

[Reviews of works by George Cuvier].

Contributors

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Great Britain, and the study of Zoology has recently begun to be placed on an equal footing with Mineralogy and Botany in the universities of England. We anticipate that the taste thus recently excited for the study in this country, will not be allowed to evaporate in mere admiration; but that, in imitation of our continental neighbours, it will be improved, and directed to the proper means of advancing the interests of the science. In the mean time if we wish to view the study of animated nature in a form truly worthy of occupying a philosophic mind, we must direct our attention to the French school, where it has long formed a regular branch of academic education, and the exclusive subject of study of men of distinguished abilities and learning, and by no one has the science been more successfully cultivated than by the eminent author of the voluminous works announced at the head of this article.

In attempting to lay before our readers a brief and impartial sketch of the scientific labours of M. Cuvier, we shall follow the chronological order of his numerous writings, that we may be enabled to trace the progress of zoological discovery during the last forty years, at the same time that we examine the merits of the successive changes this distinguished naturalist has introduced into the science. Within the period of M. Cuvier's career all the branches of Natural History have been cultivated with increased ardour in the schools of Europe, and our acquaintance with the natural productions of the globe has been greatly extended by the rapid progress of geographical discovery, by the advancement of all the collateral sciences, and by the zeal and intelligence of European colonists and travellers in distant countries. The liberal aid afforded to science by the French government, and the consequent subdivision of mental labour among its cultivators in that country, have enabled the scientific of France to maintain an ascendancy over other countries of Europe in those departments which necessarily required such aid for their successful cultivation, and particularly in Zoology, one of the most expensive of all the physical sciences.

The Menagerie of the Jardin du Roi and the Museums of Natural History and Comparative Anatomy at Paris, which have grown for more than a century, have long surpassed those of every other country of Europe in their extent, elegance, and richness; and, in the extensive means of comparison which they thus present, they afford an instrument of investigation in the study of Natural History, superior to that enjoyed by any other country. These magnificent collections, which owe
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much to the early exertions of Buffon and Daubenton, have been a means of spreading a taste for the study of Zoology and Comparative Anatomy, and have greatly contributed to the eminent success of the cultivators of these sciences in France. The labours of M. Cuvier in these departments have extended over a period of nearly forty years, they have greatly added to the reputation of the French school of naturalists, and they have been a principal means of the rapid advancement of the study of Animated Nature in our times. His comprehensive genius has shed its lustre over every department of this vast field of inquiry; the existing races of the animal kingdom he has reviewed, classified, and defined; their diversified structures he has examined and described; numerous tribes of the extinct species have almost been recalled to life by his skill and perseverance; and at the age of sixty his active and vigorous mind still continues with unabated ardour to explore new paths in that immense field of investigation, which he has so long cultivated with unrivalled success.

George Cuvier was born in the year 1769, at Montbéliard, a town now in the department of France, called the Upper Rhine, but which, at the period of his birth, belonged to Wurtemberg, one of the states of Germany. This town, on the confines of Germany, has at least the glory of having given birth to the two illustrious Cuviers, to M. Duvernoy, the present Professor of Natural History at Strasburg, and to M. Laurillard, the able assistant of M. Cuvier in the department of Comparative Anatomy. M. Cuvier was born in the same year, in the same month, and nearly on the same day with Napoleon, whose intimacy he enjoyed during a great part of his perilous career; and thus, in very distant parts, the same period gave birth to the two illustrious foreigners whose lives must be so much identified with the history of France, and whose thoughts and actions have had so great an influence on the scientific and political world in later times. His father was an officer in a Swiss regiment in the service of France, and Chevalier of the Order of Military Merit; he retired after forty years' service, with a moderate pension from France, and some time after he was made Commandant of Artillery at Montbéliard. Cuvier received the early part of his education at the University of Stuttgard, the capital of Wurtemberg, where he resided for several years, directing his attention to the study of Mathematics, Philosophy, Law, and Jurisprudence, with the view of qualifying himself for taking a share in the administration of his native country, to which he was induced
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to look forward by the kind patronage shewn him by the late Duke Charles, grand uncle of the present King of Wurtemberg. These early prospects of Cuvier, however, were soon blasted by the events which agitated France towards the close of the last century, and by which his native country became a part of a French province. The grand displays of natural scenery in the mountainous country around Stuttgard, form an allurement to the study of Natural History; and there have long existed both museums and societies in that capital devoted to its advancement. On leaving the University of Stuttgard, Cuvier betook himself to France, where he resided for some time on the coast of Normandy, and afterwards resorted to Paris. Here he commenced his career as a private lecturer, and was soon appointed to assist Professor Mertrud, in the Course of Comparative Anatomy delivered in the Museum of Natural History. Cuvier had already made himself favourably known to several of the most eminent naturalists of Paris, by his new and interesting observations on the structure of molluscous animals, made while residing on the coast of France, as tutor in the family of a nobleman. His zeal and abilities were soon recognized; he was admitted a member of most of the learned societies of Paris, and before the age of twenty-nine he was appointed Professor of Natural History in the Central School of the Pantheon. His election as a member of the Institute of France, on the first organization of that assembly in 1796, gave a new impulse to his exertions; and the numerous memoirs and discoveries which he laid before that learned body in the early part of his career, greatly extended his reputation, while they formed the bases of his more enlarged succeeding publications. The structure of the animal frame, in all the modifications it presents throughout the lower classes, was always the favourite subject of his pursuits; and he continued to discharge the duties of Professor of Comparative Anatomy in the Garden of Plants to a late period, notwithstanding the multiplicity of his other avocations. The drawings which accompanied his numerous anatomical memoirs were all executed by himself, and the beauty and elegance of his delineations are not less remarkable than the minuteness and accuracy of his descriptions. Most of these memoirs are published in the *Annales du Museum*.

The labours of Daubenton, Mertrud, and Rousseau had already greatly extended the Museum of Comparative Anatomy before the task of completing it fell to M. Cuvier, by his appointment to that chair in the Garden of Plants. While he was Professor of Natural History in the Pantheon, and delivered

livered lectures on Comparative Anatomy, for Mertrud, in the Garden of Plants, he published his first separate work, the 'Tableau Elementaire,' in 1798. This work forms an octavo volume of 710 pages, it presented a new distribution of the whole animal kingdom, and it formed the basis of the two succeeding editions of the *Règne Animal*. The principles of classification, adopted in this early publication, had already been partly developed by him in a separate memoir on a new division of white-blooded animals, which he published at the age of twenty-six, three years before the appearance of the *Tableau Elementaire*. In that early memoir, which was read to the Natural History Society of Paris on the 10th of May, 1795, and printed in the *Décade Philosophique*, Cuvier first attacked Linnæus's division of the invertebrata into insects and worms, and assigned the characters and limits of the new classes mollusca, crustacea, insecta, vermes, echinodermata and zoophyta. The distribution of these invertebrate classes into three great divisions equal to the vertebrata, was afterwards established by Cuvier in a memoir read to the Institute in July, 1812. The classification of animals is one of the principal objects to which the researches both of the zoologist and comparative anatomist are directed: without the assistance derived from methodical arrangement, the multitude and variety of objects belonging to the animal kingdom would continually impede our investigations, and overpower the strongest mind. The efforts of M. Cuvier were, therefore, early directed to this important point; and the publication just mentioned is an outline of the course of lectures delivered by him at the Pantheon, on this subject, in 1797. The animal kingdom is there divided into eight great classes: four of vertebrate animals, *Mammalia*, *Aves*, *Reptilia*, *Pisces*; and four of invertebrate animals, *Mollusca*, *Insecta*, *Vermes*, *Zoophyta*; the orders, genera, and many of the species of which are illustrated by ample details, and the characters of all the different groups are illustrated by fourteen plates, from his own pencil, representing more than a hundred objects. This work has not been translated into English, but a Portuguese translation of it, by Almeida, was published in London in 1815, in 2 vols. 8vo.

After some interesting observations on the utility of the study of Zoology, and its applications to other sciences, he details the properties which distinguish organized and sentient beings, and gives an outline of the organization of the human body and the distinctions among the different races of mankind. In treating of the mammalia he has somewhat improved the classification

classification of Professor Storr of Tubingen; he has adopted the nomenclature of Linnæus, but he has greatly improved the characters of the genera and species, by introducing more precise and detailed descriptions of the teeth, taken from the skeletons preserved in the National Museum. The arrangement of the class of birds has been taken from Linnæus and Buffon, and the descriptions are short and perspicuous. From the limited means of observation which Cuvier then possessed with regard to birds, he considers this the most imperfect part of the volume. The class of reptiles is divided into two orders, oviparous quadrupeds, and serpents; the former comprehending the *chelonias*, *sauria*, and *batrachia* of Brogniart and the later editions of the Règne Animal, and the latter order comprehending the *ophidia*. The divisions of the class of fishes are adopted from Linnæus; they consist of six orders, founded on the position of the fins, and Blumenbach had previously copied the same arrangement into his 'Manual of Natural History.' The cartilaginous fishes, which are placed first in the work of Blumenbach, and in the Tableau Elementaire, the Leçons d'Anatomie Comparée, and likewise in the Règne Animal of 1817, have been properly thrown to the bottom of the class in the great work on the Natural History of Fishes (1828), and in the new edition of the Règne Animal (1829), as in their skeleton and other parts of their organization they approach to the molluscous animals. The whole of the invertebrate animals are distributed into three great groups, which correspond with the mollusca, articulata, and zoophyta of the Règne Animal. The animals of the first division, mollusca, are characterized as having a muscular heart, and no longitudinal, knotted, nervous cord; those of the second division, insects and worms, have a longitudinal dorsal vessel, and a knotted spinal cord, or at least one of these two characters; those of the third division, zoophyta, have neither heart, nor brain, nor nerves. The mollusca are divided into the cephalopoda, gasteropoda nuda, gasteropoda testacea, and acephala; the last of these divisions comprehending Lamarck's classes, conchifera, tunicata, and cirrhipeda. His next great division he terms insects and worms, and comprehends under it all the crustacea, arachnida, insecta, annelida, and entozoa of later authors. The arrangement of these is taken chiefly from Linnæus and Fabricius, and he was as fortunate in having the personal assistance of Fabricius in regard to this class, as he had been in obtaining that of Lacepede for the classes of reptiles and fishes, and that of Lamarck for the testaceous mollusca and the corals. Cuvier, however, has paid a minuter attention to

to the organs of manducation of insects in this work than had been done by his predecessors, and has pointed out many important characters founded on these parts. The division of his great group zoophyta is nearly the same as that of the Règne Animal, with the exception of the entozoa, being placed among the vermes in the Tableau Elementaire, and the infusoria being placed between the acalepha and the true ramified zoophytes which terminate the volume.

Throughout the whole of this Elementary Treatise he displays a practical acquaintance with the objects about which he treats, and with the best authors who had preceded him. The general observations prefixed to each division are judicious and appropriate, and, considering the state of the science at that time, they contain much interesting and original information; but, in his desire to adapt the work to the capacity of his pupils, he has overlooked the advantages of the strict methodical disposition of materials, so conspicuous in the great masters whom he has followed. The great zoological distinctions of classes, orders, genera, &c., are supplied by Cuvier by the more convenient division of chapters, and the reader is sometimes left to guess the value of a subdivision by the size of the type employed in printing its description. The investigations and the extent of reading necessary for the composition of a work like this, designed to exhibit a summary of the whole animal kingdom, must have greatly aided M. Cuvier in his demonstrations of comparative anatomy; and the combination of his duties at the Pantheon and at the College of France, with those at the Garden of Plants, may be considered as a principal cause of his eminent success in both the departments of zoology and comparative anatomy. Where the latter branch is studied only in connexion with human anatomy, the knowledge acquired is generally limited to a superficial acquaintance with a few of the classes most nearly resembling man; and when studied only in connexion with geology, the acquaintance with it is generally limited to those hard parts of animals capable of being preserved in the strata of the earth. And where Zoology is cultivated without the aid of Comparative Anatomy, the true principles of classification must be overlooked, and the most discordant arrangements will result from the attention being directed exclusively to external form.

From the wide range of M. Cuvier's investigations and public duties, he was often obliged to pass from the beaten path of his predecessors in treating of the anatomy of animals, and to travel over ground which had been but little explored. The tracks pointed out by Pallas, Camper, Vicq-d'Azir, and Daubento,

benton, were too common to engage his attention; and he found, in the obscure paths followed by Swammerdam, Lister, Basterus, and Réaumur, materials more calculated to extend the principles of physiology, to enlarge the views of the anatomist, and to advance the science of zoology, than by confining his inquiries to the vertebrate classes. By his interesting researches regarding the mollusca, while residing in the south of France, he became known to Lametherie, Tessier, Olivier, Lacepede, Geoffroy, and Millin, who invited him to come to Paris, and obtained for him the chair of Zoology in the Pantheon. His earliest anatomical memoirs read before the Institute of France, were on animals the most remote from man. His memoir on the Medusæ pointed out, in animals two feet in diameter, a structure nearly as simple as that of the Infusoria. The numerous memoirs which he published in the *Annales du Museum* on the Anatomy of Molluscos Animals, fill alone a quarto volume of nearly 500 pages: they contain descriptions of the structure of nearly fifty genera, and are illustrated by thirty-five elaborate plates from his own pencil. These memoirs have rectified many of the errors or supplied the deficiencies of preceding observers, and have thrown a new light on the most remarkable and unknown forms of organization: they have pointed out the true relations of these diversified beings to each other; and, by affording the means of dividing them into natural and closely allied groups, they have greatly facilitated the labours of the conchologist. He has minutely detailed the anatomy of most of the known Cephalopodous and Pteropodous mollusca, and of numerous genera of naked and testaceous Gasteropoda. His memoirs on the Ascidia and other Acephalous Mollusca have been the means of illustrating the whole class of tunicated animals: his memoir on the Cirrhipeda has established the true relations of these singular animals, in pointing out their numerous affinities with other articulated animals in their nervous system, their respiratory organs, and their articulated extremities; and his concluding dissertation on the species of Crustacea known to the ancients, displays a happy union of extensive zoological knowledge with profound classical erudition.

A career of original investigation, like that of M. Cuvier, ill accords with the patience and labour required in extensive compilations; and although an elementary work on his favourite subject of Comparative Anatomy, was still a desideratum in France, he was too much impressed with the difficulty of the undertaking, and too eagerly engaged in a new train of investigation, to undertake the composition of such a work. Fortunately for the

the science, M. Cuvier found two able anatomists eager and qualified to reduce, to the form of a system, the vast materials employed by him in his courses of lectures on Comparative Anatomy. M. Mertrud had been appointed to the newly created chair of Comparative Anatomy in the Garden of Plants, but from his advanced age at that time, he was induced by the advice of his colleagues to appoint Cuvier as his substitute, and in that capacity Cuvier devoted himself to the extension of the Zootomical Museum, and to the means of illustrating his lectures, which were then attended by numerous assemblies. On the death of Mertrud, who had been long assistant to Daubenton, Cuvier succeeded him as Professor of Comparative Anatomy on the 1st of November, 1802. M. Dumeril, who accomplished the two first volumes of the *Leçons d'Anatomie Comparée*, comprehending the Organs of Motion and those of Sensation, was then at the head of the anatomical department of the School of Medicine at Paris; and the composer of the three last volumes, treating chiefly of the Organs of Digestion, Circulation, Respiration, Secretion, and Generation, was Dr. Duvernoy, a relation of M. Cuvier, a young and zealous anatomist, and now the distinguished Professor of Natural History at Strasburg. M. Cuvier's attention was at this time directed to the excavations in the gypsum strata of Montmartre; and his frequent excursions to that interesting theatre of geological events, together with the labour of comparing the accumulations of bones daily extracted from the quarries with those of the skeletons preserved in the cabinet, must have considerably distracted his attention from the compilation of the *Leçons d'Anatomie Comparée*, and left a large share of the merit of these volumes to the skilful anatomists who conducted them. The first volume of the work is prefaced by a letter of twenty-two pages from Cuvier to his zealous preceptor, Professor Mertrud; in which he explains, with his usual eloquence and perspicuity, the nature of the subject, the particular scope of the work, and the manner in which it was got up, from his oral demonstrations. The work is in five octavo volumes, of about 500 pages each: it is illustrated by fifty-two engraved plates; and, although it is now thirty years since it was published, it still forms the most perspicuous, correct, and complete systematic view of the science which exists in any language. In collecting materials for the work, Cuvier was aided by many donations of specimens from his friends and correspondents in distant parts: he had liberty to dissect all the animals which died in the Menagerie, and even to open those rare species which had long been preserved in the
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the Museum in spirits. Cuvier and his pupils dissected, in 1802, the large male elephant which had been pillaged, along with many other zoological treasures, from the Stathouder in Holland, during the Revolution; he dissected another male elephant in 1804, and a female elephant a few years afterwards. His younger brother, M. Frederick Cuvier, was appointed keeper of the Menagerie in 1805, and rendered Cuvier great assistance in completing the series of skeletons of the Museum of Comparative Anatomy, which was first opened to public inspection in 1806. Manuscript copies of M. Cuvier's lectures on Comparative Anatomy, taken by pupils from his oral demonstrations, had been circulated in Paris, and even cited in works, before he undertook to publish them in a complete and connected form; and M. Dumeril had taken regular and ample notes from these demonstrations during four successive years. The introductory lecture is full of original and highly interesting views of the animal economy, and of the laws of organization; the succeeding lectures of the first volume, on the Organs of Motion, treat of the osseous and muscular system of each division of the body, commencing with the bones and muscles of the trunk, those of the shoulder and anterior extremity; then those of the pelvis and posterior extremity are described, in all the classes of vertebrate animals. The organs of motion in invertebrate animals are then examined; and the first volume concludes with a lecture on the organs of motion considered in a state of action. Although it is convenient sometimes, in teaching osteology, to exhibit the organs by which the various motions of the bones are effected, the introduction of the interesting details of myology is apt to fix the attention too exclusively on individual forms, and to carry away the mind from those extensive comparisons which are required to illustrate the osteology of the lower animals; and M. Cuvier has not been followed by succeeding writers, in thus combining the osteology with the myology. The second volume commences with the description of the head, considered as the receptacle of the principal organs of sense; the brain and nerves are then considered; and the organs of sight, hearing, touch, smell, and taste, are examined at great length.

A period of five years elapsed between the publication of the first two volumes of the *Leçons* and the succeeding three; during which time M. Cuvier was elected Perpetual Secretary of the French Institute, an office which his genius, learning, and indefatigable research still continue to adorn. Cuvier was Secretary of the Institute so early as 1800, when that office was only temporary and of two years duration; he had been the third elected since the beginning of the Institute. At this

time Napoleon, returned from Egypt and declared First Consul, was made President of the Institute, which brought Cuvier into frequent personal intercourse with his future Sovereign. In 1802 Napoleon, desiring to reorganize the schools of France, appointed six General Inspectors to establish Lyceums in thirty cities of the empire. Cuvier was made one, and in that capacity he established the first Lyceums (now Royal Colleges) of Marseilles and Bourdeaux. It was while absent from Paris, on this embassy, that the Secretaries of the Institute were made perpetual, and Cuvier was appointed to that of the Physical Sciences. When at Marseilles he availed himself of the favourable opportunity to extend his inquiries into the structure of the mollusca. During this interval the two first volumes of the *Leçons* were translated into the English language; but the same respect has not been shown to the other three, which are not inferior in merit. The translation of these two volumes was executed by Mr. Ross, with the careful revisal of Professor Macartney of Dublin. A translation of the first lecture, which contains a luminous view of the laws of animal economy, had been published in a separate form by Mr. Allan, surgeon, of Edinburgh. The numerous avocations both of M. Dumeril and M. Cuvier prevented them from devoting the time and attention to the concluding volumes which they had devoted to the preceding; and Dr. Duvernoy, though aided by the manuscript notes of the former, and the plates, preparations, descriptions, and regular revisal of the latter, had many dissections to perform and repeat, and many deficiencies to supply in his difficult and meritorious task of completing the work. Cuvier had opportunities of dissecting many rare and unknown animals while the later volumes of the *Comparative Anatomy* were preparing, partly from the Menageries of the Garden of Plants and of Malmaison, and partly brought from a distance in spirits, by Geoffroy and Savigny from Egypt, by Peron from Australasia, by Humboldt from America, by Homberg and Fleuriau from the coasts of France, and by Cuvier himself from the Mediterranean. In his interesting letter to Lacepede, Professor of Zoology in the Museum of Natural History, inserted at the beginning of the third volume, he details briefly the progress of Comparative Anatomy during the five preceding years, and the important influence which his own researches for fifteen years had exerted in reforming the methodical arrangements of zoologists; the absurd classifications of the Linnæan school, founded solely on external form or on a single character, and the necessary dependance of correct zoological arrangements on the progress and application of zootomical knowledge, are also pointed out with great distinctness and ability.

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The Organs of Digestion form the subject of the third volume; and, in treating of this function, many important parts of the system are described with great minuteness and detail. The form, structure, and motions of the jaws; the teeth of mammalia, reptiles, and fishes; the salivary glands, the organs of mastication and deglutition; the structure and peculiarities of the œsophagus, stomach, and intestinal canal, throughout the various classes of animals, are successively described, and in every part illustrated with original observations. The peculiarities of the liver, pancreas, and spleen, and the digestive apparatus of invertebrate animals, form the first subjects of the fourth volume; the heart and circulating organs, the organs of respiration in land and aquatic animals, and the organs of voice, so intimately connected with atmospheric respiration, are described at great length in the same volume. The organs of generation and those of excretion occupy the fifth volume. Throughout these volumes, the parts which relate to the organization of insects and molluscous animals are the exclusive productions of M. Cuvier; and, probably, no anatomist then living, besides himself, was qualified to undertake these obscure parts of zootomy. In what relates to the digestive system of the mammalia, nearly all the interesting facts collected by Daubenton, in his Description of the Cabinet, have been incorporated. In the tables of the classification of the whole animal kingdom, added to this work, many important improvements are introduced into the arrangements of the *Tableau Elementaire*; partly resulting from M. Cuvier's own more extended inquiries, and partly adopted from the eminent writers who, during this period, had illustrated many separate branches of zoology. In what relates to the classification of quadrupeds and birds, he has availed himself of the improvements introduced by Lacepede, and in the arrangement of the testaceous mollusca, he has been assisted by the labours of Lamarck. The vermes and crustacea here form two classes distinct from that of insects; the former arrangement of reptiles, taken from Lacepede, is changed for the more convenient subdivisions of Brogniart, into chelonia, sauria, ophidia, and batrachia. The entozoa are placed, provisionally, in the class of vermes; and the infusoria still succeed the Medusæ in the class of zoophytes.

During the composition of the *Leçons*, M. Cuvier had collected many interesting observations regarding the fossil bones accumulated in the strata around Paris. In his visit to Italy he had examined the situations most famed for the fossil remains of animals they afforded, and many distinguished naturalists had sent him from distant parts of Europe remains, or drawings or descriptions, of animals found in a fossil state. The immense

collection of skeletons preserved in the Cabinet of Comparative Anatomy at Paris, afforded him the means of instituting the necessary comparisons of the fossil with the existing species, and must have greatly assisted and encouraged him in his early attempts to decipher the remains of the higher classes of animals so frequently submitted to his inspection. The certainty of the truths thus brought to light, the novelty of the results, and their important applications to the hitherto fanciful speculations of geology, excited the liveliest interest among the naturalists of Europe to the curious and novel investigations of M. Cuvier; and the success of his labours in identifying the fossil bones of the mammalia, affords the most splendid illustration of the utility of zootomical knowledge, as applied to geological investigation, which has yet been recorded in the history of that science. The opportunities which M. Cuvier enjoyed for prosecuting these geological inquiries were such as no naturalist ever before possessed; but it must also be said, that no man ever before possessed in a more eminent degree, than Cuvier, all the requisite qualifications for the successful employment of these advantages. His indefatigable industry, and his enthusiasm in these pursuits, his practical acquaintance with all the collateral sciences, and his extensive general knowledge, the beauty of his language, and the elevated tone of his descriptions, the extent and grandeur of his general views, and the sublime truths they have unfolded regarding the past revolutions of the animal kingdom and of the globe we inhabit, convince us that no other naturalist in his situation could have so successfully performed what he has accomplished, in regard to the restoration of extinct species of animals. These researches now occupy seven large quarto volumes, illustrated with more than two hundred engraved plates; they have made us acquainted with at least seventy species of animals before entirely unknown to naturalists, and have pointed out the occurrence of eleven or twelve known existing species in a fossil state, besides many other species of animals which have not yet been identified.

Cuvier was appointed, in 1808, one of the councillors for life of the Imperial University, which was created that year by Napoleon. This sedentary appointment accorded well with that of Perpetual Secretary of the Institute, and led Cuvier often to discuss affairs of administration before the Council of State, and in presence of the emperor. In this capacity he was sent in 1809 and 1810, to organize the academies of the Italian states which had been recently added to the empire; and the judicious arrangements which he made at Turin, Genoa, and Pisa, were found so advantageous, that on the return of the
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respective sovereigns of these states, the measures adopted by Cuvier were preserved inviolate. In 1811 he had a similar mission to Holland and the Hanse Towns, and many of the changes and nominations which he made there, are still respected and preserved. When at Hamburgh, he was informed that the emperor had conferred upon him the title of Chevalier, with an hereditary endowment. Though a Protestant by country, birth, and education, he was sent, in 1813, to organize the University of Rome; and some of the improvements which he introduced into the University of La Sapienza, were retained even after the return of the pope. When in that city, he received intelligence of his appointment as Master of Requests, a place in the ministry to which he had been called by a personal resolution of Napoleon, who was acquainted with the acts of Cuvier's administration as Councillor of the University, both from his own observation and from the favourable report of Fontane. During his numerous missions through the vast territories formerly subservient to France, on affairs connected with the state, Cuvier never omitted the opportunities they afforded him of prosecuting his favourite scientific investigations.

The great accumulations of the bones of elephants which M. Cuvier saw in Italy, convinced him that they could not have belonged to the few animals of this species lost by Hannibal in traversing that country, but must have belonged to species inhabiting that part of the globe at a much more remote period. The same cause is assigned by him for their remains occurring in England, Ireland, Germany, Denmark, Norway, Poland, Russia, Siberia, and in the islands and shores of the Polar Seas. Kotzebue found them common on the coasts of America within the Arctic Circle, and Parry, in Melville Island, where the temperature is now frequently fifty degrees below the freezing point. The great animal of the Ohio has been restored by Cuvier, the bones of which were considered by Daubenton to belong to the elephant and hippopotamus. Cuvier has identified different species of this animal to which he has given the name *Mastodon*, from the nipple-like form of the grinding teeth. The fossil hippopotami and rhinoceroses, which are so abundant in the valley of the Arno, Cuvier has been enabled to ascertain, by means of the skeletons of the recent species he has procured for the Museum. The rhinoceros of *Caffreria*, described by Sir E. Home, as similar to the fossil species, was shown by M. Cuvier to differ from the latter in not having the septum of the nostrils ossified as in the allied fossil species. The pretended fossil human skeleton of Scheuchzer, which Camper suspected to be that of a lizard, was carefully examined by Cuvier when
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at Haerlem, where it is preserved in the Museum, and shewn to be, what he had previously announced it to be, a gigantic salamander. Cuvier examined at Pavia the collection of fossil bones brought from the Island of Cerigo, and asserted by Spallanzani to be remains of the human species, and found that not a single fragment of them had ever formed a part of a human skeleton, but were all remains of ruminating animals. He has determined nearly twelve species of the extinct genus *Palæotherium*, some of which were nearly as large as a rhinoceros; they appear from the shells which are found along with their bones, to have frequented the banks of rivers and marshes. The immense accumulations of bones found in the caves of Gaylenreuth, on the frontiers of Bayreuth, Cuvier found to have belonged almost entirely to extinct species of bears, which must have lived and died peaceably in the situations where we now discover their remains. The remarkable fossil animal of South America, the *Megatherium*, which measures twelve feet in length, and six or seven in height; and the *Megalonyx*, nearly as large, Cuvier has ascertained to have been closely allied, in their general characters, to the sloths and ant-eaters of that country. He has found the bones of a species of opossum in the gypsum quarries of Paris, and thus confuted the opinion of those who maintained all such bones to have been flooded north from Asia, as the animals of this genus are inhabitants only of the New World. Two species of seals have been discovered by Cuvier in the coarse marine limestone of the department of the Maine and Loire, one of which is nearly three times as large as the common species still inhabiting our seas, and in the same locality he has found two unknown species of Lamantins. His labours have been scarcely less productive in the class of reptiles, of which he has pointed out many extraordinary and gigantic species found in a fossil state.

From the examination of the numerous extinct species of animals found in the gypsum quarries of Montmartre, Cuvier was naturally led to study the nature and superposition of the various strata containing them, and in conjunction with M. Brongniart, Professor of Mineralogy, he undertook a laborious and extensive examination of the geological structure of the Paris basin, and of the surrounding country. The results of their investigations form an important part of the great work on Fossil Organic Remains, and one of the most valuable contributions which geology has ever received. They have shown the country around that capital to be formed by a succession of marine and fresh-water deposits, as if by the flux and efflux of salt and fresh water over that extensive district. Above the
chalk,

chalk, which forms the bottom of the great basin they examined, rest the plastic clay and coarse marine limestone, both containing, as well as the chalk itself, remains of marine animals. On these strata rests the great gypsum fresh-water formation, containing remains of quadrupeds, birds, and reptiles, and of fishes and shells belonging to fresh-water species. Marl and sandstone containing the remains of marine animals lie on the gypsum formation, and these are covered with beds of flint and silicious limestone, abounding with fresh-water shells. All these strata are covered with a dark-coloured carbonaceous alluvium composed of sand, marl and clay, and containing trunks of trees, and bones of elephants, oxen, and other large quadrupeds. These interesting geological details occupy more than six hundred pages, and are illustrated with geological maps and numerous sections of strata, not only of the Paris basin, but also of similar formations in Italy, Switzerland, and Germany. Numerous plates are also given of the invertebrate animals which occur in these beds, and which have been carefully identified by Lamarck, DeFrance, Audouin, and other zoologists; in what relates to the fossil vegetables, many of which are figured, the work has been assisted by the late researches of M. Adolphus Brogniart.

The preliminary discourse in the first volume of this work contains so many grand and original views of the revolutions which have taken place on the surface of this globe and in the animal kingdom, and is composed in a style at once so profound, elegant, and attractive, that it has long been translated into the English language both in this country and in America, and more recently also into the German language. The translations of Dr. Mitchel of New York, and Professor Jameson of Edinburgh, are enriched with numerous original notes and illustrations; and the translation of the latter has gone through five large editions. The original discourse is now published in Paris as a separate work, and both in an octavo and quarto form. Besides the preliminary discourse and the elaborate memoirs on the osteology of the recent and extinct species of elephants and hippopotami, and on the remains of the fossil mastodons, the first volume contains a dissertation on the ibis, so much revered by the ancient Egyptians, in which he has attempted to show by an examination of several mummies of the bird from the tombs of Thebes, and from historical documents, that it still exists in that country as in the time of the Pharaohs, and that it has undergone no perceptible change in its form since that remote period. In treating of the other pachydermatous animals in the second volume, which is chiefly occupied with the geology of the Paris formation,

formation, M. Cuvier has entered into the same minute and extended details of the osteology of the living species, along with that of the extinct races, as in the preceding volume, and the same plan has been followed throughout the whole of this vast undertaking. The labour of collecting materials for so great a work during his travels and surveys in various parts of Europe, and the task of arranging and describing them, might be thought sufficient to have occupied the greater part of M. Cuvier's life; but they have afforded him leisure, not only for his numerous important public avocations, and for the composition of works even more elaborate, but also to draw and even to engrave with his own hands some of the most detailed osteological plates contained in this voluminous work. The third volume is principally occupied with a detailed account of the means employed to restore the species of pachydermatous animals found in the gypsum quarries around Paris, by the careful examination and comparison of their separate bones. It is illustrated with eighty quarto engraved plates, the greater part of which are from the pencil of Cuvier's able assistant, Laurillard, one of the most skilful anatomical designers in Europe. It is fortunate for the interests of ichthyology, that the same accurate and elegant draughtsman has undertaken the elaborate folio anatomical plates of the great work on Fishes, now publishing by Cuvier and Valenciennes. In determining the fossil remains of the mammalia, Cuvier considers the examination of the molar teeth as affording by far the most important characters. By these we at once perceive whether an animal is carnivorous or herbivorous, and when it belongs to the latter order we can generally determine by the forms of these teeth the particular kind of herbivorous animals to which it is most nearly allied. Cuvier was induced to commence his researches with the pachydermata, from their occurring in most abundance in the newest alluvial formations, from the great size of their bones and the facility of identifying the species, and from the imperfect state of our knowledge regarding the osteology of these gigantic inhabitants of tropical climates. Besides the extended descriptions of the Palæotheria and Anoplotheria, this volume contains an account of other pachydermatous animals, and of Carnivora, Rodentia, a species of Opossum, the remains of birds, tortoises, crocodiles, and fishes which occur along with them in the same gypsum formation, and the whole is terminated by a lengthened monograph on the fossil vegetation of the environs of Paris, by M. A. Brogniart.

The ruminating animals differ remarkably in several of their characters from the other orders of mammalia, as in the imperfection

fection of their dental system, in the structure of their stomach, and in the forms of their horns; yet they resemble each other so much, and are so numerous, that their discrimination is attended with great difficulty both with regard to the recent animals and the extinct species. Important generic characters are often taken from the form of their horns, those most changeable of all their external parts according to their age, sex, and climate. To facilitate his researches into this numerous tribe of fossil mammalia, M. Cuvier, in his fourth volume, enters at considerable length into the characters of the existing species as taken from the teeth, the head, and the rest of the skeleton, and then describes the different fossil species of deers, oxen, and other ruminating animals, determined chiefly by their horns, and found in various situations in France, Germany, and other parts of Europe. He has attempted, in the same manner, to decipher the bones of the ruminating animals found in so great abundance in osseous brecchias, in fissures, and caves, at Gibraltar, Cette, Antibes, Nice, Uliveto, Cape Palinurus, Corsica, Sardinia, Sicily, Dalmatia, Cerigo, Conclud, and Verona. His views in regard to the antiquity of these osseous accumulations in caves and fissures, have been modified by the interesting discoveries and conclusions of our zealous and learned countryman Professor Buckland; and he agrees with this eminent geologist as to the manner in which these bones have been collected together and enveloped in the diluvium. M. Cuvier proceeds in the same manner with the numerous order of carnivorous animals as with the ruminantia, to determine the osteological characters of the various existing races, before attempting to identify the fossil species. The teeth present very important and useful discriminating characters, both in the carnivora and rodentia, from the striking diversities they exhibit in the genera of these orders. In determining the fossil species of these animals, M. Cuvier was greatly aided by the elaborate and useful work which his brother had undertaken, at his request, on the forms and arrangement of the teeth in all the existing genera of this class. This volume concludes with the description of the discovered fossil species of bears, hyænas, wolves, foxes, and other small carnivorous animals, and the whole of the details are illustrated with numerous valuable plates representing chiefly the forms of the teeth, the jaws, the entire crania, and other essential parts of the osteology. The osteology of the rodentia, edentata, and marine mammalia, and the investigation of the fossil species of these orders, occupy the first part of the fifth volume, which is illustrated with twenty-seven plates, representing the skeletons and the separate bones of many rare and interesting animals,

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as the echidna, the ornithorhyncus, the dugong, the lamantin, and several cetaceous animals scarcely to be met with in any other museums but that of the Garden of Plants.

The number of rodentia appears to have been as great in the ancient world as at present, and most of the species appear to have been small as those now met with in a living state. After showing the gradual transition to this order of quadrupeds in the systems of dentition presented by the species belonging to the marsupial genera phalangista, macropus, and phascalomys, Cuvier details the characters of the order rodentia, and of the recent genera it comprehends, and enters particularly into the description of the molar teeth, the form of the head, and the characters which may be obtained from the other parts of the skeleton. In treating of the fossil rodentia, particularly those found in caves, he has given a full account of the interesting researches of Dr. Buckland, in regard to the species of this order met with in the caves of Kirkdale, and has endeavoured to identify some of the separate bones of these animals represented in the plates of the *Reliquiæ Diluvianæ*. These bones appear to have belonged chiefly to species of mice, rats, and hares. The *Trogontherium Cuvieri*, is a large fossil species belonging to this order, and agreeing in all its characters with the genus *castor*; it was found on the sandy banks of the sea of Azof, and measures a fifth larger than the recent species of Europe or America. The skeletons of those singular quadrupeds, the sloths, ant-eaters, and monotremata, are the next described in this volume. Cuvier was the first to point out to Daubenton, thirty years ago, the remarkable irregularity observed in the cervical vertebræ of the sloth, called the *Ai*, where their number amounts to nine, being two more than are met with in almost all the other mammalia. The great length of the anterior extremities of this animal, and of some other sloths, is regarded by Cuvier as a principal cause of their remarkable slowness of motion, and of their feebleness. They present, likewise, remarkable peculiarities in the form of the pelvis, and in the union of its parts, in the mode of articulation of the hind feet, in the rigidity of all the parts of the toes, in the manner in which the long nails are folded under the feet during a state of rest, and in the articulations of the scapula and clavicle. The details on the osteology of the monotremata, contained in this volume, though not applied to the determination of any fossil remains, form a most valuable contribution towards the anatomy of these most singular of all the animals hitherto brought from New Holland, and whose structure and nature have so much perplexed the most eminent anatomists of Europe. It is remarkable,

able, that, notwithstanding the knowledge we possess of the anatomy of the ornithorhyncus, one of these monotremata, naturalists are not agreed as to the class to which that animal belongs, Cuvier regarding it as a viviparous quadruped, Lesson as a bird allied to the penguin, and Geoffroy St. Hilaire as belonging to an oviparous class, between quadrupeds and birds. The only fossil species hitherto discovered belonging to the order edentata, are the megalonyx of Jefferson, from North America, the great megatherium from Paraguay, and another gigantic, though still unknown species, of which Cuvier has only been able to examine the plaster model of a phalanx found in a pit of sand and gravel, supposed to have been formed by deposition from the Rhine, near Eppelsheim, in Hesse. The fossil species of marine mammalia are much more numerous, and Cuvier has described and figured the remains of extinct species of seals, lamantins, dolphins, narwals, whales, and cetaceous animals allied to the hyperoodons and cachalots, which he is particularly enabled to illustrate, by means of the rich collection of these animals preserved in his museum in the Garden of Plants. He has not, however, described all the remains of these animals in his possession, but has selected only those which afforded the means of being satisfactorily determined. By thus pointing out many species of marine mammalia, which are now extinct, he has further confirmed the conclusion to which naturalists had been led by the study of fossil conchology; that not only the productions of the land have been changed by the revolutions which have taken place on the surface of the globe, but that the sea itself, the chief agent in most of these revolutions, has changed its inhabitants. The gigantic bulk and force of the cetacea have not better protected their species in the ocean, than the size and strength of the elephants, rhinoceroses, hippopotami, mastodons, and megatheria, have enabled them to resist on land the revolutions which have destroyed their race.

It is not a little remarkable, that among the fossil remains of vertebrate animals, there should so seldom be found the bones either of birds or of serpents. This cannot be ascribed merely to the delicacy of their skeleton, and the consequent difficulty of preserving it in the rocky strata, or of collecting its parts, from these ancient beds, as we find in many of the older strata, the skeletons of the smallest fishes preserved with the most delicate spines of their fins uninjured. The saurian reptiles are much more common, and the batrachia are also frequently found in a fossil state. The crocodile, of all the saurian reptiles, presents the nearest affinities in its osteology,

ology, to that of the mammalia; in determining the nature of its separate bones, their relative position is examined, the muscles which are attached to them are considered, the blood vessels and nerves which pass through their foramina are ascertained, and all similar indications are carefully sought for and applied. From this determination of the bones, particularly those of the head of the crocodile, we obtain a solution of the more difficult analogies in the osteology of the other saurian reptiles, and likewise of the tortoises and serpents. The batrachian reptiles present anomalies which require a different kind of investigation from that of the other orders of their class. M. Cuvier deprecates, as visionary, the ingenious views of those who endeavour to decipher the osteology of the cranium of these animals, by comparing the bones of the head of vertebrate animals to a series of dilated vertebræ. After thus carefully determining the osteology of each of the recent genera of reptiles, and illustrating all the details with large engravings, he proceeds in the last part of the fifth volume of this stupendous monument of his profound zootomical knowledge and indefatigable spirit of research, to examine the characters of the remarkable extinct species of these animals. The remains of reptiles occupy a series of strata much more ancient than those which contain the fossil bones of mammalia, even of the aquatic species. The chalk formation, and all the strata of anterior date, present no trace of the former existence of mammiferous animals, which are all confined to newer formations; but the chalk strata, and all the older strata of the secondary series, to the great coal formation, abound with remains of tortoises, crocodiles, and lizards, which have even left distinct traces of their footsteps on the now solid sandstones of the latter formation, as in the sandstone quarries of Dumfriesshire in Scotland, although very few of these animals are now found in strata newer than the chalk. At the remote period alluded to, only cold-blooded reptiles moved upon the dry land, and the bottom of the sea was peopled with species of ammonites, belemnites, terebratulites, encrinites, and many other genera now almost entirely extinct.

After establishing the division of the great family of crocodiles into three subgenera of alligators, crocodiles properly so called, and gavials, (the first of which is distinguished by having the fourth tooth of the lower jaw on each side, received into a depression of the upper jaw-bone, and by having the feet semipalmated; the second, by the same tooth on each side of the lower jaw, passing through a distinct fissure of the upper maxillary bones, the feet palmated, and the beak oblong; and the

the gavials forming the third division, are distinguished from the other two subgenera, by having an elongated cylindrical beak, and palmated feet,) M. Cuvier examines, with great minuteness and detail, the separate bones of the living species of crocodiles. The bones of the head are carefully compared with the corresponding bones of the mammalia, the bones of the trunk and extremities are illustrated with equal detail, and the whole skeleton is contrasted with those of the alligators and gavials at present existing. The fossil species of these animals are next described; both those known to preceding observers, and those ascertained by M. Cuvier. The gavial of the calcareous slates of Franconia, described by Sœmmerring, that of the limestone quarries of Caen, and the bones of two unknown species found near Honfleur and Havre, are described at great length. Several crocodiles have been found in the chalk and in the strata immediately adjacent above and beneath that formation, as in the chalk of Mendon, in the ferruginous sand beneath the chalk in Sussex, in the plastic clay of Auteuil, and in Provence, and the island of Sheppy. Remains of these reptiles are likewise described by Cuvier, found along with the palæotheriums and lophiodons, in formations newer than the chalk, and which not only differ from the more ancient species, but distinctly approach in their characters to the existing races, as in the gypsum quarries, in the marl of Argenton, in the gravel beds of Castelnaudary, those found near Blaye, and those found at Brentford and at Mans.

M. Cuvier has described, in the same manner, the recent and fossil species of chelonian reptiles, the land and fresh water tortoises, and those which still inhabit the sea, and the fossil species found in various parts of Italy, France, Switzerland, Germany, and England. After describing the general osteology of the recent species of lizards, he examines the facts connected with the fossil monitors found at Thuringen and other parts of Germany; the great saurian reptile found in the quarries of Maestricht; the gigantic lizard, discovered by Sœmmerring near Monheim, and termed *geosaurus* by Cuvier; the huge *megalosaurus*, found by Buckland in the oolite of Stonesfield, near Oxford; the saurian reptile, discovered by Gaillardreau, in the quarries of compact limestone near Lunéville; and the four discovered species of *pterodactylus*, a genus distinguished by the extraordinary length of the fourth toe of the anterior extremities. The observations and plates, illustrative of the osteology of the recent species of batrachian reptiles, form a valuable contribution to Comparative Anatomy; and the details regarding the fossil bones of the
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great aquatic salamander, from the quarries of *Æningen*, which Scheuchzer regarded as those of the human species, are full and satisfactory. This great work concludes with details full of interest and originality, regarding the two remarkable genera *ichthyosaurus* and *plesiosaurus*, almost peculiar to the strata of England, and of which several species have been discovered. The *ichthyosaurus* is found with us in almost all the secondary strata, from the new red sandstone upwards, to the green sand lying immediately beneath the chalk. The number of fragments already obtained of these two genera, and the many facts ascertained regarding them, principally by English naturalists, have enabled M. Cuvier to represent, in his concluding plate, the entire skeletons of these extraordinary aquatic reptiles, as they existed in our ancient seas.

The views of M. Cuvier regarding the extinct races of vertebrate animals, and the facts he had collected relating to them, were first published as a series of detached memoirs in the *Annales du Museum d'Histoire Naturelle*; and in 1812 these memoirs were collected by the author, connected together by means of supplementary articles and a preliminary discourse, and published as a separate work, forming the first edition of his '*Recherches sur les Ossements Fossiles*,' in four quarto volumes. A second edition was published in 1817, in five volumes, quarto. After nearly ten years of continued research in the same interesting field of inquiry in various parts of Europe, M. Cuvier commenced, in 1821, a new edition of the work, which was completed in 1824 in seven quarto volumes, though forming only five according to the plan of the work. It has been recently reprinted, with a new edition of the preliminary discourse. This work, which is the greatest monument of the genius, learning, and industry of Cuvier, has reformed the science of geology, and greatly advanced our knowledge of Comparative Anatomy; and is justly styled, by our most eminent mineralogist, Professor Jameson, the most splendid contribution to Natural History furnished by any individual of this age.

The writings and researches of Cuvier, however, have not always been limited to the animal creation. He has, for many years, been in the habit of employing his leisure hours in collecting the most interesting historical facts, in examining the scientific labours, and in composing biographical memoirs of the most eminent members of the French Institute who have died during that period. These historical discourses are designed to commemorate the services rendered to science by the most distinguished members of that learned body, and
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are generally composed and read before the Royal Academy of Sciences, soon after the decease of any of its most valuable associates. The biographical memoirs, composed by M. Cuvier on such occasions, during a period of nearly thirty years, and read before the Institute of France, have been recently collected and published as a separate work, which consists of three octavo volumes. All the most interesting memoirs of these volumes have been translated into the English language, and published separately in our periodical Journals. The first volume commences with an interesting sketch of the progress of the sciences and their influence on human society, which was read at the opening of the Academy in 1816, and contains historical sketches of the scientific labours of Daubenton, Lemounnier, l'Héritier, Gilbert, Darcet, Priestley, Cels, Adanson, Broussonnet, Lassus, Ventenat, Bonnet, and Saussure—thirteen distinguished scientific characters connected with the Institute, and whose lives were read by M. Cuvier, before that Assembly, between the years 1800 and 1810. The second volume contains the biographical memoirs composed by M. Cuvier, from 1810 to 1819, embracing the lives of Fourcroy, Desessarts, Cavendish, Pallas, Count Rumford, Parmentier, Olivier, Tenon, Werner, Desmarets, Riche, and Bruguières. The same volume contains the oration delivered by M. Cuvier before the French Academy in 1818, on being elected to the place vacant by the death of M. de Roquelaure, and the answer to that oration, written by the Count de Seze, then Director of the Academy. These two volumes were published in 1819. The third volume made its appearance so late as 1827, and contains historical memoirs of M. de Beauvois, Sir Joseph Banks, Duhamel, Haüy, Berthollet, Richard, Thouin, Count Lacépède, Hallé, Corvisart, Pinel, and Fabbioni, together with two funeral orations in honour of Van Spaendonck and the Chevalier Delambre. The volume concludes with two interesting and learned dissertations on the recent discoveries and present state of Natural History and Chemistry; the former read before the Academy in 1824, and the latter in 1826. These volumes display an extensive and intimate acquaintance with all the physical sciences, and with the progress of discovery in each of their various departments: their style is elegant, easy, and perspicuous, and in bestowing encomiums on departed talents, they are composed with great judgment and impartiality.

The same remarks are applicable to the elaborate historical sketch of the 'Progress of the Physical Sciences from 1789 to 1807,' which M. Cuvier drew up as Perpetual Secretary of the Academy of Sciences, and presented to the French government,

government, in the name of the Institute, in 1808, and of which a new edition was published in 1827. In this comprehensive memoir he has entered into the minutest details of the various chemical theories of that period; he has examined the importance of the different experiments and discoveries on which these were founded, and the instruments invented to facilitate these investigations; and he has traced the march of the science for twenty years, in all its separate departments. In natural history he has followed the progress of discovery with equal minuteness, in meteorology, hydrology, mineralogy, geology, physiology, anatomy, botany, zoology, and comparative anatomy. And in treating of the application of these sciences to practical purposes, he has detailed the various improvements recently introduced into medicine, surgery, the veterinary art, and agriculture, and the important advantages which have resulted from the application of natural history and chemistry to the arts and manufactures. Although M. Cuvier acknowledges the liberal assistance he received from his learned colleagues in the composition of this early and extensive survey of the physical sciences, the memoir displays, in every part, an author familiar with all the departments of inquiry which it embraces, and it presents a luminous view of the state of the physical sciences at the period when it was officially presented to the emperor.

This interesting and elaborate memoir has been again reprinted at Paris to form the first volume of the extensive work published last year (1829) by Cuvier, on the Progress of the Physical Sciences from 1789 to 1827, in four volumes 8vo. This work, embracing a field of investigation as extensive as that traced in the first volume, is composed of the Reports annually delivered by M. Cuvier to the Academy of Sciences on the progress of the physical sciences during the preceding year. These reports, however, have not been printed as they were read by Cuvier at the meetings of the Institute. The parts relating to each branch of science have been carefully arranged under the respective departments, so as to exhibit a connected view of the progress of the various branches of Physical science for a period of twenty years from that at which the first volume terminates. The separate branches of science under which the interesting details of this work are arranged, are Physics, Chemistry, and Meteorology, Mineralogy and Geology, Botany, and Vegetable Physiology, Anatomy, Physiology, and Zoology, Medicine, and Surgery. The general march of discovery in each of these departments of physical investigation is traced with equal learning and impartiality. And while the whole

whole work exhibits a faithful and connected outline of the successive improvements introduced into these sciences during the last forty years, it presents a luminous and comprehensive view of the present state of physical science in Europe.

A period of twenty years had elapsed from the publication of the *Tableau Elementaire* to the appearance of the first edition of the *Règne Animal* in 1817, during which the study of comparative anatomy and zoology had been cultivated with increased ardour in every part of Europe, and our knowledge of the organization and species of the animal kingdom had been almost doubled. This rapid advancement was principally due to the continued and well-directed exertions of M. Cuvier, to the eloquence and genius of his writings, to the importance, originality, and attractive nature of his views, and to the greatly increased opportunities afforded him by his situation in the Garden of Plants. From the comprehensive nature of the *Règne Animal*, embracing equally the structure and history of all the existing and extinct races of animals, this work may be viewed as an epitome of M. Cuvier's zoological labours; and it presents the best outline, which exists in any language, of the present state of zoology and comparative anatomy. The work is in four volumes octavo, with fifteen plates, and treats of the organization and characters of all the divisions, classes, orders, and genera of the animal kingdom, from man to the lowest of the infusoria. The third volume, treating of the three principal classes of articulated animals, was entirely composed by M. Latreille, and the concurrent testimony of all the naturalists of Europe in favour of his views, have afforded M. Cuvier a convincing proof of the correctness of his choice, in selecting that profound entomologist to conduct this important part of the work. In the new edition of the *Règne Animal*, four volumes of which have been already published during the last year, the part intrusted to Latreille has extended to two volumes, thus augmenting the work by at least an entire volume. The concluding volume of this new edition, comprehending all the classes of molluscous and radiated animals, is looked for with equal anxiety by all naturalists. Notwithstanding the lapse of twelve years between these two editions, the general plan of the work and the distribution of the animal kingdom are so nearly the same in both, as not to require a separate examination in this place.

The four great divisions of the animal kingdom pointed out more than thirty years ago in the *Tableau Elementaire*, have been adopted in both editions of the *Règne Animal*, and established by more extended details, and by characters more precise

cise and correct. These four divisions are termed vertebrata, mollusca, articulata, and radiata; and each of them comprehends several classes. They are founded on extensive and accurate analogies, and have been sanctioned by long and general adoption; but they convey no idea of any uniform principle of classification applied to the whole animal kingdom. The first division is founded on the presence of the vertebral column, a part of the organization of comparatively little importance in the economy; the second division is founded on the general softness of the body when deprived of its skeleton, a character which becomes more and more appropriate to the classes of animals as we recede from the mollusca towards the infusoria; the third is founded on the divisions or articulations of the skeleton, which are merely the result of its covering the surface of these animals, and have no important influence on the rest of the organization; and the fourth is established on a peculiarity in the external form of the body almost limited to the echinodermata, and not applicable to the entozoa, zoophyta, and infusoria, which constitute by much the greatest portion of this division. We cannot help thinking that the science of comparative anatomy is now so far advanced, as to afford the means of distributing the animal kingdom on some more uniform and philosophical principles,—as on the modifications of those systems or functions which are most general in the animal economy. The characters for such a philosophical distribution might be looked for in the modifications of the generative system, or the digestive, or the nervous system; and, indeed, attempts have already been made, both in Germany and in this country, to found the divisions of the animal kingdom on the simple modifications presented by the nervous system. It is greatly to be regretted that, with his vast resources for the improvement of this part of our nomenclature and arrangement, he has overlooked these minutiae of zoological distribution and remained fettered by his earliest views of classification. Had he taken the same liberties with his own classifications in every successive publication, which he took with those of Linnæus when he attacked and reformed them thirty-five years ago, the present room for improvement in all this part of the science could not have existed.

The first great division of the animal kingdom, M. Cuvier has divided, as is usually done, into four classes: *viz.* mammalia, aves, reptilia, pisces. The term amphibia, employed by Linnæus, Blumenbach, and many other naturalists, for the four-footed reptiles, is used by Cuvier for a small group of aquatic mammalia, comprehending the seal and the walrus. In
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the first edition of the *Règne Animal* (1817), the class *mammalia* is divided into eight orders, *bimana*, *quadrumana*, *sarcophaga*, *rodentia*, *edentata*, *pachydermata*, *ruminantia*, and *cetacea*. In the great order *sarcophaga*, the bat and the walrus, the lion and the mole, the kangaroo and the hedgehog, are all placed under the same division, from having claws and three kinds of teeth. The marsupial quadrupeds, in the new edition of the work, are removed from this singular group to form a separate order; but the other discordant families are still left together in the same order, although Blumenbach and others had already separated the *cheiroptera* to form a division equal in importance to that of the *quadrumana*. The class of birds is divided in both editions of the *Règne Animal* into six orders, nearly analogous to the six orders of Linnæus, *accipitres*, *passeres*, *scansores*, *gallinæ*, *grallæ*, *palmipedes*. The division of reptiles into four orders, *chelonias*, *sauria*, *ophidia*, and *batrachia*, proposed by M. Brogniart, is adopted in both editions of M. Cuvier's work, as it was in the *Tables of Classification of the Leçons d'Anatomie Comparée* in 1800. In the former edition the class of fishes was divided into eight orders, commencing with the cartilaginous, and terminating with the osseous fishes. The same eight orders are preserved in the new edition, but their arrangement is there reversed; the cartilaginous fishes which approach nearest to the mollusca, in their general characters, being placed at the bottom of the class; and this new arrangement is the same with that adopted in the great work on this class of animals publishing by M. Cuvier and M. Valenciennes. In the subdivisions of the orders, and in the distribution of the genera, many important improvements are introduced. The *acanthopterygious* fishes now stand at the head of the class, to which succeed the *malacopterygii abdominales*, *malacopterygii pectorales*, *malacopterygii apodes*, *lophobranchii*, *plectognathi*, *chondropterygii branchiis apertis*, and *chondropterygii branchiis tectis*. It is in the cartilaginous fishes belonging to the last of these orders that we find the simplest organization, and the most imperfect form of the skeleton met with in all the vertebrate animals; and hence they form a natural link of connexion between the true osseous fishes and the cephalopodous mollusca.

The volumes of the *Règne Animal* which treat of the articulated division of the animal kingdom being the entire production of Latreille, do not come properly within this notice of the scientific labours of M. Cuvier; and the volume of the new edition, containing the account of the great divisions, mollusca and radiata, not being yet published, we have to

ascertain the views of M. Cuvier regarding the lowest classes of animals from the former edition of this work. The first of his divisions of invertebrate animals is divided into six classes, the most perfect of which, comprehending those mollusca most nearly allied to fishes, is termed cephalopoda. These, and the pteropoda, which compose the second class, move to and fro in the sea freely by means of membranous expansions like fins. The third class, termed gasteropoda, creep on a muscular disc or foot, placed under the belly. Those mollusca which have no distinct head, and have the mouth concealed under the mantle, as the inhabitants of bivalve shells and the tunicated animals, form the fourth class, called acephala. The animals of the fifth class resemble those of the preceding, in being enveloped in a mantle; but the mouth placed on the fore part is surrounded with long fleshy and ciliated arms, which they can extend at pleasure to seize objects: these are called brachiopoda. The last class of this great division is termed cirrhopoda, and comprehends a remarkable tribe of animals, the details of whose organization connect them much more closely with the articulated animals than with the mollusca, particularly in their possessing a double longitudinal, knotted nervous cord, and numerous articulated members. In the third great division of the animal kingdom, termed articulata, M. Cuvier has carefully drawn up, from his own observations, the account of the first class, called annelida, one of the most remarkable of the invertebrate divisions, in the animals belonging to it possessing a circulating fluid of a red colour like the blood of vertebrate animals. This small but anomalous class, was first established by M. Cuvier, in a Memoir read to the Institute of France in December, 1801, and has since been almost universally adopted. He has divided these animals into three orders, founded on characters taken from the respiratory organs. The first order, termed tubicola, have the branchiæ, in the form of small tufts, placed on the anterior part of the body, and almost all reside in tubes, like the *serpula* and *sabella*. The dorsibranchia, which form the second order, have the branchiæ in form of ramified branches, or of plates situated on the middle, or along the sides of the body, as the common sand-worm of our coasts: these animals generally reside in soft mud, or swim freely in the sea. The last order is termed abbranchia, from the animals belonging to it exhibiting no apparent branchiæ, and appearing to respire by means of the whole soft surface of their body, as the common earth-worm. In placing this class of animals at the head of the articulata, M. Cuvier has probably been more guided by the convenience

convenience of publication, than by the consideration of their structure, as none of them possess an organization so complicated as that of the succeeding classes of articulated animals, described in the third volume of this work by Latreille, particularly of the class crustacea.

The great varieties of form and organization presented by the lowest classes of the animal kingdom, render it much more difficult to devise principles for their classification, than for the higher orders, and it is in their divisions and arrangement that we find the greatest discordance among naturalists. M. Cuvier's fourth great division of the animal kingdom, termed radiata or zoophyta, comprehends the echinodermata, entozoa, acalaphæ, zoophyta or polypi, and infusoria, which form the five classes of this division. In the *Tableau Elementaire* the absence of the nervous system is given as a principal character of this great division, and in the *Règne Animal* he mentions, that when the nervous system is discernible, it is disposed in a radiated form. The nerves which have been discovered in the echinodermata and acalaphæ have, however, rather a circular form, and embrace the digestive sac, and in the intestinal worms the nerves form simple longitudinal filaments. Separate sexes have been ascribed by several writers to the entozoa; but when M. Cuvier states that most of the other zoophytes are hermaphrodite and oviparous, we consider his proposition as inconsistent with the best ascertained facts, which tend to show that they are entirely destitute of sex, and are either gemmiparous or fissiparous. The echinodermata, comprehending the arterias, echinus, and similar animals, are adopted from Bruguiere, who gave them that name from the spines which usually cover their surface. To this class Cuvier has added the holothuriæ which have no superficial spines, but have an internal structure similar to the other echinodermata. The intestinal worms, which form the second class of the radiated animals, Cuvier supposes to originate solely from previously existing parents by the mode of generation usual in the higher classes; while Lamarck, Meckel, and many other naturalists, believe that they may sometimes originate from the materials of the animals in which they are found. He conceives that, from the smallness of their germs, they may enter by the narrowest avenues of the body, and even be communicated to the embryos of animals before their birth. In the distribution of the entozoa, Cuvier has chiefly followed Rudolphi. The acalaphæ are divided into two orders; those which have the body fixed like the actinia, and those which have it free like the medusæ. The polypi or true zoophytes are likewise divided into two orders; those which have the
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body naked as the hydra, and those which are provided with an axis or polyparium as the gorgonia and madrepora. The pedicellariæ, placed in the first order, appear to us to be organs of the echinus present in every individual. The property ascribed to the pennatulæ in the second order, of swimming freely by means of their contractions, and by the combined action of their polypi, is contradicted by the recent observations of Dr. Grant on these animals, and by the analogy of all the other known species of this class. The fifth class of radiated animals, and the lowest in the animal kingdom, termed infusoria, M. Cuvier has not attempted to define by their structure or form, but by their smallness; and consequently this class comprehends beings of very different organization. The first order is called rotifera, and comprehends those which have an oval gelatinous body, with a mouth, a stomach, an intestine, and an anus situate near the mouth. The genera supposed to have this complicated structure are the furcularia, tubicolaria, and brachionus. The second and only other order of the infusoria is termed homogœna, and comprehends all those animalcules which have no internal viscera, nor other organs, and often present no appearance of a mouth. Some of these have visible external cilia, as the urceolaria, tricoda, kerona, and some others, and a second group present no external organs excepting sometimes a tail, as the cercaria, vibrio, enchelis, proteus, volvox and monas.

The whole of the divisions, and the general distribution of the animal kingdom established by M. Cuvier in this work, are founded on a more extensive and minute survey of the organization than had ever before been taken, and many of the most important distinctions among the orders and families are the result of his own researches. Where his divisions have not been adopted, the valuable and original anatomical observations contained in every part of the work have served as the bases of the new divisions proposed, and of almost all the improvements of zoological arrangement which have been introduced since the first appearance of the work. This truly useful and classical work is justly adopted as a standard of reference by the naturalists of every country, and the greater part of it has already been ably translated into our language in a form suited to the importance of the great original.

The class of fishes, the most numerous of all the vertebrate division, presents the greatest difficulties to the zoologist in attempting to discover principles for their classification, from the general sameness of their form and structure, and from the few external parts which they present capable of affording characters

racters for their distribution. This interesting class of animals has long occupied the particular attention of M. Cuvier ; and in the first edition of the *Règne Animal*, he considered his account of that class as the most important of all his contributions to the natural history of vertebrate animals. Since the publication of that work, in which Cuvier reformed almost the whole of the families and genera of fishes, immense accessions have been made to the ichthyological part of the Paris Museum, by travellers and navigators in all parts of the globe, and many valuable contributions have been added to ichthyology by the writings of naturalists in different countries. When M. Cuvier first left his native country, in 1788, and resided with a French family, in a pleasant retreat on the coast of Normandy, he dissected, described, and drew almost all the fishes met with on the coast of La Manche*. While engaged in organising the Royal College of Marseilles, in 1803, he occupied his leisure hours in examining the ichthyology of that part of the Mediterranean ; and when engaged many years afterwards on a similar mission in the Italian States, he continued his ichthyological inquiries at Genoa and other parts of the coast of Italy. It is chiefly, however, from the vast ichthyological treasures of the Natural History Museum of Paris, accumulated for more than half a century, from every part of the globe, and which have been liberally submitted to his examination, that M. Cuvier has derived the materials of the present work. When M. Cuvier and M. Valenciennes first undertook to publish a complete history of that class of animals, it was calculated that the work would extend to about twenty volumes octavo, and would embrace the history of five thousand species. We have now the best information for stating, that by the almost daily increase of their materials since the commencement of their vast undertaking, these distinguished naturalists are now in possession of more than six thousand distinct species of fishes. Although the account of the class of fishes in the new edition of the *Règne Animal* presents an outline of the classification adopted in the great work on the natural history of these animals, it must be considered as affording a very imperfect list of the genera and families, which will necessarily be greatly increased and often changed as the work proceeds. Four volumes of this work are already published, containing ninety-nine plates, and the plates of the fifth volume are considerably advanced. Although the work is the joint production of the two authors, the parts contributed by each are regularly pointed out in the list of the species contained in each volume.

* The Department so named.

The first volume contains the fullest account of the progress of ichthyology from the earliest period to the present times, which has yet appeared, and interesting biographical notices of all the authors mentioned are given in the form of notes. The rich and vast library of M. Cuvier, which occupies a long suite of apartments, could alone furnish the materials of this elaborate history. For several centuries before Aristotle, ichthyology, and other branches of natural history, consisted only of a series of detached observations, which scarcely merited the name of a science. The knowledge of this branch, collected by Aristotle, was still very limited, and but little applicable to the distinction of species; and succeeding naturalists continued to copy him, and comment on his writings, till about the middle of the sixteenth century, when Rondeletius, Belon, and Salviani precisely at the same time recommenced the study of Nature, and laid the foundation of ichthyology, by giving accurate descriptions and figures of several well-determined species of fishes. Willoughby and Ray, however, were the first to attempt to classify the species, on scientific principles, derived from their organization; a task afterwards accomplished by Artedi and Linnæus, by giving precise limits to the genera, and placing under them species well ascertained and accurately characterized. After a concise account of the knowledge possessed by the Egyptians, the Phœnicians, and the Carthaginians, regarding this class of animals, Cuvier gives a minute account of the opinions of Aristotle and other Greek writers respecting them, and of the various Roman poets, historians, and naturalists who have spoken of these animals. The writers of the middle age, and after the revival of letters, are examined with the same minuteness; and the contributions of the ichthyologists of the sixteenth and seventeenth centuries, from Belon to Blasius and Valentin, are faithfully recorded. The writers on the anatomy of fishes, from Fabricius to Swammerdam and our countryman Collins, are next examined; and the works of ichthyologists, from Jonston and Willoughby to Pallas and Pennant, are reviewed with the same minuteness. The accessions made to our knowledge of this class of animals, by travellers and navigators, from Commerson and Sonnerat to the latest voyages of discovery, and all the important facts regarding the structure of fishes discovered by anatomists during the last and the present century, as well as the views of naturalists in almost every country of Europe regarding their classification, are carefully collected and recorded with strict impartiality, in the elaborate historical sketch which occupies the half of the first volume.

The introductory observations on the nature, the economical
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uses, and the general characters of fishes, are drawn up with M. Cuvier's usual taste and elegance, and are peculiarly calculated to engage the attention and excite the interest of the reader in commencing the study of these animals. After a short account of the general structure and chemical composition of the skeleton of fishes, the author enters at great length into the particular anatomy and physiology of every part of the body, illustrating all the details by the anatomy of the perch, which is minutely and beautifully represented in eight folio engravings. In the view of the distribution of the class of fishes, with which the first volume terminates, they are divided into osseous and cartilaginous. The osseous fishes are divided into those which have the branchiæ of a pectinated form, or in plates; and those which have them in form of tufts, as the hippocampus. The osseous fishes, with pectinated branchiæ, are divided, in the same binary mode, into those which have the upper jaw free, and those which have the same part fixed. Those with the upper jaw free are the acanthopterygious and malacopterygious divisions, and those with the jaw fixed form an order, which is thence called plectognathi. The great division of cartilaginous fishes is divided into three families,—sturionii, plagiostomi, and cyclostomi. From the extreme difficulty of establishing well-marked subdivisions throughout the class, M. Cuvier has here principally relied on the more convenient divisions of families, of which he has enumerated twenty-eight as calculated to contain all the known genera and species of fishes. Although the division of this class into orders well marked, proportionate, and convenient, is very far from being yet attained, the anatomical details of M. Cuvier regarding this class, which occupy the latter half of the first volume, may be considered as the most important step which has ever been made towards attaining that object, as they form the best contribution which has yet been made to this branch of Comparative Anatomy.

The cartilaginous fishes form a very distinct and convenient division of the class, presenting obvious characters, and comprehending only about a tenth part of the known species; but the division of the rest of the class into two parts, founded on the structure of the fins, which are soft and supported by branched and articulated rays in the malacopterygii, and are stiff and in part supported by undivided sharp osseous spines in the acanthopterygii, is too general to serve for their distribution into orders. M. Cuvier, impressed with the great importance and value of these characters of Artedi, and disregarding all the attempts made by Ray, Linnæus, Gouan, Pennant, Lacepede, Dumeril,

Dumeril, Risso, Goldfuss, and other naturalists, to establish inferior divisions founded on the general form of the body, on the position or absence of fins, or on the absence or nature of the operculum, has, throughout the volumes already published, entirely overlooked the usual method of zoologists, of distributing all the genera into appropriate and well-defined orders, and has only attempted to subdivide the great primary divisions of the class into numerous natural families.

The acanthopterygious fishes, which compose nearly three fourths of the known species, are divided into numerous subordinate groups, formerly regarded as genera, so intimately related to each other, and connected by transitions so imperceptible, that the whole may be regarded as an immense natural family, which cannot at present be disunited without losing sight of their most important relations. These subordinate groups are the natural families which Cuvier has preserved, assigning to each more definite characters, and preserving for it the name by which its principal genus is designated. The second and third volumes are occupied with the history of the great family of perches, which are taken first of all the acanthopterygious families, from the facility of obtaining these fishes, and their immense abundance in all parts of Europe. The common perch (*perca fluviatilis*, *Lin.*), one of the most beautiful and useful of all our fresh-water fishes, is taken as the type of this great family, and those species which have the closest resemblance to it are described in succession, and at considerable length. The species of fifty other genera of this family are described in these volumes in the same detailed and scientific manner, and one or more species of each of the genera are illustrated by accurate and elegantly finished octavo engravings, in praise of which it is sufficient to state that they are from the pencil of Werner, well known to Europe for his accurate delineations in every branch of zoology. The fourth volume, the last which has appeared, comprehends the description of twenty-two genera, embracing all the species belonging to the second great family of acanthopterygious fishes. This family comprehends the fishes most nearly allied to that of the perches, and is distinguished by having the side of the head armed, by the suborbital plates covering a greater or less portion of the cheek, and articulating with the preoperculum. It is divided into two distinct groups easily recognised; the first having no free spinous rays in front of the dorsal fin, and the second having only free spines in place of a first dorsal fin. The first, and most numerous of these groups is subdivided into those which have two dorsal fins, of which there are ten genera, commencing with the *Trigla*
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of Linnæus and Lacepede, and terminating with the *Platycephalus* of Bloch, and those which have only a single dorsal fin, of which there are nine genera. The second group of this family, or those with free spines instead of the first dorsal fin, comprehends the *monocentris* of Bloch, the *gasterosteus* of Linnæus, and Cuvier's remarkable new genus, the little tuberculated *oreosoma* of the Atlantic, only an inch and a half in length, which forms the lowest limit of this family, from its suborbital plates forming only a narrow arch on the side of the cheek, and uniting with the preoperculum only at the upper part. From the minute and satisfactory details which are given of all the external characters, the history, the distribution, and the synonymes of the species, and of the internal structure of those which have been dissected, from the accuracy, the number, and the elegance of the engravings, and from the vast and daily increasing resources of these naturalists, we anticipate, in the completion of this great work, a new and brilliant æra in the history of Ichthyology.

Arrived at the term of threescore years, crowned with every distinction which genius and learning could obtain, oppressed with the duties of his elevated and important rank in the state, and exhausted with half a century of continued and varied research, it might be expected that so vast an undertaking as the examination and description of six thousand species of almost unknown animals, would be more than sufficient to engage every unoccupied minute of his life: yet, besides the concluding part of the new edition of the *Règne Animal*, embracing more than half of the classes of the animal kingdom, which is now preparing for publication, M. Cuvier is at this instant actively engaged in arranging and preparing his vast materials for a new edition of his early and celebrated work on *Comparative Anatomy*. The immense improvements introduced into every part of the science within these thirty years, while they imperiously call for a new edition of the only complete treatise on the subject, will render it a herculean labour to bring that extensive work up to the present state of the science. And he even now contemplates the commencement of a vast undertaking greater than all he has yet achieved, an undertaking alluded to in all his publications, the chief study of his life, and the constant idol of his thoughts for thirty years,—a complete system of *Comparative Anatomy*, embracing a detailed account of all that is known of the organization of the animal kingdom, and illustrated in every part with accurate zootomical engravings taken from nature. For this undertaking M. Cuvier has prepared an immense series of drawings and engravings,

engravings, and for this he has formed the Museum of Comparative Anatomy, which now far surpasses every thing of the kind in existence.

But these achievements, vast as they may appear to us, must be looked upon as only the pastime of his leisure hours, when we reflect on his numerous and important public duties connected with the administration of the state. Indeed his zoological career is one to which he was driven by the troubles of 1788, which separated his country from Germany, bereaved him of his patrons, blasted his political prospects for which he had prepared himself at the University of Stutgard, and caused him to seek employment in a foreign country: so that in resuming his political career, and partaking in the administration of France, instead of that of Wirtemberg, he has only followed his original destination, and has now become the Counsellor of State of a great monarch in place of being that of a petty prince. Notwithstanding the succession of rulers, the changes of ministry, and the frequent perturbations of France, Cuvier's political progress has been as sure and regular as his march in science. The catastrophe at Paris in 1814, happened at the moment when Cuvier was about to be named Counsellor of State by the emperor; but that event only caused a delay of a few months, for Louis XVIII. conferred that dignity upon him in the month of September of the same year. M. Royer Collard, and M. Becquey, with whom Cuvier had been long intimate, assisted in this preferment by making him known to the Abbé de Montesquiou. It was also by the influence of Collard and Montesquiou that he was retained in 1815 as Member of the Commission of Public Instruction, which was substituted for the Council of the University, and was charged with the functions of chancellor of that body, an honourable distinction which he still retains. Since that period he has had a great share in the administration, not in mere political schemes, with which Cuvier has always declined interfering, but in many of the projects of law, and in the whole administration of the interior in so far as it depends on the Committee of the Interior, of the Council of State, and he has almost always been Commissary of the king before the Chambers for the defence of projects of law. M. Cuvier occupies the second place in the University of France, and not being a Catholic he could not reasonably aspire to the first. Besides his functions of Chancellor of the University, he is charged with the direction of the Faculties. Only during the famous hundred days was Cuvier separated from the Council of State, but even then he retained, unmolested, his important situations connected with public instruction. When

When on a scientific visit to England in 1818, he received the gratifying intelligence of his election as one of the Forty of the French Academy, a title reserved to reward only extraordinary merit, and the highest distinction which science can obtain in France or in Europe. At the close of the same year the Ministry of the Interior was proposed to M. Cuvier, but the conditions under which he would have accepted it could not be realized. In the beginning of 1819, however, he was named President of the Committee of the Interior, of the Council of State; and notwithstanding the changes of ministry, M. Cuvier has still preserved that place, because, however important in itself, it is unconnected with political intrigues, and requires only method, a constant activity, a rigid discharge of duty, and a thorough acquaintance with the laws and the principles of administration. During the same year, Louis XVIII. spontaneously granted him the title of Baron, for an act of loyalty with which he was personally touched. Cuvier has been several times called to the cabinet Councils, and was officially present as one of the Presidents of the Council of State at the coronation of Charles X. In 1824, he received from the King of France the decoration of Grand Officer of the Legion of Honour, and in 1826, the King of Wirtemberg, his former sovereign and his early protector, testified his kind regard for M. Cuvier, and his high estimation of his merits, by conferring upon him, of his own accord, the title of Commander of his Order of the Crown. When a Catholic Bishop was appointed chief of the University in 1822, Cuvier received, in an independent form, the functions of Grand Master, with regard to the faculties of Protestant Theology, and he still retains them, although, since 1827, the Grand Masters have been laymen. And what gives M. Cuvier a preponderant influence in the nomination of the Protestant clergy, and in all that relates to the administration of the Protestant churches and synagogues in France, is his being entrusted, since 1827, with the direction, in the ministry of the interior, of all the ecclesiastical affairs not belonging to the Catholic church.

Such has been the political and scientific career of this distinguished foreigner; and such are the writings he has bequeathed to posterity,—a career of usefulness worthy of imitation, as his writings are deserving of the attentive study of all who follow in the same track of science. Notwithstanding the scientific achievements of this great man, which we have attempted briefly to enumerate, no man by his comportment appears to have achieved less. With wealth, influence, learning and fame, M. Cuvier's easy and unaffected manners command

mand the love and esteem of all who have the honour to enjoy his acquaintance. With a robust natural constitution, and method in all his undertakings, he achieves without exertion what would surpass the powers of ordinary men. Guided in his arduous career by no other motive than the love of knowledge and the desire to benefit his race, his labours for science merit the gratitude, and will command the admiration of all posterity.