTITY.
THE GREAT VALUE OF SU₂RUTA'S CLASSIFICATION COULD BE REALIZED FROM THE FACT THAT THIS CONCEPT GAINED VALIDITY IN MODERN SURGERY ONLY RECENTLY AFTER 1950 AND IS NOW UNIFORMLY ACCEPTED IN THE CLASSIFICATION AND MANAGEMENT OF THESE INJURIES.

SU₂RUTA HAS POINTED OUT THAT HEMORRHAGE CAN BE ARRESTED BY APPOSITION OF THE CUT EDGES WITH STITCHES, APPLICATION OF STYPTIC DECOCTIONS, BY CAUTERIZATION WITH CHEMICALS OR HEAT. THAT THE PROGRESS OF SURGERY AND ITS DEVELOPMENT IS CLOSELY ASSOCIATED WITH THE GREAT WARS OF THE PAST IS WELL KNOWN. THE VRA₂A OR INJURY, SAYS SU₂RUTA, INVOLVES BREAKDOWN OF BODY COMPONENTS AND MAY HAVE ONE OR MORE OF THE FOLLOWING SEATS FOR OCCURRENCE, VIZ., SKIN, FLESH, BLOOD VESSELS, SINews, BONES, JOINTS, INTERNAL ORGANS OF CHEST AND ABDOMEN AND VITAL STRUCTURES.
CLASSICALLY VRA, A, THE WOUND, IS THE ULTIMATE EXPLOSION OF THE UNDERLYING PATHOLOGICAL STRUCTURE. IT IS, IN SU₂RUTA'S WORDS, THE SIXTH STAGE OF A CONTINUOUS PROCESS, WHICH STARTS WITH SOTHA (INFLAMMATION). SU₂RUTA SAYS THAT IN THE FIRST STAGE, THE ULCER IS WITH PUS COLLECTION AND HENCE CALLED A DUÀṬA VRA,A. BY PROPER MANAGEMENT IT BECOMES A CLEAR WOUND, A ËUDDHA VRA,A. THEN THERE IS AN ATTEMPT AT HEALING AND IS CALLED RUHYAMÌNA VRA,A AND WHEN THE ULCER IS COMPLETELY HEALED, IT IS A RUDHA VRA,A. SU₂RUTA HAS ADVOCATED THE USE OF WINE AS AN ANESTHESIA.  Although the use of henbane (cannabis indica) and of sammohin¢ and saµJ¢VAŒ¢ are reported at a later period, SU₂RUTA WAS THE PIONEER OF ANESTHESIA. THIS IS A LIST OF ORGANIZATIONS FEATURED IN THE ELDER SCROLLS UNIVERSE. SAµJ¢VAŒ¢ OR SAµJ¢VAŒ¢ IS A
(MYTHICAL) MAGICAL HERB WHICH HAS THE POWER TO CURE ANY MALADY.

**SURGICAL PROCEDURES OF SUÁRUTA**


THE ANCIENT INDIANS, SAYS F. H. GARRISON, 'PERFORMED ALMOST EVERY MAJOR OPERATION EXCEPT LEGATION OF THE ARTERIES.' LIMBS WERE AMPUTATED, ABDOMINAL SECTIONS WERE
PERFORMED, FRACTURES WERE SET, HEMORRHoids AND FISTULAS WERE REMOVED.

SU₂RUTA DESCRIBES EIGHT TYPES OF SURGICAL PROCEDURES.³⁶ EXCISION (CEDANA) IS A PROCEDURE WHEREBY A PART OR WHOLE OF THE LIMB IS CUT OFF FROM THE PARENT. INCISION (BHEDANA) IS MADE TO ACHIEVE EFFECTIVE DRAINAGE OR EXPOSURE OF UNDERLYING STRUCTURES TO LET THE CONTENT OUT. SCRAPING (LEKHANA) OR SCOOPING IS CARRIED OUT TO REMOVE A GROWTH OR FLESH OF AN ULCER, TARTAR OF TEETH, ETC. THE VEINS, HYDROCELE AND ASCETIC FLUID IN THE ABDOMEN ARE DRAINED BY PUNCTURING WITH SPECIAL INSTRUMENT (VYADHANA).

THE SINUSES AND CAVITIES WITH FOREIGN BODIES ARE PROBED (ESANA) FOR ESTABLISHING THEIR SIZE, SITE, NUMBER, SHAPE, POSITION, SITUATION, ETC. ÁRAVA, A (BLOOD LETTING) IS TO BE CARRIED OUT IN SKIN DISEASES, VIDRADHIS, LOCALIZED SWELLING, ETC. IN CASE OF ACCIDENTAL
INJURIES AND IN INTENTIONAL INCISIONS, THE LIPS OF THE WOUND ARE APPOSED AND UNITED BY STITCHING (SVANA).

TO OBTAIN PROFICIENCY AND ACQUIRE SKILL AND SPEED IN THESE DIFFERENT TYPES OF SURGICAL MANIPULATIONS, SUKRUTA DEVISED VARIOUS EXPERIMENTAL MODULES FOR TRYING EACH PROCEDURE.

FOR EXAMPLE, INCISION AND EXCISION ARE TO BE PRACTICED ON VEGETABLES AND LEATHER BAGS FILLED WITH MUD OF DIFFERENT DENSITIES; SCRAPING ON HAIRY SKIN OF ANIMALS; PUNCTURING ON THE VEIN OF DEAD ANIMALS AND LOTUS STALKS; PROBING ON MOTH EATEN WOOD OR BAMBOO; SCARIFICATION ON WOODEN PLANKS SMEARED WITH BEESWAX, ETC. ON THE SUBJECT OF TRAUMA, SUKRUTA Speaks OF SIX VARIETIES OF ACCIDENTAL INJURIES ENCOMPASSING ALMOST ALL PARTS OF THE BODY.

SUKRUTA ALSO GIVES CLASSIFICATION OF THE BONES AND THEIR REACTION TO INJURIES. VARIETIES
OF DISLOCATION OF JOINTS (SANDHIMUKTA) AND FRACTURES OF THE SHAFT (Kṣaḍbhagna) ARE GIVEN SYSTEMATICALLY. HE CLASSIFIES AND GIVES THE DETAILS OF THE SIX TYPES OF DISLOCATIONS AND TWELVE VARIETIES OF FRACTURES. HE GIVES THE PRINCIPLES OF FRACTURE TREATMENT, VIZ., TRACTION, MANIPULATION, APPPOSITIONS AND STABILIZATION. SUṆRUTA HAS DESCRIBED THE ENTIRE ORTHOPAEDIC SURGERY, INCLUDING SOME MEASURES OF REHABILITATION, IN HIS WORK.


SUṆRUTA ALSO DISCUSSES CERTAIN SURGICAL CONDITIONS OF ANORECTAL REGION, HE HAS GIVEN
ALL THE METHODS OF MANAGEMENT OF BOTH HAEMORRHHOIDS AND FISTULAE. DIFFERENT TYPES OF INCISION TO REMOVE THE FISTULOUS TRACT AS LANGALAKA, ARDHALANGALAKA, SARVABHADRA, CANDRAADHA (CURVED) AND KHARJURAPATRAKA (SERRATED) ARE DESCRIBED FOR ADOPTION ACCORDING TO THE TYPE OF FISTULA.

SUŘUTA WAS WELL AWARE OF THE URINARY STONES, their varieties; the anatomy of urinary bladder along with its relations is well recorded in the chapter on urinary stones. Varieties of stones, their signs and symptoms, the method of extraction and operative complication are given in detail. Apart from the above, surgery of intestinal obstruction (baddha-gudodara), perforated intestines (chidrodara), accidental injuries to abdomen (assaya-bhinna) in which protrusion of omentum occurs are also described along with their management.
MATERIALS AND METHODS

SUÆRUTA SAÆHIT¡ MEANS 'A COLLECTION OF SYSTEMATICALLY ARRANGED VERSES' OR 'A TEXT.' IN ANCIENT INDIA, FOR EASY LEARNING AND MEMORIZING, THE WORKS OF ART, SCIENCE OR SCRIPTURES WERE COMPOSED IN VERSE FORM, AS PRINTING WAS NON EXISTENT AT THAT TIME. THE SURGICAL TREATISE, SUÆRUTA SAÆHIT¡, WAS COMPILED IN VERSES BY THE ÉYURVEDIC SURGEON, SUÆRUTA. THIS TEXT, DIVIDED INTO SIX SECTIONS, DESCRIBES IN DETAIL THE VARIOUS BRANCHES OF SURGERY WHICH INCLUDES MILITARY MEDICINE, MEDICAL ETHICS, TEACHING METHODS, DISSECTION OF HUMAN BODY, DISSECTION PRACTICES AND OPERATIVE SURGICAL EXERCISES ON VEGETABLES, AND OTHER MODELS LIKE FABRIC ETC. ONE FULL CHAPTER (IX OF SECTION I) IS DEVOTED TO PRINCIPLES OF EXPERIMENTAL SURGERY.

CHAPTERS VII AND VIII OF SECTION I GIVES A DETAILED DESCRIPTION OF 121 TYPES OF SURGICAL
INSTRUMENTS. THESE ARE CLASSIFIED INTO TWO MAIN GROUPS. PERHAPS ONE COULD EVALUATE THE STATUS OF SURGERY DURING ANY PERIOD BY THE TYPE OF INSTRUMENTS IN VOGUE DURING THAT PERIOD. SūRUTA GIVES A LIST OF BLUNT AND SHARP INSTRUMENTS AND ADDS THAT A SURGEON, BY HIS OWN EXPERIENCE AND INTELLIGENCE, MAY INVENT AND ADD NEW INSTRUMENTS TO FACILITATE THE SURGICAL PROCEDURES. HE POINTS OUT THAT THE HAND IS THE MOST IMPORTANT AND THE BEST INSTRUMENT BUT FOR WHICH THE OPERATION OF OTHER INSTRUMENTS CEASES. THE BLUNT INSTRUMENTS ARE MEANT FOR REMOVAL OF FOREIGN BODIES, FOR SUCKING THE FLUIDS, FOR FACILITATING THE VARIOUS SURGICAL PROCEDURES AND FOR VISUALIZING THE LESIONS. THE DOUBLE ARMED AXILE INSTRUMENTS, WHICH HAVE TWO MOVING LIMBS TO HOLD AND PULL ANY OBJECT ARE CALLED SVĀSTIKĀ-YANTRAS AND THEY RESEMBLE THE VARIOUS TYPES OF FORCEPS. SūRUTA'S
CLASSIFICATION AND DESCRIPTION BECAME THE BASIS FOR THE DEVELOPMENT OF INSTRUMENTS. IN FACT HE CAN BE SAID TO HAVE BEEN THE FIRST PERSON TO INTRODUCE THE DIAGNOSTIC INSTRUMENTS AND THEIR PRINCIPLES, WHICH WERE MODIFIED LATER WITH THE INTRODUCTION OF OPTICAL SYSTEM IN THEIR CONSTRUCTION.

SUÁRUTA SAYS THAT, OF ALL THE INSTRUMENTS, HAND IS VERILY THE MOST IMPORTANT ONE, AS THE INSTRUMENTS ARE OF NO USE WITHOUT THE USE OF HAND. TO BE SUCCESSFUL IN SURGERY, THE SURGEON SHOULD BE WELL VERSED WITH THE INSTRUMENTS. HE SHOULD PRACTICE THE HANDLING OF THE INSTRUMENTS BEFORE USING THEM ON PATIENTS.

ANATOMY AS ENUMERATED BY SUÁRUTA

SUÁRUTA IN HIS CIKITSÉSTHíNA EXPLAINS THE METHOD OF PERFORMING SURGERY IN ABOUT 200 PARTS OR ORGANS OF THE BODY, JUST LIKE THE PERFORMANCE OF SURGERY BY THE MODERN MEDICAL PRACTITIONERS IN THE PRESENT TIME. He
ELABORATELY EXPLAINS IN ĀRĪRĀSTHṬṆA THE
IMPORTANT ORGANS AND THE SUB DIVISIONS OF THE
BODY IMPLYING THAT IT IS NECESSARY TO KNOW
EXTENSIVELY ABOUT THE ORGANS BEFORE
PERFORMING SURGERY ON THEM.

THIS DESCRIPTION OF THE BODY IS KNOWN AS
‘ANATOMY’ IN THE PRESENT TIMES. SuḍRUTA
REMAINS A GUIDE TO MODERN MEDICAL SYSTEM FROM
2000 YEARS AGO BY ENUNCIATING THE DESCRIPTION
OF HUMAN ORGANS TERMED AS ANATOMY WHICH IS
BEING WRITTEN AND TALKED ABOUT BY THE MODERN
MEDICAL PRACTITIONERS IN A BIG WAY.

SIMILARLY A MEDICAL PRACTITIONER SHOULD
UNDERSTAND THE FOETAL DEVELOPMENT, SINCE
MEDICAL PRACTICE STARTS FROM THERE AND
CONTINUES UP TO THE TREATMENT OF THE
DEVELOPED ORGANS BY KEEPING THIS IN MIND,
SUḍRUTA, IN HIS ĀRĪRĀSTHṬṆA HAS MENTIONED
ABOUT WEEKLY AND MONTHLY DEVELOPMENT OF THE
FOETUS BY STAGES. THE MODERN MEDICAL
PRACTITIONERS CALL ONLY THIS AS 'GYNECOLOGY.' HENCE IT IS ONLY BEFITTING TO SAY THAT SUṣRUTA IS THE GUIDE FOR THE EXPLANATION OF THE FOETAL DEVELOPMENT, NAMELY, GYNECOLOGY, WHICH IS HIGHLY ADVANCED IN THE MODERN MEDICAL SCIENCE.

PLASTIC SURGERY

THE GREAT HIGHLIGHT OF SUṣRUTA'S SURGERY WAS THE OPERATION OF RHINOPLASTY. THE MAKING OF A NEW NOSE CAPTURED THE IMAGINATION OF THE MEDICAL WORLD AND BROUGHT HIM FAME AS THE ORIGINATOR OF PLASTIC SURGERY.¹

SUṣRUTA LAYS DOWN THE BASIC PRINCIPLES OF PLASTIC SURGERY BY ADVOCATING A PROPER PHYSIOTHERAPY BEFORE THE OPERATION AND DESCRIBES VARIOUS METHODS OR DIFFERENT TYPES OF DEFECTS, VIZ., RELEASE OF THE SKIN FOR COVERING SMALL DEFECTS, ROTATION OF THE FLAPS TO MAKE UP FOR THE PARTIAL LOSS AND PEDICLE FLAPS FOR COVERING COMPLETE LOSS OF SKIN FROM
AN AREA. HE HAS MENTIONED VARIOUS METHODS INCLUDING SLIDING GRAFT, ROTATION GRAFT AND PEDICLE GRAFT. NASAL REPAIR OR RHINOPLASTY HAS BEEN DESCRIBED IN GREATER DETAIL, WHICH TO THIS DAY HAS STOOD THE TEST OF TIME AND IS MENTIONED AS THE INDIAN METHOD OF RHINOPLASTY IN THE BOOKS OF PLASTIC SURGERY. LASTLY, LABIOPLASTY TOO HAS RECEIVED HIS ATTENTION. IN SHORT, ALL THE PRINCIPLES OF PLASTIC SURGERY, VIZ., ACCURACY, PRECISION, ECONOMY, HAEMOSTASIS AND PERFECTION FIND AN IMPORTANT PLACE IN SUÇRUTA'S WRITINGS ON THIS SUBJECT.

SURGICAL SCIENCE- ¯ALYĀ TANTRA EMBRACES ALL PROCESSES AIMING AT THE REMOVAL OF FACTORS RESPONSIBLE FOR PRODUCING PAIN OR MISERY TO THE BODY OR MIND. HEALTH, ACCORDING TO SUÇRUTA, IS A STATE OF PHYSICAL AND MENTAL WELL BEING BROUGHT ABOUT AND PRESERVED BY THE MAINTENANCE OF HUMOURS, GOOD NUTRITION,
PROPER ELIMINATION OF WASTE PRODUCTS AND A PLEASANT HARMONY OF THE BODY AND THE MIND.

Sūrūta warns that improper intervention with surgical manoeuvre either due to ignorance of the progress of the disease process, or greed for money or lack of judgement, lead only to complications. A conscientious surgeon, on the other hand, considers his patient as a whole. For diseases divorced from patients are abstractions from reality. Any surgical manoeuvre is a phased programme well planned and then executed. The pācītkaṇaṁ included the rehabilitation and removal of complications.

Today's commercialization of medical science, remind one of the ancient surgeons who maintained nobility of their profession. Sūrūta says that, there can be nothing more magnificent than the act of removing human suffering. The science of life in practice is
GODLY, LIFE GIVING; INDEED IT IS VIRTUE AND FAME PERSONIFIED.

OPHTHALMOLOGY

THE TREATMENT OF ANY INJURY WAS WELL TAKEN CARE OF BY THE ANCIENT SURGEONS. IF THERE IS ANY INJURY TO EYE, THEN COLD ASCYTANA (DROPPING LIQUID IN TO THE EYES) SHOULD BE ADMINISTERED. THE PHYSICIAN SHOULD QUICKLY ADMINISTER THE THERAPIES FOR CLEANSING THE EYES WITH THE HELP OF UNCTOUS, COLD AND SWEET RECIPES. IF THE EYE IS INJURED BECAUSE OF SVEDA, FIRE, SMOKE, FEAR, GRIEF, ANY DISEASE OR EXPOSURE TO HEAT, THEN THE PHYSICIAN SHOULD ALSO ADMINISTER THE ABOVE MENTIONED THERAPIES.

SUṆṆUTA DEVOTES 18 CHAPTERS TO DESCRIBE THE 76 DIFFERENT DISEASES OF THE EYE of which 51 REQUIRE OPERATIONS. SUṆṆUTA WHO IS SAID TO BE THE FIRST SURGEON TO HAVE REMOVED CATARACTS, DESCRIBED VARIETIES OF CATARACTS
ALONG WITH THE DEPRESSION METHOD OF COUCHING BY THE ANTERIOR ROOT.

SUŚRUTA DESCRIBED AND USED 101 BLUNT INSTRUMENTS AND 20 SHARP INSTRUMENTS, WHICH 'SHOULD HAVE AN EDGE SO FINE THAT IT SHOULD DIVIDE THE HAIRS ON THE SKIN.' ACCORDING TO SUŚRUTA, THE EYE, WHICH 'RESEMBLES THE TEAT OF A COW,' IS COMPOSED OF FIVE BASIC ELEMENTS: THE SOLID EARTH (BU) FORM MUSCLES, HEAT (AGNI) IS IN THE BLOOD THAT COURSES IN ITS VEINS OR ARTERIES, AIR (VYU) FORMS THE BLACK PART (IRIS OR PUPIL), THE FLUID ELEMENT (JALA) FORMS THE LUCID PART (VITREOUS), AND THE VOID (ĀKĀ) FORMS THE LACRIMAL DUCTS OR SACS FOR DISCHARGE OF SECRETIONS.

ANATOMICALLY, HE OUTLINES FIVE SUBDIVISIONS (MA, ALAS) OF THE EYE: EYELASHES (PAKĀMA-MA, ALA); EYELID (VARTMA-MA, ALA); SCLERA OR CORNEA (ĀVETA); CHOROID (KU, A-MA, ALA); AND PUPIL (DVAṬHI-MA, ALA), WHICH 'LOOKS LIKE A HOLE
AND IS THE SIZE OF A LENTIL SEED.' SANDHIS REPRESENT THE 'JOINT' WHERE THE MALAS BIND OR CONNECT. AN EXAMPLE OF A DISEASE INVOLVING ONE OF THE SANDHIS IS ALLERGIC BLEPHARITIS (KAMI-GRANTHIĀ): 'A SWELLING (GRANTHI) CHARACTERIZED BY ITCHING AT THE JOINING OF THE EYELASHES WITH THE EYELID.'

MEDICAL TREATMENT FOR THESE OCULAR CONDITIONS WAS FORMULATED ACCORDING TO WHICH COMPONENT OF THE DOĀĀ WAS PREDOMINANTLY ABNORMAL. MATURÉD CLARIFIED BUTTER (GHEE), BREAST MILK, AND SAINDHAVA SALTS WERE FREQUENTLY USED, IN ADDITION TO PLANTS AND MEATS IN THE FORM OF EYEDROPS (ASCHYOTANTA, MADE BY FOLDING AND SQUEEZING MATERIALS THROUGH A PIECE OF SILK), SALVES (ANJANA), SNUFFS (NASYĀ), AND FUMIGATION(DHUMA).

ADDITIONALLY, LINEN-SOAKED BANDAGES, VENESECTIONS, SOOTHING MEASURES (TARPANA), AND EMETICS OR PURGATIVES WERE EMPLOYED. AS
ONE WOULD EXPECT IN A REGION SO CLOSE TO THE EQUATOR, OCULAR CONDITIONS SENSITIVE TO ULTRAVIOLET LIGHT, SUCH AS CATARACT AND PTERYGIUM, WERE COMMON MALADIES. IN ADDITION TO THE TECHNIQUE OF CATARACT EXTRACTION, SUÆRUTA DESCRIBES SUCH MODERN CONCEPTS AS ANTISEPSIS, ANESTHESIA, AND POSTOPERATIVE CARE. THE FOLLOWING IS A DIRECT TRANSLATION FROM THE ORIGINAL SANSKRIT OF WHAT MAY BE THE FIRST RECORD OF EXTRACAPSULAR EXTRACTION.

'THIS PROCEDURE IS AUSPICIOUSLY PERFORMED PRIMARILY IN THE WARM SEASON PREOPERATIVELY THE SKIN IS RUBBED WITH A PLEDGET OF COTTON SATURATED WITH AN OILY MEDICINAL PREPARATION FOLLOWED BY A HOT WATER BATH. THE PATIENT IS GIVEN A LIGHT REFRESHMENT. THE SICK ROOM IS FUMIGATED WITH VAPOURS OF WHITE MUSTARD, BDELLIUM, NIMVA LEAVES, AND THE RESINOUS GUMS OF SHALA TREES (IN ORDER TO RID THE AREA OF INSECTS AND THE DISEASES THEY HARBOUR). INCENSE
OF CANNABIS IS USED IN ADDITION TO WINE FOR SEDATION TECHNIQUE. THE PATIENT SITS ON A HIGH STOOL WITH THE SURGEON FACING HIM. THE HANDS ARE SECURED WITH PROPER FASTENINGS. THE PATIENT IS ASKED TO LOOK AT HIS OWN NOSE WHILE THE SURGEON RESTS HIS LITTLE FINGER ON THE (BONY MARGIN OF THE OUTER ANGLE OF THE ORBIT), HOLDING A YAVA VAKTRA SALAKA BETWEEN HIS THUMB, INDEX, AND MIDDLE FINGER. THE LEFT EYE SHOULD BE PIERCED WITH THE RIGHT HAND, AND VICE VERSA’.


THE EYE IS THEN SPRINKLED WITH BREAST MILK. “CARE IS TAKEN TO AVOID BLOOD VESSELS IN
THE REGION. THE TIP IS THEN MADE TO INCISE THE (ANTERIOR CAPSULE) OF THE LENS. WITH THE NEEDLE IN THIS POSITION, THE PATIENT IS ASKED TO BLOW DOWN THE NOSTRIL, WHILE CLOSING THE OPPOSITE NARE.

AFTER THIS, LENS MATERIAL *(KAPHA)* IS SEEN COMING ALONGSIDE THE NEEDLE. WHEN THE PATIENT IS ABLE TO PERCEIVE OBJECTS, THE NEEDLE IS REMOVED, INDIGENOUS ROOTS, LEAVES, AND GHEE ARE APPLIED WITH A LINED BANDAGE. PATIENT THEN LIES FLAT AND IS ASKED NOT ERUCTATE, SNEEZE, COUGH OR MOVE. THE EYE IS EXAMINED EVERY FOURTH DAY FOR TEN DAYS. IF THE WHITISH MATERIAL RECURS, THE SAME PROCEDURE IS REPEATED.

PTERYGIUM IS AN ABNORMAL MASS OF TISSUE ARISING FROM CONJUNCTIVA OF THE INNER CORNER OF THE EYE THAT OBSTRUCTS VISION BY GROWING OVER THE CORNEA. Many stages of pterygium (ARMES) are described as distinct diseases.
ONCE MEDICAL TREATMENT WITH THE TOPICAL DROPS AND SALVES WAS EXHAUSTED, SURGICAL EXCISION OF THE INFLAMED PTERYGIUM WAS CONSIDERED. THOUGH INSTRUMENTATION AND PERIOPERATIVE MEDICINALS HAVE CHANGED, THE FOLLOWING EXCERPTS ILLUSTRATE A TECHNIQUE QUITE SIMILAR TO THOSE USED TODAY: PERIOPERATIVELY THE EYE IS IRRITATED WITH SAINDHAVA SALT AND SOAKED WITH A WARM COMPRESS.

THE PATIENT FACES THE SURGEON WHILE SITTING AND IS ASKED TO LOOK AT THE INTERIOR CORNER OF HIS AFFECTED EYE. THE LIDS ARE HELD WIDE APART AND THE PTERYGIUM IS SECURED WITH A HOOK AND HELD WITH A THREADED NEEDLE. THIS IS THEN EXCISED AT ITS BASE WITH THE MALIGRA INSTRUMENT. THE ROOT OF THE PTERYGIUM SHOULD BE PUSHED ASUNDER FROM THE CORNEA AND THEN REMOVED. POST OPERATIVELY THE AREA IS RUBBED WITH A COMPOUND MADE UP OF VARIOUS SALTS,
FOMENTED AND BANDAGED FOR THREE DAYS. THIS WILL RECUR IF NOT PROPERLY EXCISED.

**SUÁRUTA'S TEACHING.**

AS A TEACHER, SUÁRUTA WAS ABLE TO CONFER HIS WISDOM, MOULD FUTURE PHYSICIAN OR SURGEONS, AND ESTABLISH THE ORIGINAL CODE OF MEDICAL ETHICS. HE TAUGHT MEDICAL STUDENTS FOR A SIX YEAR PERIOD, DURING WHICH HE ENCOURAGED THEM TO PERFORM DETAILED, THOROUGH PHYSICAL EXAMINATIONS USING ALL SENSES.**46** HE ADVISED THEM AGAINST UNINTELLIGENT REPETITION FROM WRITINGS, FOR IF ONE DID HE WAS 'LIKE AN ASS WITH A BURDEN OF SANDALWOOD, FOR HE KNOWETH THE WEIGHT, BUT NOT THE VALUE THEREOF. CONTRARY TO THE CODE OF MANU, THE INDIAN CODE OF LAW, WHICH CONSIDERED THE DECEASED BODY TO BE SACRED, SUÁRUTA STRESSED THE IMPORTANCE OF MASTERING ANATOMY ON HUMAN CADAVERS.**47**

SURGEONS WERE PERFORMED PRIMARILY ON CORPSES OF INFANTS LESS THAN TWO YEARS OF AGE;
ALL OTHER CORPSES WERE CREMATED PRECLUDING THEIR DISSECTION. THE CADAVERS WERE WRAPPED IN GRASS AND ALLOWED TO DECOMPOSE IN RIVER WATER FOR SEVEN DAYS; LAYER BY LAYER OF THE BODY WAS SCRUBBED AWAY WITH A BRUSH AND STRUCTURAL DETAILS WERE STUDIED UPON GRADUATION, EVERY STUDENT TOOK AN OATH, WHICH WAS SIMILAR TO THE HIPPOCRATIC OATH \(^{48}\) WRITTEN FOUR CENTURIES LATER, ALLOWING THEM TO COMMENCE TREATING PATIENTS.

SU\(_{2}\)RUTA INSISTED THAT THOSE WHO INTEND TO PRACTICE IT MUST HAVE ACTUAL EXPERIMENTAL KNOWLEDGE OF THE SUBJECT. HE SAYS: 'NO ACCURATE ACCOUNT OF ANY PART OF THE BODY, INCLUDING EVEN ITS SKIN, CAN BE RENDERED WITHOUT A KNOWLEDGE OF ANATOMY, HENCE ANYONE WHO WISHES TO ACQUIRE A THOROUGH KNOWLEDGE OF ANATOMY MUST PREPARE A DEAD BODY, AND CAREFULLY EXAMINE ALL ITS PARTS.'
FOR PRELIMINARY TRAINING, STUDENTS WERE TAUGHT HOW TO HANDLE THEIR INSTRUMENTS BY OPERATING ON PUMPKINS OR CUCUMBERS, AND THEY WERE MADE TO PRACTICE ON PIECES OF CLOTH OR SKIN IN ORDER TO LEARN HOW TO SEW UP WOUNDS. MAJOR OPERATIONS, AS DESCRIBED BY SU₂RUTA, INCLUDED AMPUTATIONS, GRAFTING, SETTING OF FRACTURES, REMOVAL OF A FOETUS AND OPERATION ON THE BLADDER FOR REMOVAL OF GALLSTONES. "THE OPERATING ROOM, HE DECLARES SHOULD BE DISINFECTED WITH CLEANSING VAPORS. HE DESCRIBES 127 DIFFERENT INSTRUMENTS USED FOR SUCH PURPOSES AS CUTTING, INOCULATIONS, PUNCTURING, PROBING AND SOUNDING. CUTTING INSTRUMENTS, SU₂RUTA MAINTAINS, SHOULD BE OF BRIGHT HANDSOME POLISHED METAL, AND SHARP ENOUGH TO DIVIDE A HAIR LENGTHWISE.

GAINING SURGICAL EXPERIENCE

THE PUPIL MAY HAVE UNDERSTOOD THE PURPOSES OF ALL THE KNIVES, BUT HE MUST STILL
HAVE PRACTICAL EXPERIENCE. ONE SHOULD TEACH THE METHODS OF THERAPY IN OIL MASSAGE, ETC., AND IN CUTTING AND SO ON. SOMEONE WHO HAS HEARD A GREAT DEAL, BUT WHO HAS NOT HAD ANY PRACTICAL EXPERIENCE, WILL BE INEPT WHEN IT COMES TO PERFORMING OPERATIONS. SO ONE SHOULD DEMONSTRATE THE DIFFERENT KINDS OF THINGS TO BE CUT USING SUCH ITEMS AS ASH GOURD, BOTTLE GOURD, WATERMELON, CUCUMBER, SWEET MELON, AND SPINY BITTER CUCUMBER. AND ONE SHOULD TEACH UPWARD AND DOWNWARD CUTTING STROKES.\textsuperscript{50}

ONE SHOULD HAVE PRACTICAL EXPERIENCE:

• OF THE THINGS TO BE SPLIT USING SUCH ITEMS AS A LEATHER WATER BAG, A BLADDER, OR A POUCH;
• OF THE THINGS TO BE SCRATCHED, USING A STRETCHED HIDE WITH HAIR ON IT;
• of the things to be pierced, using the ducts of dead animals, and lotus stalks;
• of the things to be probed, using wood which has been damaged by woodworm, bamboo tubes, reeds, and the opening of a dried gourd;
• of the things to be extracted, using jackfruit, red gourd, bengal quince, marrow, and the teeth of dead animals;
• of things to be drained, using a plank of wood from the silk-cotton tree coated with beeswax;
• of things to be sutured, using the two edges of thin and thick cloth, and on the two edges of soft leather;
• of bandaging, using the different limbs and other features of a human dummy;
• of cauteré and caustics, using soft pieces of meat;
• OF JOINING AND WRAPPING EARS, USING SOFT PIECES OF LEATHER
LUMPS OF MEAT, AND LOTUS STALKS;

• OF GOING INTO THE EYE, OF WOUNDS ON THE BLADDER,
AND OF PAINFUL PRESSURE ON THE BLADDER, USING A HOLE IN THE SIDE OF A POT FULL OF WATER, AND THE OPENING OF A DRIED GOURD. AND THERE ARE VERSES ON THIS.

THE WISE MAN WHO GAINS PRACTICAL EXPERIENCE IN THE PROPER WAY ON SUBSTANCES WHICH ARE SUITABLE FOR PRACTICE, LIKE THOSE ABOVE, WILL NOT GO WRONG WHEN IT COMES TO OPERATIONS. THEREFORE, SOMEONE WHO SEeks EXPERTISE IN OPERATIONS THAT USE KNIVES, CAUSTICS, AND CAUTERIZATION, SHOULD GAIN
PRACTICAL EXPERIENCE ON ANALOGOUS.

THE QUALITIES OF A GOOD SURGEON

A PHYSICIAN WHO SETS OUT ON THIS PATH SHOULD HAVE UNDERSTOOD THE SYSTEM, AND HAVE PRACTICED THE GOALS OF THE SYSTEM. HE SHOULD HAVE WITNESSED OPERATIONS, AND DEVELOPED PRACTICAL EXPERIENCE AND BE INVOLVED IN DISCUSSING THE DISCIPLINE. HE MUST BE LICENSED BY THE KING. HE SHOULD BE CLEAN, KEEP HIS NAILS AND HAIR SHORT, AND DRESS IN A WHITE GARMENT. HE SHOULD HAVE AN UMBRELLA, CARRY A STICK, WEAR SANDALS, AND HAVE A MODEST OUTFIT. HE SHOULD BE CHEERFUL, WELL-SPOKEN. HE SHOULD BE A FRIEND TO ALL CREATURES, AND KEEP COMPANY WITH VIRTUOUS PEOPLE.

ON DIAGNOSIS

NEXT, THE MESSENGER OMENS AND LUCKY SIGNS PERMITTING, HE SHOULD GO TO THE HOUSE OF THE SICK PERSON. THEN, HAVING TAKEN A SEAT, HE SHOULD HAVE A GOOD LOOK AT THE PATIENT,
FEEL, HINT, AND QUESTION HIM.

SOME PEOPLE BELIEVE THAT ALMOST ALL AILMENTS CAN BE DIAGNOSED USING THESE THREE METHODS OF DIAGNOSIS. BUT THIS IS NOT TRUE, BECAUSE THERE ARE SIX METHODS OF DIAGNOSIS, I.E., THE FIVE SENSES PLUS INTERROGATION.

THE PARTICULARS TO BE DIAGNOSED USING THE SENSE OF HEARING ARE EXPLAINED AMONGST THE DISEASES IN THE CHAPTER ON THE DIAGNOSIS OF WOUNDS AND DISCHARGES. THERE, IT SAYS THINGS LIKE, 'THE WIND, IMPELLING THE FROTTHY BLOOD, ISSUES FORTH NOISILY.'

THE SCOPE OF SUÑÁRUTA'S SURGERY

IN THE SUÑÁRUTA SAÑÆHITI THAT, ONE FIRST COME ACROSS A SYSTEMATIC METHOD OF ARRANGING THE SURGICAL EXPERIENCES OF THE OLDER SURGEONS, AND OF COLLECTING THE SCATTERED FACTS OF THE SCIENCE FROM THE VAST RANGE OF VEDIC
LITERATURE. *Súdruta had no desire of abandoning the Vedas in the darkness and pushing on an independent voyage of discovery. The crude methods and the still cruder implements of incision such as, bits of glass, bamboo skins etc., laid down and described in the *Sāhūti, may be the relics of a primitive instrumentalogy which found favour with our ancestors long before the hymnisation of any Rg verse. Practical surgery requires a good knowledge of practical anatomy. The quartered animals at the Vedic sacrifices afforded excellent materials for the framing of a comparative anatomy. *Súdruta devoted his whole life to the pursuit of surgery proper, to which he brought a mind stored with luminous analogies from the lower animals. It was he who first classified all surgical operations into five different kinds, and grouped them under heads such as Ėhīṛya...
(Extractions of solid bodies), Bhedyā (Excising), Chedyā (Incising), Eāya (Probing), Lekhyā (Scarifying), Sivyā (Suturing), Vedhya (Puncturing) and Vīḍraya (Evacuating fluids).

The surgery of Suṇḍūṭa recognizes a hundred and twenty-five different instruments, constructed after the shape of beasts and birds, and authorizes the surgeon to devise new instruments according to the exigencies of each case. The qualifications and equipments of a surgeon are practically the same as are recommended at the present time. A light refreshment is enjoined to be given to the patient before a surgical operation, while abdominal operations, and operations in the mouth are advised to be performed while the patient is fasting. Suṇḍūṭa enjoins the sick room to be fumigated with the vapours of white mustard, Bdellum,
NIMBA LEAVES, AND RESINOUS GUMS OF Á¡L¡ TREES, ETC., WHICH FORESHADOWS THE ANTISEPTIC (BACILLI) THEORY OF MODERN TIMES.

THE NUMBER OF SURGICAL IMPLEMENTS DESCRIBED IN THE SAÆHIT; IS DECIDEDLY SMALL IN COMPARISON WITH THE ALMOST INEXHAUSTIBLE RESOURCES OF WESTERN SURGERY, AND ONE MAY BE NATURALLY LED TO SUSPECT THE AUTHENTICITY OF THE GLORIOUS ACHIEVEMENTS CLAIMED TO HAVE BEEN PERFORMED BY THE SURGEONS OF YORE; BUT THEN THEIR KNOWLEDGE OF THE PROPERTIES AND VIRTUES OF DRUGS WERE SO GREAT THAT CASES, WHICH ARE RECKONED AS SURGICAL NOWADAYS, WERE CURED WITH THE HELP OF MEDICINES INTERNALLY APPLIED. SURGERY, SAYS TANTRA, IS MUTILATION NOT DOCTORING. IT SHOULD ONLY BE EMPLOYED WHEN THE AFFECTED VITAL ENERGY IS NOT STRANG ENOUGH TO ALONE EFFECT THE CURE THAT THE SURGEON IS JUSTIFIED TO HANDLE HIS KNIFE. WE FIND IN THE SAÆHIT; THAT OPHTHALMIC,
OBSTETRIC AND OTHER OPERATIONS WERE PERFORMED WITH THE UTMOST SKILL AND CAUTION.53

**SUÁRUTA'S CONTRIBUTIONS TO ALLIED FIELDS**

SURGICAL DEMONSTRATION OF TECHNIQUES IN MAKING INCISIONS, PROBING, EXTRACTION OF FOREIGN BODIES, ALKALI AND THERMAL CAUTERIZATION, TOOTH EXTRACTION, EXCISIONS, TROCAPS FOR DRAINING ABSCESS DRAINING HYDROCELE AND ASCITIC FLUID. HE DESCRIBED REMOVAL OF THE PROSTATE GLAND, URETHRAL STRICTURE DILATATION, VESICULOLITHOTOMY, HERNIA SURGERY, CAESARIAN SECTION, MANAGEMENT OF HAEMORRHIOIDS, FISTULAE, LAPAROTOMY AND MANAGEMENT OF INTESTINAL OBSTRUCTION, PERFORATED INTESTINES, ACCIDENTAL PERFORATION OF THE ABDOMEN WITH PROTRUSION OF OMENTUM. CLASSIFIED DETAILS OF THE SIX TYPES OF DISLOCATIONS, TWELVE VARIETIES OF FRACTURES AND CLASSIFICATION OF THE BONES AND THEIR REACTION TO THE INJURIES. PRINCIPLES
OF FRACTURE MANAGEMENT, VIZ., TRACTION, MANIPULATION, APPPOSITIONS AND STABILIZATION INCLUDING SOME MEASURES OF REHABILITATION AND FITTING OF PROSTHETICS. CLASSIFICATION OF EYE DISEASES WITH SIGNS, SYMPTOMS, PROGNOSIS, MEDICAL OR SURGICAL INTERVENTIONS AND CATARACT SURGERY. DESCRIPTION OF METHOD OF STITCHING THE INTESTINES BY USING ANT-HEADS AS STITCHING MATERIAL.\textsuperscript{54}

FIRST TO DEAL WITH EMBRYOLOGY AND SEQUENTIAL DEVELOPMENT OF THE STRUCTURES OF THE FETUS. DISSECTION AND STUDY OF ANATOMY OF HUMAN BODY. INTRODUCTION OF WINE TO DULL THE PAIN OF SURGICAL INCISIONS. ENUMERATION OF 1120 ILLNESSES AND RECOMMENDED DIAGNOSIS BY INSPECTION, PALPATION AND AUSCULTATION.

SUI\textscript{2}RUTA TOOK SURGERY IN MEDIEVAL INDIA TO ADMIRABLE HEIGHTS AND THAT ERA WAS LATER REGARDED AS THE GOLDEN AGE OF SURGERY AS IN ANCIENT INDIA. BECAUSE OF HIS NUMEROUS SEMINAL
CONTRIBUTIONS TO THE SCIENCE AND ART OF SURGERY IN INDIA, HE IS REGARDED AS THE FATHER OF INDIAN SURGERY AND THE FATHER OF INDIAN PLASTIC SURGERY.

SUÁRUTA - THE SEED OF MEDICAL SCIENCE

SUÁRUTA HAS ENUNCIATED IN HIS WORK MIRACULOUS ACHIEVEMENTS LIKE THE ABORTION (MEDICAL TERMINATION OF PREGNANCY THROUGH SURGERY), DELIVERY OF THE CHILD THROUGH CAESAREAN OPERATION DURING CRITICAL CHILD BIRTH ETC., (15TH CHAPTER OF THE CIKITSÁTHÁNAM IN SUÁRUTA SAÆHIT;).

THE METHOD OF CONTRACEPTION THROUGH VASECTOMY IS CLEARLY SEEN IN THE PART OF ATHARVAVEDA, A PART OF WHICH IS ÊYURVEDA. THE METHOD OF PREVENTING PREGNANCY DURING COITUS HAS BEEN EXPLAINED IN ÊRAYAKA UPANIÄAD. ALLEVIATING PAIN THROUGH TREATMENT DURING ABORTION AND THE WAYS OF BEGETTING A MALE OR FEMALE CHILD AS PER THE
wish have been mentioned in the second part of Arācāraṣṭhīṇa in Sūrūta Sāñhitā. Surgery should be avoided in 107 vital parts essential to life which are otherwise called the secret zones. Sūrūta, warns, that utmost caution must be exercised during treatment, if surgery can't be avoided, and also describes 120 instruments used in surgical operation.

CONCLUSION

The genius of Sūrūta prompted eminent surgeon Whipple to declare 'All in all, Sūrūta must be considered the greatest surgeon of the premedieval period.' Razes repeatedly quoted Sūrūta as the foremost authority in surgery.

The accuracy of Sūrūta's descriptions and classification of diseases is really remarkable. Much of his great compendium has a modern feeling about it. The original autographic manuscript of the Sūrūta
SAÆHIT¡ HAS NOT SURVIVED. EXTINCT ONLY ARE COPIES OF COPIES AND REVISIONS OF REVISIONS, SO THAT THE ORIGINAL WORK OF SU¿RUTA HAS BEEN MUCH OBSCURED BY CENTURIES OF EMENDATION, SUPPLEMENTATION, AND VARIOUS KINDS OF ALTERATION. HOWEVER, FROM BENEATH THE LAYERS OF ALL THE INCRUSTATIONS OF LATER SCHOLARS THE ORIGINAL LUSTRE OF SU¿RUTA STILL SHINES FORTH.

IN 'THE SOURCE BOOK OF PLASTIC SURGERY,' FRANK MCDOWELL APTLY DESCRIBED SU¿RUTA AS FOLLOWS, 'THROUGH ALL OF SU¿RUTA'S FLOWERY LANGUAGE, INCANTATIONS AND IRRELEVANCIES, THERE SHINES THE UNMISTAKABLE PICTURE OF A GREAT SURGEON. UNDAUNTED BY HIS FAILURES, UNIMPRESSIONED BY HIS SUCCESSES, HE SOUGHT THE TRUTH UNCEASINGLY AND PASSED IT ON TO THOSE WHO FOLLOWED. HE ATTACKED DISEASE AND DEFORMITY DEFINITIVELY, WITH REASONED AND LOGICAL METHODS. WHEN THE PATH DID NOT EXIST, HE MADE ONE.'
SUÆRUTA WAS PROBABLY THE FIRST SURGEON IN THE WORLD TO CLASSIFY AND DESCRIBE, IN DETAIL, THE SURGICAL INSTRUMENTS, THEIR METHOD OF MANUFACTURE, QUALITY CONTROL, MAINTENANCE AND THEIR SPECIFIC USAGE IN THE DIAGNOSIS AND TREATMENT OF DISEASES.

SUÆRUTA WAS ALSO THE FIRST SURGEON TO DESCRIBE ENDOSCOPES SUCH AS RECTAL, AURAL, NASAL AND VAGINAL SPECULA. HIS CONTRIBUTIONS SHOULD NOT BE VIEWED BASED ON THE HIGHLY AND SIGNIFICANTLY ADVANCED CURRENT SURGERY OF THE 21ST CENTURY. YET HIS CONTRIBUTIONS ARE SIGNIFICANT TO THE MEDICAL HISTORY OF THE WORLD. AS HE LIVED AROUND 600 B.C., HIS SURGICAL TREATISE SHOULD BE JUDGED IN THE LIGHT OF THE STATE OF MEDICINE AND SURGERY WHICH PREVAILED AT THAT PERIOD OF TIME CONSIDERING THE RELIGIOUS TABOOS AND OTHER LIMITATIONS LIKE THE NON EXISTENCE OF HIGH TECHNOLOGY MANUFACTURING EQUIPMENTS. WITH HIS EXEMPLARY
CONTRIBUTIONS TO ALL THE BRANCHES OF SURGERY,
IT IS APT TO CALL HIM THE FATHER OF SURGERY.

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