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You're Reading a Free Preview Pages 316 to 325 are not shown in this preview. You're Reading a Free Preview Pages 337 to 344 are not shown in this preview. You're Reading a Free Preview Page 348 is not shown in this preview. You're Reading a Free Preview Pages 360 to 376 are not shown in this preview. You're Reading a Free Preview Pages 382 to 388 are not shown in this preview. You're Reading a Free Preview Pages 392 to 394 are not shown in this preview. You're Reading a Free Preview Pages 407 to 414 are not shown in this preview. Jump to ratings and reviewsThe revised edition of *Plant Taxonomy* is designed to present the current principles, practices and techniques of plant taxonomy and contemporary classifications, and also to describe important angiospermic families and groups. It provides a broad and up-to-date synthesis of this active and fascinating field of botany in the most effective manner. Salient features: Four new application-oriented chapters on: Numerical Taxonomy, Chemotaxonomy, Serotaxonomy, Molecular Taxonomy. Exhaustive coverage on: Plant Classification, Plant Collection and Specimen preparation, Identification and Botanical Nomenclature, Herbarium and Botanical Gardens, Phylogeny, Classification System and Description of 89 Families. Completely updated as per 16th International Botanical Congress Guidelines, 1999 IAPT; St. Louis Code, The International Code of Botanical Nomenclature. More than 900 rich plant organs sketches and floral diagrams. #1. Introduction. 2. History of Plant Taxonomy. 3. Classification. 4. Taxonomic Structure. 5. Plant Collection and Specimen Preparation. 6. Plant Identification. 7. Examination of Plant Specimen. 8. Plant Nomenclature and Botanical Names. 9. Modern Trends in Plant Taxonomy. 10. Numerical Taxonomy. 11. Chemotaxonomy. 12. Serotaxonomy. 13. Phylogeny: Origin and Evolution of Angiosperm. 14. Molecular Taxonomy. 15. Botanical Library. 16. Herbarium. 17. Botanical Gardens. 18. Floral Formula and Floral Diagram. 19. Position of selected families in classification systems proposed by Bentham and Hooker, Engler and Prantl, Hutchinson, Takhtajan, Cronquist, and Thorne. 20. Terms of Plant Description. 21. Selected Families of Dicotyledons. 22. Selected Families of Monocotyledons. 23. Examination Tool B. #top Get help and learn more about the design. O P Sharma, Formerly associated with Meerut College, Meerut. 2.1 HISTORY AND DEVELOPMENT OF PLANT CLASSIFICATION 2.1.1 Earlier than Man Could Read and Write Not much is known today about the botanical knowledge of our preliterate ancestors. But it is clear that they knew by experience the plants that were edible and others which were not. The preliterate mankind also possessed some kinds of linguistic mechanisms for correct distinctions among different kinds of plants. 2.1.2 Age of Theophrastus, Secundus, Dioscorides and Parasara The advent of writing and printing changed the entire picture of the ancient preliterate mankind. Theophrastus (370-285 B.C.), the "grandfather of the modern botany", was the greatest botanical writer of the distant past. He was a student of Plato and Aristotle, and studied botany under their philosophic guidance at Athens. He classified the plants into four groups: herbs, subshrubs, shrubs, and trees. He also distinguished between the nonflowering plants (Cryptogams) and flowering plants (Phanerogams). He suggested that calyx and corolla are the modified leaves. He described nearly 500 plants in details, and certain names (e.g. Asparagus, Daucus, and Narcissus) are used even today in the same sense. The details of his works are available to the world in the form of books entitled "Enquiry into Plants" and "The Causes of Plants". Caius Plinius Secundus (23-79 A.D.), known to the botanical world as Pliny the Elder, was a lawyer and also served in the Roman army till his death caused by the heart failure. Voluminous and important works of Pliny are available in the form of 37 volumes of Natural History. He described the biological, medicinal and agricultural aspects of the plants known to the world up to his time in these volumes, and Pliny's Natural History was among the first books to be printed by the movable type in the late 15th century. The word 'stamen' in its modern sense was first used by Pliny. Pedanius Dioscorides (62-128 A.D.) was a contemporary of Pliny the Elder. He was actually a Physician in the Roman army and belonged to a Roman province, Cilicia. His monumental work is compiled in the form of 'Materia Medica'. It described the botany, mainly the medicinal aspects of about 600 species of plants.



Materia Medica was considered as a highly esteemed source book for 2 HISTORY OF PLANT TAXONOMY CHAPTER 9 History of Plant Taxonomy those practicing medicine in those days. The importance and fame of Materia Medica of Dioscorides may be guessed from the fact that the Emperor Flavius Anicius Olybrius (500 A.D.) presented a beautifully illustrated copy of the book to his daughter (Princess Juliana Anicia) as a precious gift at the time of her marriage.

Juliana's copy of Materia Medica remained for several years in Constantinople (Istanbul) and was later transferred to Vienna, where it still exists under the name of Codex Juliana. Several plant names (e.g. Aloe, Aristolochia, Anemone, Phaseolus) as suggested by Dioscorides are still in use in the present botanical literature. The book titled Vrikshayurveda, written by an Indian, Parasara, is one of the earliest Indian works describing plants in a scientific manner. Though it was written before the beginning of the Christian era, the scientifically described plant classification and distribution in this book led the famous systematist Albert E. Radford (1986) of USA to state that Parasara had some kind of hand lens or microscope. There exist several other references which show that the early civilizations of India, Egypt and China did have a definite knowledge of the plant taxonomy. 2.1.3 Taxonomy in Middle Ages Little is known about the development of taxonomy during the early one thousand years of the Christian era. Then came the Middle Ages or Medieval Ages (about A.D. 1100-1500). Albertus Magnus (A.D. 1200-1280) has been the most famous plant taxonomy worker of this period. Commonly called "Doctor Universalis" or "Aristotle of the Middle Ages" by his contemporaries and historians, Magnus employed a scheme of classification of plants that recognised monocots and dicots, and separated nonvascular plants from vascular plants. Worth mentioning are the names of two Muslim scholars of twelfth century. Ibn-Sina who authored Canon of Medicine, and Ibn-al-Awwam of Spain who described over 600 species of plants and interpreted accurately the sexuality in plants. 2.1.4 Herbalists After the Medieval Ages (A.D. 1500) the history of plant taxonomy was influenced tremendously by two things, the invention of printing and the development of the science of navigation. The printing technology lowered the cost of books and increased literacy. During the early years of printing, the medically oriented books on plants became quite popular. Printed forms of ancient texts had many superfluous and irrelevant writings and this actually prompted several interested persons to write and publish their own botanical medical books. These books were called herbals and their authors were called herbalists. The science of navigation prompted sailors to go on long voyages.

This resulted in the exploration of several new areas of the world, and, in turn, increased man's practical knowledge of plant taxonomy. At the advent of 16th century the first herbals published were "Gart der Gesundheit" and "Hortus Sanitalis". These herbals had crude illustrations of plants and were published without an attribution of authorship. However, the 16th century is considered as the "time of great herbalists". The best known among the herbalists belong to Germany. Among them were Otto Brunfels (1464-1534) known for his herbal Herbarum Vivae Eicones, Jerome Bock (1469-1554) for his herbal Neu Kreuterbuch, and Leonhart Fuchs (1501-1566) for his herbal De Historia Stirpium. All these herbalists are considered as the "German Fathers of Botany" and their herbals exhibit some excellent illustrations and detailed 10 Plant Taxonomy taxonomic descriptions of several available plants.



However, they did not emphasize on any system of classification of plants.

2.1.5 Taxonomy during Seventeenth Century Andrea Caesalpino (1519-1603), an Italian, was the first scientist who worked for achieving a rational scheme of classification of plants. Another name of repute among the taxonomists of the 17th century is that of Gaspar Bauhin (1560-1624), a Swiss botanist. He compiled all the different kinds of plants known to the science till then in a register called Pinax Theatri Botanici. His register, which had an account of different names used by various workers for each plant, is considered an authoritative discussion of synonymy in systematic botany. He, first, established the distinction between the concept of genus and species and also initiated the use of the binomial nomenclature, in some cases though not consistently. John Ray (1627-1705), an English taxonomist, is another great contributor of the seventeenth century. His works are published in two books entitled Methodus Plantarum Nova (1682) and Historia Plantarum (1686). He also suggested a scheme of classification of plants. Joseph Pitton de Tournefort (1656-1708) is another significant name in the field of taxonomy, mainly for his publication titled Institutiones Rei Herbariae. He arranged over 9,000 kinds of plants in about 700 genera grouping them in classes. 2.1.6 Period of Linnaeus The eighteenth century belongs clearly to Carl Linnaeus (1707-1778) from the point of view of history of taxonomy. He is the creator of the modern system of nomenclature. A son of a Swedish clergyman, Linnaeus was educated at the universities of Lund and Uppsala, and obtained the degree of M.D. in Netherlands. After practicing medicine for a few years, he became a Professor of natural history at the University of Uppsala, where he spent the rest of his life. Linnaeus is considered as the first taxonomist who showed that the reproductive features were of paramount importance in taxonomy. He was the originator of the sexual system of classification, in which he recognized 24 classes, mainly on the basis of number, length, union and certain other characters of stamens. He was the first to use consistently the "binomial system of nomenclature", in which each organism is represented first by its generic name followed by the name of its species. This scheme of nomenclature provided by Linnaeus is used throughout the world till today. The plant taxonomy findings of Linnaeus were published in May 1753 in the form of his work Species Plantarum. The name of Linnaeus is commemorated today in the form of a well-established scientific society, The Linnaean Society of London, and journals, such as Linnaea. Contribution of Linnaeus has been so great that it may well be stated that so far the 'plant taxonomy' would survive in the world, Linnaeus would be remembered. 2.1.7 Natural System Approach Though Linnaeus (1753) was the first one to establish a system of classification of plants based on reproductive parts, several totally unrelated plants were classified together (e.g. Prunus was classified along with Cactus because of the same number of stamens) in his system of classification. This fact