BUFFON,

THE PHYSIOCRATS

AND THE RULE OF NATURE

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by

CATHERINE MARY CLEGG ROWLES, B.A.

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AUTHOR: Catherine Mary Clegg Rowles, B.A. (McMaster).

SUPERVISOR: Dr. G. J. Grinnell.

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ABSTRACT

An examination of Buffon's theories of natural history and Physiocratic doctrines, which treats them as products of the same socio-economic pressures; that is, as responses to the pressures created by the material requirements of the French war-machine and by the necessity of reconciling aristocratic and bourgeois ethical systems. Includes a study of the use of Newtonian ideas to undermine the social, economic and moral foundations of the Ancien Regime and to justify man's domination of nature.

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INTRODUCTION

A revolutionary solution was attempted at the end of the eighteenth century to resolve the problems of the Ancien Regime. This requires no demonstration, but what I will be suggesting through this study of Buffon's theories of natural history, and the physiocratic doctrines, is that the solution was proposed earlier than 1789. The greatest revolution was accomplished first in the minds of men and only later in the political arena.

It is necessary to understand the problem; namely that France had to guarantee prosperity and security to a population which had increased in numbers over the century from approximately 19 million to approximately 25 million. What is meant by France is the men and women who through possession of either political authority, economic power, social pre-eminence or intellect, felt a responsibility to guarantee these things to the rest of their society. Consequently, the solution could be proposed not only by legislators and administrators, but by poets, economists and scientists.

In the eighteenth century, the country was fundamentally agricultural, and public administration, including military expenditure, was financed through the efforts of a large,

rural population, but the country was still not secure from agricultural and economic disasters which threatened population, natural resources, agricultural productivity and consequently the production of revenues for the State. Any reductions in materials or revenues reduced the effectiveness of the administration and compromised the ability of the nation to sustain military expenses in a period when France was surrounded by aggressive rivals. Military expansion, particularly naval expansion, also depended upon material resources, for which the Ministry of Marine had to compete against the requirements of new industries, crafts, and the domestic needs of a growing population. The increased demand for forest products inevitably led to over-cutting with the result that the quality of wood required in construction deteriorated. Moreover, there are indications that the effects of over-consumption became noticeable just when the delayed effects of the "grand hyver" of 1709 were manifesting themselves in trees attaining an eccentric maturity.

Although, from the distance of the twentieth century, it is possible to see that the climate was becoming more benevolent, agricultural productivity was increasing, and prices were gradually rising, these improvements were not so obvious at the time. There was no guarantee that periodic crises would not continue to be restricted and regional in

their effects. Particular disasters, especially the one in 1748-49, resembled earlier devastations in the pattern of chain reactions they initiated. There was no guarantee that future crises would not completely destroy the material and human resources on which the State relied, the way they had done forty years before.

The solution proposed, in one form or another, was rational exploitation and distribution of resources as opposed to customary exploitation and distribution, and it can be found in works as apparently disparate as the Histoire Naturelle and the Tableau Oeconomique. This solution does not sound too revolutionary in the abstract, but an examination of specific applications, such as those outlined in the physiocratic programme, shows that the implications are immense for their programme challenged not only the traditional arrangements of the society, but the philosophy or concept of order in the universe on which they were based.

The physiocratic doctrines challenged the idea that order was imposed upon Creation by the operation of authority filtering through an absolutely fixed hierarchy. Instead they envisioned an order that was self-manifesting, arising out of the interaction of materials according to forces which operated with equal strength everywhere. In economic and social terms, this meant that the regulation of the production and exchange of goods, the restricted access to

material resources and all those economic privileges which were legitimised by position in a social hierarchy, now appeared arbitrary and artificial. It was argued that regulation and privilege were not aspects of order, but that they actually fomented chaos and instability because they obstructed the establishment of economic relationships. Only when customary regulations and privileges were annihilated, when circulation was unfettered, and above all, when human industry was unrestricted, would the uniform operation of the market economy establish prosperity and security. To sustain harmony and regularity all that was required was rational human superintendance to prevent interruption or disturbance of the self-manifesting pattern.

The weapon used to accomplish this ideological revolution was Newtonian science. Granted, it was a Newtonianism which Newton himself would have abjured in some respects; still he would have recognised as his own the demonstration that Heaven and Earth were united by one law, and that the Universe was subject to forces like gravity which operated equitably and rationally. Books like Buffon's volumes on natural history became important, because they demonstrated that the physiocratic analysis of the economy was actually true to Nature. Buffon's examination of the formation of the Universe, the development of the Earth, and the growth and reproduction of animals and vegetables, showed how order

emerged on the inert and organic levels through the operation of inherent and universally active forces in nature, like gravity. There was no natural hierarchy in Buffon's universe; the substance of the Creation and all its fundamental processes were undifferentiated.

Buffon not only re-envisioned the natural order, he restated Man's relationship to Nature, by demonstrating that although order was self-manifesting it did not attain completion without rational superintendance. The Histoire Naturelle proved that superintendance of the natural order was a material necessity. Buffon provided Man with the authority to undertake the task by showing that a qualitative difference existed between human and animal natures, or between humanity and the rest of Creation. Thus both the physiocrats and Buffon over-emphasized Man's uniqueness and destroyed the tension in traditional Catholic Thomistic doctrine between the idea of Man's superiority to Creation and his subordination to Nature as a small part of an immense complex Whole. Man became the masterpiece of a Creation which existed for his benefit and his immediate ends superceded any transcendental purpose. Although the solution overturned traditional Catholicism it was not without its own moral content. Both Buffon and the physiocrats made education or moral awareness the only safeguard against the tyranny of utility. Quesnay consciously

emulated Confucius, and Buffon had before him the example of Solomon. Nevertheless, the exaggeration of Man's significance in the Universe removed the need to integrate human needs and the delicate balance of Creation -- particularly after Buffon demonstrated that not every part in Nature was necessary to the operation of the whole. Man became morally free to manipulate nature for his immediate satisfaction, regardless of other consequences.

This solution has had important consequences for us, but for the eighteenth century it amounted to the release of human action from the restrictions of traditional economic, social, and moral arrangements. Men were freed from the communal agricultural practices, from paternal provisioning policies which hampered the marketing of grain, from the confusion of tolls and duties which obstructed trade, from the innumerable dues, rents and impôts which drained revenue away from re-investment in agricultural production, and from the assortment of ordinances which restricted the utilisation and improvement of natural resources like forests. All these archaic restrictions could be evaluated, and retained or abandoned on the basis of their advantageousness or disadvantageousness to men.

It was because of this freedom that an individual was now obliged to exercise Reason to comprehend and utilise the natural order. The procedure for acquiring the necessary

knowledge of the Universe was also provided by Newtonian thinkers. They perpetuated the belief that Creation was quantifiable and that statistical analysis would yield the understanding which was the basis of control. The popularity of this solution can be judged from the sale of Buffon's works and from the infiltration of liberal economic ideas into the administration. Legislation freed production from restrictive communal practices by encouraging the expropriation of communal lands and their transformation into "productive" cereal fields. Even the King began to speak Quesnay's language, perhaps because he saw in this concept of order a way to finally defeat an aristocracy he found troublesome and presumptuous. A host of administrators emerged during the century and busied themselves gathering statistics on imports, exports, harvests, births, deaths and prices, presumably because they believed that human existence, like all Creation was quantifiable and that material prosperity and security could be controlled and guaranteed if life was measured, weighed and reduced to numerical units. Numbers could be manipulated with regard only to the most useful combination, instead of regard to customary order.

It is not difficult to demonstrate from the works of the physiocrats that their doctrine originated in a concern for national security and French military supremacy as well

as social order. This concern is less explicit in Buffon's writings, but it is evident in his professional career, in his continuous association with the Ministry of Marine, and in his involvement with projects which contributed directly or indirectly to military technology. Neither his doctrines, nor those of the physiocrats, were simply the result of professional affiliations, and they are not completely explicable in terms of the specific intellectual traditions in which they were formulated. The physiocratic doctrines can be interpreted as attempts to demonstrate the validity, or indeed the necessity, of adopting a specific ethic. Similarly, Buffon's theories of Nature legitimised this ethic by showing that it was within the natural order of things. After all, the rational administration of human existence was a particularly bourgeois idea.

Still their works were not merely attempts to substitute one ethic for another. The physiocrats and Buffon were struggling to evolve doctrines which would reconcile a new system of values to an older one, to balance utilitarianism or rational exploitation with self-sacrifice and disinterested social responsibility. Some historians have identified this struggle between two ethics as one of the fundamental tensions within French society at the end of the Ancien Regime. The struggle can be identified in the attempt of Mirabeau, a conservative aristocrat, to find a common ground with

Quesnay, the son of "laboureurs". It can also be identified in George Leclerc, the heir of a tax gatherer, and belatedly the Comte de Buffon, who struggled to reconcile in his works as well as in his own life, the contradictory aspects of two sets of values which derived from two distinct social classes.

The first chapter of this thesis consists of an examination of Buffon in an effort to account for what appears to be a lifetime of deceit, manipulation, and ruthless self-aggrandisement. Unlike many scientists, Buffon's overwhelming personality intrudes into his work and few accounts of his theories succeed in divorcing the science completely from the man. Before attempting to understand the science, then, it seems necessary to come to some understanding of the man, whose activity outraged his contemporaries and has dismayed later commentators. The biographical account constitutes an effort to explain his public and private actions in terms of pressures created by his ambiguous social position.

The second chapter draws on existing scholarship to present an account of economic conditions accompanying the promotion of the bourgeoisie. It suggests that the endeavour to reconcile two contradictory systems of values was not restricted to the personal level but was attempted on the intellectual level in the eighteenth century. The

chapter includes an analysis of the physiocratic doctrines to demonstrate that the authors found "bourgeois" values particularly serviceable in formulating an economic solution.

The third chapter examines Buffon's theories of natural history to demonstrate how his works legitimised Quesnay's analysis of the functioning of a market economy, and physiocratic proposals concerning the role of government. I have attempted to show the influence of Newtonian science on Buffon's work but also to point out the fundamental philosophical difference between the two scientists -- a difference which probably accounts for Buffon's specific distortions of Newton's ideas.

In the final chapter, Buffon's work is compared directly with that of the physiocrats to show that despite superficial differences, they are fundamentally similar in theory and intent. It will be demonstrated that Buffon's theories are characterized by the same ethical combination evident in the account of his personal life. Although there is a distinct class bias in Buffon's natural science, as well as in the physiocratic doctrines, their work does more than legitimize specific class ambitions.

Scientists or economists, like other artists, recognise in their personal dilemmas those things which are characteristic of their society, and in trying to find a personal solution they simultaneously attempt to reconcile the

divergences of the entire society. The solution which Mirabeau, Buffon, and Quesnay formulated in their works and lives testifies to the embourgeoisement of the aristocracy and society in eighteenth-century France. It also indicates that men recognized quite early in the century that the fundamental economic relationships between man and the environment, his use of natural resources, and the social relationships which depend upon these, had to be re-ordered if men, or at least Frenchmen, were to achieve permanent prosperity and security. The solution had been formulated by 1748 when Buffon put the finishing touches on the first volumes of the Histoire Naturelle and it was fully articulated by 1763 when Quesnay and Mirabeau published the Tableau Oeconomique.

T A B L E O F C O N T E N T S

SOURCE ABBREVIATIONS

C.G. -- Correspondances Generale de Buffon

O.C.B. -- Oeuvres Completes de Buffon

M.N.H.N. -- Le Museum Nationale d'Histoire Naturelle

H.E.S.F. -- L'Histoire Economique et Sociale de France

CHAPTER I

BUFFON, THE GRAND SEIGNEUR

OR

GEORGES LECLERC MEETS THE EIGHTEENTH CENTURY

After Buffon's death in 1788, when the Academie des Sciences lamented his passing, the official elegist, Condorcet, employed the opportunity to bury Buffon properly. In a long and apparently commendatory oration, he managed nonetheless to accuse Buffon of superficiality and to dismiss his theories as artistic but insubstantial. He also implied that Buffon was animated by an exaggerated personal ambition and thirst for public acclamation which determined not only his private behaviour and his public actions but his scientific endeavours as well.[1]

He suggested that Buffon first picked up Newtonian mathematics and then began investigations into applied physics, because he sensed these were fashionable and he hoped that public attention would be directed to his efforts. The translations of Newton and Hales, made ostensibly to improve his English, were published so that time spent on

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[1]Condorcet, "Eloge" in Oeuvres Complotes de Buffon (Paris, 1824) I:

this self-improvement would contribute to his struggle for public recognition.[2] Condorcet also suggested that Buffon's practical interests as a proprietor encouraged his researches particularly the work done on the physical properties of wood, and he implied that throughout Buffon's career, his private interests were suspiciously bound up with his official responsibilities.[3]

Condorcet's analysis may have been less than objective, but many of his insinuations were echoed in defensive passages written by other contemporaries, by subsequent panegyrists and even by Buffon himself, denying any opportunism or self-interest.[4] This would indicate that Condorcet's comments were not merely the venomous product of some personal resentment, but had some truth in them, or at least, that aspects of Buffon's career were compromising enough in appearance to require excuse.

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[2] Ibid., 1:viii.

[3] Ibid., 1:xliii.

[4] Madame de Blesseau, and Chevalier de Buffon emphasized his public-spiritedness in their "Memoirs" (see Correspondances Generale, ed.J.Lanessan. Reprint 1971) as did Lanessan, the editor of Buffon's letters. For one of Buffon's claims of disinterest, the reader may look at Lettre 1766 a de Brosses, where Buffon discusses the business transactions surrounding the acquisition of new buildings for the Jardin du Roi.

> "Les motifs de l'interet personnel n'ont aucune part ici et je ne me suis determine que pour donner un certain degre de consistance et d'utilite a un etablissement que j'ai forme."

Buffon died as the Comte de Buffon, Seigneur de Montbard, Marquis de Rougement, Viscomte de Quincy, Seigneur de la Maire, Les Marans, Les Berges et autres lieux, and he could claim membership in the Academie des Sciences, and academies at Dijon, Auxerre, Nancy and St.Petersburg, as well as in the Royal Society, the Institut de Bologne, the Arcades de Rome, the Societe d'Agriculture and L'Academie Francais.[5] He was born, however, simply, Georges Leclerc, the son of a petty tax official at Montbard, forty miles northwest of Dijon. The Buffon family were bourgeois in origin, and their gradual self-promotion followed what was a recognizable pattern in eighteenth-century France. The great-great-grandfather was only a surgeon, but the great-grandfather was a physician and the grandfather studied law, managing to purchase the position of juge-prevot. His son, that is Buffon's father, had also prepared for law, and had succeeded in attaining (purchasing?) a minor office in the administration of the gabelle.[6] In 1714, when Buffon was seven, the family progress was remarkably accelerated when they inherited the fortune of a maternal uncle who had prospered during his

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[5]S.Milliken and O.Fellows, Buffon (New York, 1972), p.56 lists academies and associations Buffon had memberships in. Information also provided by Chevalier de Buffon in his "Memoir", C.G., p.397. Buffon's titles are given in Milliken and Fellows book, p.16.

[6]L.Bertin, "Buffon; Hommes d'Affaires", Buffon (Le Museum Nationale d'Histoire Naturelle, Paris, 1952), p.88.

career as tax farmer for the King of Sicily.[7] With the sudden increase in wealth, Leclerc Sr. could purchase the position of conseiller in the Dijon Parlement, which would confer first degree nobility after twenty years in office. He also invested in property. For 13,000 livres he obtained the castellanship of Montbard, including lands, vineyards, and fishing rights and the lands of Buffon, a small village nearby. The family had outgrown their town house in Montbard so they left that sleepy village and moved into a prestigious hostel in Dijon, where they began rubbing shoulders with the noblesse de la robe who filled the provincial capital.[8]

Thibodeau remarked in the course of his memoirs, that "the two main careers open to the bourgeoisie were the Church and the Palais"[9] so it is not surprising to discover that Leclerc Sr. prepared two of his sons for the church, and groomed the other, George, for the magistracy. He was enrolled with the other sons of the Parlementarians in the local Jesuit College, and he passed his law exams in 1726. From the scant evidence concerning his early years, Buffon appears to have been self-preoccupied, and vaguely dissatisfied with the limited pleasures of the provincial capital and the

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[7] Ibid., p.92.

[8] S.Milliken and O.Fellows, Buffon, p.41.

[9] E.Barber, The Bourgeoisie In Eighteenth Century France (Princeton, 1955), p.24.

prospect of a future in the Parlement.[10] Comments by contemporaries suggest that his father received some criticism for allowing his son to spend his time aimlessly in abstract and profitless studies.

> Bien des gens accusèrent le père de foiblesse et se démandoient comment il pouvoient souffrir que son fils, à son age, s'amusait encore à faire des cercles. [11]

Buffon was now in his twenties, and while his school-mates Varenne, de Brosses, and Ruffey, had secured promising positions in the magistracy, Buffon was rambling around Europe in the entourage of the Duke of Kingston.[12] It is not quite accurate to picture him as the unappreciated intellectual. Many have suggested that he pursued his interest in mathematics while on tour, encouraged by the attentions of the Duke's tutor and chaperone, Hickman. The letters, however, suggest that in the string of cities on their itinerary, Buffon was pre-occupied with the things that preoccupy most young travellers -- the local sights,

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[10] Letters written before and during travels with Duke of Kingston contain expressions of dissatisfaction with Dijon and his disinclination to return. See Lettres 1729-1731, C.G., pp.4-8.

[11] Bernard (1804) quoted in L.Hanks, Buffon Avant L'Histoire Naturelle (Paris, 1966), p.19.

[12] de Brosses was appointed Conseiller in 1730. (C.G., p.16, note 2) Ruffey had received an appointment as Conseiller-Maitre des Comptes de Bourgognes and was congratulated by Buffon in a letter from Angiers, 1730, (C.G., p.8), and Varenne was already Conseiller D'Etats. (C.G., p.106, note 3)

the opposite sex, entertainments and intestinal illnesses.[13] Any studies seem to have been cursory, or at least intermittent. Condorcet, and historians after him,[14] claimed that in Italy amidst the stupendous scenery, Buffon determined to devote his life to an examination of the natural order. Other apocryphal stories designate a terrifying storm in Genoa harbour as his moment of epiphany and conversion to natural science. This is open to debate, especially given the ironic tone of much of Condorcet's éloge, but it is evident that some change or self-determination did occur during this trip. It was during this period that Georges began styling himself Leclerc de Buffon, and he later indicated in his writings, how important this stage of his life had been.[15] In the Histoire Naturelle, when he was attempting to introduce a moral or philosophical content into some life-expectancy tables, he stated that at twenty-five, man really begins to live morally, for his thoughts are then put in order and decisions about future life and necessary conduct are taken.[16] Presumably, like most intellectuals, Buffon was generalizing from personal experience. His determination appeared in 1732 when his mother died unex-

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[14] see R.Heim, Preface to Buffon (M.M.H.N.)

[15] Lettre VII from Rome (1732), C.G., p.12. Editor's note confirms that this is first occasion on which Leclerc added "de Buffon" to his signature.

[16] C.N.B., 13:224

pectedly and his father remarried. Buffon made financial claims upon the estate and was prepared to take court action to obtain his inheritance.[17] His father finally settled 80,000 livres upon him, and gave him the castellanship of Montbard. In addition, the village of Buffon, (which had been sold in 1729), was re-purchased and ceded to him, although the title was never a clear one. Forty years later, his father still refused to speak directly to him and would only communicate with his son through intermediaries.[18]

Having secured his patrimony, Buffon began massive re-constructions at Montbard, which were to occupy at least thirty years and provide steady employment for a large section of the local lobour force. He took over the hill-side adjoining his property, although it technically belonged to the Dukes of Burgundy, and he began demolishing their ruined mediaeval fortress that stood at the top. The Buffon family house was re-constructed as the new chateau while this old one was dismantled.

A score of labourers carted basketsful of earth up the slope to transform the hilltop into a plateau. This uppermost terrace contained a tower used by Buffon as a study, and there was a vast regular garden in which the

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[17] Lettre X a Ruffey (1733), C.G., p.19.

[18] S.Milliken and O.Fellows, Buffon, p.47.

author walked and meditated upon order in Nature.[19] Through the years the gardens were extended further as Buffon gradually acquired adjoining properties. He frequently paid double value for these lands, conscious of his obsession, but also certain that his business errors were a kind of public charity, since the owners of these properties were seldom well-to-do.[20]

In addition to his country residence, Buffon had established himself in Paris, and he began the seasonal migrations between the capital and the provinces which became the pattern of his life. In the same year that he came into his inheritance, his professional career got off to an amazing start. An unknown in Paris in 1733, he joined Duhamel de Monceau (a chemist and agronomist with an established reputation) as a collaborator in a number of silviculture experiments.[21] These had been requisitioned by the Minister of the Marine, Maurepas, who wanted to have information on the tensile strength of wood, the effect of frost and drought on the trees and the means by which wood could be strengthened.[22] During the same year, Buffon was admitted as adjoint-mécanicien to the Academie, where

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[19] Pere Ignace, "Memoir", C.C., p.23. H. de Sechelles, Voyage a Montbard, also quoted in C.C., p.24 and L. Bertin, "Buffon; Hommes d'Affaires", Buffon (MNHN), p.92.

[20] Pere Ignace, "Memoir", C.C., p.410

[21] L. Hanks, Buffon Avant L'Histoire Naturelle, p.142.

[22] Ibid., p.143

he and Duhamel subsequently presented their findings. Careful research by historians like L.Hanks, has shown that Buffon conducted himself throughout this association with a disconcerting aggressiveness.[23] Although Duhamel was ostensibly the senior partner, Buffon began to monopolise the reports and on one occasion at least Duhamel expressed public astonishment that Buffon was presenting as his own, material that was the result of their collaboration. Duhamel must have been even more astonished when he returned from overseas in 1739 to discover that the Intendant of the Jardin du Roi had died unexpectedly and that Buffon, just as unexpectedly, had been appointed his successor. Duhamel, who had been regarded as the logical candidate, was pacified with a position as inspector-general in the Navy.[24]

Condorcet's catty funeral remarks pointed to the anomaly that existed between Buffon's qualifications and his public offices. His reception into the Academie in the first place is puzzling for he had little to recommend him apart from his sustained interest in mathematics and his correspondence with Gabriel Cramer, the Genevan mathematician. He was not totally lacking in qualifications for the Intendancy. He had studied botany at Nancy for a short

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[23] Ibid., p.140.

[24] S.Hilliken and C.Fellows, Buffon, p.54

period after leaving Dijon,[25] and there were the silviculture experiments. Early in 1739 he had switched to the Botanical Section of the Academy and had been promoted to "_nombre-associe_" a month before the death of Dufay.[26] However, his dedication to Botany, and his comprehension of its principles is open to question. He himself later admitted,

> I am shortsighted. I have learnt botany three times over and forgotten it as many. Even if I had good eyes every step that I take would be fresh knowledge on that subject. 27

Although Condorcet's charges of opportunism were probably exaggerated, it is impossible not to conclude that Buffon profited as much from social connections and the good graces of people in influential positions, as he did from any formal training. The name Maurepas recurs continuously in Buffon's early career. It was Maurepas who had called for the silviculture experiments in the first place, and who suggested to Duhamel that Buffon be allowed to collaborate on them. It is suspected that Maurepas' manoeuvrings opened a place in the Academie, for which Buffon was marginally qualified,[28] but then Buffon's

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[25] _C.G._, p.3.

[26] S.Milliken and O.Fellows, _Buffon_, p.54.

[27] St.Beuve, _Portraits Of The Eighteenth Century: Historic and Literary_, trans. K.P.Wormeley (London,1964), 2:252.

[28] L.Hanks, _Buffon Avant L'Histoire Naturelle_, p.102.

candidacy also had the support of several of his friends from "down home", for example de Conde who was governor of the province, and du Chatelet, the wife of the Grand Bailli de Semur and Voltaire's companion.[29] Maurepas later engineered Buffon's promotion to Perpetual-Treasurer of the Academie,[30] and brought his influence to bear on the selection of the Intendant of the Jardin.[31] Their friendship was still beneficial for Buffon twenty years later, when in 1763 he acquired permission for himself and the other forge-masters in the area to undertake research at government expense, testing the manufacture of cannons. The research apparently resulted in a number of military and naval contracts.[32]

There are many examples in his professional life of Buffon's ability to combine scientific interests, public office and private profit, and examples of a single-mindedness that made him forgetful of other interests. He was able to first undertake research on trees because of his own extensive forests, however, he soon used his influence with Maurepas to gain access to the royal forests where he could try out his experiments at government expense.

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[29] F. Bourdier, "Principaux Aspects De La Vie et De L'Oeuvre De Buffon", Buffon (MNHN), p.22.

[30] Ibid., p.30.

[31] Lettre XX a M. Hellot (1739), C.G., p.41

[32] L. Bertin, "Buffon; Hommes D'Affaires", Buffon (MNHN), p.93 and F. Bourdier, "Principaux Aspects ...", Buffon (MNHN), p.42.

He secured exemptions from forestry laws, however, his imperious conduct involved him in a prolonged legal battle with the Maître des Forêts at Avalon,[33] who maintained a conservative regard for traditional legislation and was unimpressed by ministerial exemptions. In 1735, he used his influence with Condé to have a government pépinerie established on his property.[34] The Estates of Burgundy had established pépineries already in the area but Buffon went ahead and planted a suitable property near his estates then presented himself to Conde with the suggestion that a nursery also be established at Montbard. The enterprise, which had cost him 1,500 to establish was sold for 2,500 livres and he profited further from his appointment as a salaried administrator.[35] In 1740, when the King renewed recommendations to extend the cultivation of silk worms and the mulberry bushes upon which they thrive, Buffon recommended that the Etats show a spirit of co-operation and loyalty. A counsellor, and personal friend of Buffon was appointed to determine which lands in the vicinity were most suitable and chose lands near Montbard, recommending a purchase price of 3,700 livres.[36] These actions caused a good deal

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[33]Lanessan gives a lengthy account of the quarrel which resulted in legal processes stretching from 1738-1767. See C.G., p.177.

[34]L.Bertin, "Buffon; Hommes D'Affaires", Buffon (M.H.H.N.) p.95 and Lettre XII, C.G., p.22.

[35]S.Milliken and C.Fellows, Buffon, p.47.

[36]L.Bertin, "Buffon; Hommes D'Affaires, Buffon (M.H.H.N.) p.94

of local grumbling but opposition was over-ridden by the prestige and power of Conde who presided over the Estates in his capacity as Governor. He was even able to prevail upon the Estates to double the honorarium which Buffon received for his administrative duties at the nursery.[37]

Buffon was not simply a drawer of pensions. The enterprises he took in hand profited and expanded. By 1740 the pepiniere was producing 5,000 saplings annually, and the number increased over the next decade to ten thousand and then twenty thousand saplings.[38] At the Jardin du Roi too, he increased the collection and extended the functions of the institution immeasurably. When he assumed his position, the Jardin boasted little more than a garden of medicinal herbs and a collection of curios -- (dogfish, two-headed calves, disturbingly shaped fossils and the like.) Dufay had introduced some changes and the Jardin was beginning to assume more responsibility for public education in the natural sciences. However, it was really Buffon who transformed it into a public institution and a national symbol, which as Condorcet remarked, represented the enlightenment and power of the State.[39] Although in many ways he was simply continuing the work initiated by

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[37] Ibid., p.94

[38] F.Bourdier, "Principaux Aspects ...", Buffon, (M.N.H.N.), p.22

[39] Condorcet, "Eloge", O.C.C., 1:xliii

Dufay, Buffon often referred to the Jardin in his letters as "the institution that I formed".[40]

Buffon capitalized on his prestige, his ministerial influence and his access to the royal presses to increase the collection under his administration. He used a ministerial contre-seing to acquire a postal franchise with correspondents, and where this proved inadequate he relied upon friends like d'Ogny, the head of Burgundy's Bureau de Poste, to help him evade normal exorbitant shipping fees which would have increased the difficulty of obtaining specimens.[41] He also received permission from Maurepas to create an honorary title, "Correspondent du Jardin" which he could award to amateurs who had proven themselves particularly helpful.[42] Lonely and inconsequential colonial administrators in forsaken imperial outposts sent rare species of flora and fauna back to Paris and gloried in their honorary rank, in some honorable mention in the Histoire, or even the minor promotions that their co-operation secured for

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[40]Lettre 1766 a de Brosses, C.G.. F.Yves, in "Buffon Au Jardin Du Roi", Buffon (M.N.H.N.) p.116, notes that the Jardin increased immensely in popularity during Buffon's administration, in part because of changes he inaugurated. By 1750 there were 1,200-1,500 visitors every week, who flocked to the Jardin to hear lectures in Botany, Chemistry and Astronomy.

[41]Editor's note, C.G., ed.J.Lanessan.

[42]S.Milliken and O.Fellows, Buffon, p.55.

them.[43] Established writers, and sovereigns who did not really need the publicity, were no less pleased by seeing Buffon's appreciation immortalized in his works.

He could be quite imperious in the pursuit of acquisitions. Once at the Table du Marbre where he was arraigned on charges, he caught sight of an immense ornate table made from a single oak trunk and summarily requisitioned it for the Jardin.[44] In 1738 when his arch-rival Réaumur died and willed his fantastic insect collection to the Academie des Sciences, Buffon used his authority to appropriate it for the Jardin. A number of other impressive private collections, those of Bonnier de la Mosson, the anatomist, or Adanson the Senegal explorer, and Pajot d'Osembray, found their way into the Jardin despite the intentions of the owners.[45] Buffon always exhibited a somewhat single-minded pre-occupation with his own plans, and this characteristic calcified with age. When he expanded the

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[43]Lettre XXVI (1742) and Lettre XXIX (1747) a M.Arthur, Medecin Du Roi, a Cayenne, C.G., pp.47 & 50 respectively. From Lettre XXVI,

> "J'ai recu, Monsieur, la caisse de curiosites que vous avez bien voulu m'adresser par la voie de M.Belamy, et je vous en fais mes remerciements ... j'ai renouvele mes representations au sujet de vos appointements, et l'on vous a accorde une augmentation de trois cents livres; c'est tout ce que nous avons pu faire. Vous avez obligation à M.de la Porte qui s'est porté de fort bonne grace à faire valoir vos raisons et les miennes aupres de M.le Comte de Maurepas."

[44]L.Bertin, "Buffon; Hommes D'Affaires", Buffon (M.N.H.N.) p.101

[45]F.Yves, "Buffon Au Jardin Du Roi", Buffon (M.N.H.N.),p.110

grounds of the Jardin in the last decade of his life, he did so with an aggressive noblesse oblige. He manipulated title-deeds, enlisted ministerial support and entered upon elaborate negotiations to ensure that he could summarily expropriate householders in the area he wanted to develop.[46] His actions during this period are not commendable but he was possessed of a confident certainty that the public value of the result would more than justify any temporary individual inconvenience suffered. Buffon's personal finances were particularly entangled with those of the Jardin du Roi. During the years, as the establishment repeatedly outgrew its quarters, he used his own funds to purchase lands and houses. Familiar with the frustratingly slow process of requisitioning funds for the purchase of materials, lands or buildings he would simply purchase whatever he thought was necessary. Such a long time elapsed between his actions and administrative approval for the plans, and the allocation of funds, that the value of the lands or buildings invariably appreciated considerably in the interval.[47] The handsome profits he turned by this practice aroused suspicions, and

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[46] L. Bertin, "Buffon; Hommes D'Affaires", Buffon (M.N.H.N.) p.101

[47] See Wm. Falls, "Buffon Et L'Aggrandissement Du Jardin Du Roi a Paris", Buffon (M.N.H.N.), for an exhaustive account of the financial manipulations involved in consecutive enlargements of the Jardin. He estimates at one point that Buffon made approximately 400,000 livres profit over the years.

Testaments to his own disinterestedness appear frequently in his letters.[48]

Shortly after he took his place at the Jardin, Buffon announced his intention to publish, in accordance with the wishes of Maurepas, a catalogue of the holdings of the Cabinet du Roi in the Jardin. The anatomical descriptions were to be provided by Buffon's assistant, Daubenton, while Buffon himself intended to append narrative passages which would make the entries more comprehensible. The enterprise soon expanded in his hands to become a comprehensive Natural History, beginning with the formation of the planets and the essential processes in Nature and including histories of the animal, mineral and vegetable kingdoms. Amazingly enough, much of this proposed work was actually completed, although it required more than forty years to do it, and volumes were still being produced after Buffon's death. Only the section on plants never saw the light, which is curious since the books were published under the auspices of the Royal botanical gardens.

The first volumes, containing the explanation of the formation of the earth and the history of Man, along with the first part of the history of the animal kingdom were published in 1749. They were an immediate success. The

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[48]Lettres a de Brosses (1766), C.G..

first edition in-4° was exhausted within six weeks, and two other editions were printed early in 1750, along with an edition in-12 . By 1750, the work had already been translated into Dutch, German and English and the translated editions kept pace with the French. The first six volumes of the series were re-printed four times during the fifties, then in 1770 there was a new edition in-12 of all the volumes released to date. A deluxe edition in ten folio volumes began to appear in 1771, and in 1774 a second edition in-4° was published.[49]

Approval of the book was not universal. D'Argenson recorded in his diary the following notes,

> Les dévots sont furieux, et veulent le faire bruler par le main du bourreau. Véritablement, il contredit la Genèse en tout. 50

Buffon's most vociferous critics were the Jansenists, who condemned his work in their journal, Nouvelles Ecclésiastiques, claiming that Buffon was leading his readers to materialism, and that he was confusing moral issues with his speculations on truth.[51] Buffon disdained to answer any critics, particularly the Jansenists whom he

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[49]Lettre XXXVI a Cramer, C.G., p.62. Also Editor's footnotes, C.G., p.62.

[50]Editor's note, C.G., p.61.

[51]Piveteau, "La Pensee Religieuse De Buffon", Buffon (M.N.H.N.), p.126.

held in contempt.[52] When his work was questioned by the Sorbonne Theological Faculty, which was dominated by a Jansenist faction, it became necessary to make some retraction. There was much debate among his contemporaries concerning the legitimacy of this retraction and subsequent historians are equally uncertain whether it was sincere or merely practical. The Jansenists themselves were not convinced, but Buffon's formal retreat allowed him to resume publication.[53] From 1753, he issued one volume a year until 1767, when the history of animals was completed. Publication was interrupted, perhaps because of personal tragedy, since Buffon's wife was very ill and finally died in 1769. In 1770, the first volume in the series on birds was issued. This was largely the work of Gueneau de Montbeliard, who did the spadework while Buffon refined the prose and worked on his own researches into metallurgy.[54] In 1774, he began

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[52]Lettre XXXIX a LeBlanc (21 Mars 1750), C.G. Buffon refers to Montesquieu's reply to the Jansenists who attacked both men in the same issue of Nouvelles Ecclésiastiques, and says,

"Il a repondu par un brochure assez épaisse et du meillur ton. Sa reponse a parfaitement reussi; malgré cet example je crois que j'agirai différement et que je ne repondrai pas un seul mot. Chacun a sa délicatesse amour-propre; la mienne va jusqu'a croire que de certaines gens ne peuvent pas meme m'offenser."

[53]Piveteau, "La Pensée Religieuse De Buffon", Buffon (M.N.H.N.), p.127. Buffon made his retraction in Jan. 1751. The Jansenists returned to the attack in their journal on June 26, and July 3, 1751.

[54]J.Bourdier, "Principaux Aspects ...", Buffon (M.N.H.N.) p.40.

a history of minerals in five volumes which occupied him until his death.

Buffon of course received a large income from these officially commissioned productions, especially after 1764 when his publisher declared bankruptcy. Buffon bought up the rights to his works, and all surplus volumes and became his own publisher. He jettisoned his first assistant, Daubenton, which caused some hard feelings but ensured the continued success of the work, which was becoming overburdened with dry anatomical descriptions. Buffon also added two Views of Nature to recapture the audience, which he recognized was more attracted to the general commentary and philosophical reflections than to minute descriptions.[55]

Buffon always displayed a remarkable business acumen in his professional capacity. It has been estimated that at the height of his career he was drawing in approximately 80,000 livres annually.[56] By his own estimation in Essai d'Arithematiques, 10,000 livres was sufficient to maintain a gentil'homme, so he had exceeded his marginal requirement by several thousand livres.[57] Modern scholars like Bertin

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[55]L.Bertin, "Buffon; Hommes D'Affaires", Buffon (M.N.H.N.) p.103.

[56]S.Milliken and O.Fellows, Buffon, p.4.

[57]Buffon, "Essai d'Arithmetiques Morales", O.C.B., 15

and Falls have concluded that despite the bewildering variety of pensions and salaries, Buffon was supporting himself primarily on income from his properties and the businesses connected with them, for example the nursery, the tannery, and the forge, which he re-activated in 1767, and of course from the sale of the Histoire.[58] Contemporaries were very critical of Buffon because they believed he was capitalizing on public appointments. Condorcet remarked in ironic tones,

> ... tant d'hommes séparaient leurs interêts de l'interet général, qu'il serait injuste de montrer de la séverite pour ceus qui savent les reunir. [59]

His statement need not be taken as ironically as it was intended. Buffon evidently identified himself with the public institutions he directed. As he once remarked in the letters, he regarded the Jardin as a son, and the idea of conflict of interest does not seem to have occurred to him.[60] As his concerns prospered, so did he. It should

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[58] L.Bertin, "Buffon; Hommes D'Affaires", Buffon (M.N.H.N.) p.104 and Wm.Falls, "Buffon Et L'Agrandissement ...", Buffon (M.N.H.N.). F.Yves, "Buffon Au Jardin Du Roi", Buffon (M.N.H.N.) p.109 includes a quotation attributed to either Lignac or Reaumur which indicates that contemporaries believed Buffon was siphoning a substantial amount of money in pensions.

> "Une partie des honoraires de l'intendant, qui ne vient a Paris, que pour receuillir de l'argent, serait plus suffisante pour rendre utile le Cabinet." (from Archives Nationale O-2124)

[59] Condorcet, "Eloge", C.C.B., 1:xiv.

[60] Reported by Mme. Blesseau in "Memoir", C.G., p.405.

also be mentioned that the Crown profited from the confusion of finances too. At Buffon's death, the National Treasury still owed his estate huge sums which Buffon had advanced for the improvement of the Jardin, and much of this money was never recovered.[61]

Buffon's relentless enterprise and (one suspects) the magnitude of his success generated a degree of animosity that was exacerbated by his personality. Over the years, the enemies multiplied as steadily as the admirers, and despite his public success, he had (as his housekeeper put it) "many acquaintances ,but few friends". Many of his most enduring friendships were the ones he formed in his youth with other Dijonnais like Gueneau de Montbeillard, Condamine, Ruffey and de Brosses, Varenne, d'Ogny and Poligny. At the Academie there were continual conflicts. His attempts to promote his friends Abbe Le Blanc, de Brosses and Bailly were checked repeatedly by the concerted action of several of the philosophes, including d'Alembert and Voltaire.[62] He and Condillac did not get on well, and Buffon suspected him of initiating an attack on his works (although it was actually

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[61] Mme. Blesseau estimates Buffon advanced cent mille livres, and S.Milliken and C.Fellows, Buffon, p.49 report that the treasury owed Buffon's estate 200,000 livres.

[62] Editor's note, C.G., ed. J.Lanessan, p.82.

Réaumur who had encouraged the author).[63] His differences with Voltaire were not confined to the Academie, but spilled into territorial disputes in Burgundy where Voltaire also had property.[64]

It appears that differences with his colleagues were occasioned as often by his character as by his theories.[65] D'Alembert found his elegant fastidiousness, his self-possession and his assertiveness annoying and always referred to him as Comte de Tuffiere*, after a parvenu in one of Destouches plays, who was as unscrupulous as he was vain.[66] Condorcet's remarks on Buffon's personality betray more than

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*this has been rendered into English, rather awkwardly, as 'Count All-Proud'.

[63] From d'Argenson's journal, quoted in C.G., p.82.

[64] Editors note in C.G., ed. J.Lanessan, p.170.

[65] Accounts of the disagreement between Voltaire and Buffon vary. S.Milliken and C.Fellows, Buffon, p.108, suggested that Voltaire took offense when in 1749, Buffon savaged a pamphlet on the incidence of inland beds of sea-shells, which had been written by Voltaire but published anonymously. The Chevalier de Buffon, C.G., p.339, said Voltaire resented Buffon's refusal to grant that he was both philosopher and poet. Buffon himself attributed their quarrel to Voltaire's envy of talent and success, from F.Bourdier, "Principaux Aspects...", Buffon (J.N.H.N.), p.29--"Sa jalousie contre tout celebrite aigrit sa bile recuite par l'age". All accounts are probably equally correct.

[66] S.Milliken and C.Fellows, Buffon, p.28. Nadault de Buffon explained their antagonism succinctly: "D'Alembert did not like Buffon ... he found neither his person nor his talents sympathetic" (S.Milliken and C.Fellows, p.145)

a note of irritation with his intellectual obstinacy, his sensitivity to minute social distinctions and the noble gravity which he maintained without respite.

> ... quoique aimant par goût la magnificence et tout ce qui avait quelque appareil de grandeur, il avait conservé cette politesse noble, ces déférences exterieurs pour le rang et les places, que étaient dans sa jeunesse le ton général des gens du monde. 67

Condorcet did try to account for some of Buffon's traits and he ascribed them to his pre-occupation with the great endeavour of his life, the Histoire Naturelle.

> M. de Buffon n'était occupé que d'un seul objet; n'avait qu'un seul gout ... et il est difficile d'etre sans orgueil quand occupé sans cesse d'un grande objet qu'on a dignement remplie. On est forcé en quelque sorte de porter toujours avec soi le sentiment de sa superiorité. 68

It is not unlikely, however, that Buffon carried with him not the consciousness of his great task, but a consciousness of his background, and that the more conservative aspects of his personality might be as easily explained by his personal and family history.

D'Alembert's nick-name suggests that Buffon had all the pretensions of nobility without the reality and this is not too far from the truth. For most of his life, Buffon was a seigneur, not a noble, and despite his wealth, his

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[67] Condorcet, "Éloge", O.C.B., 1:xlix.

[68] Ibid., 1:xlviii.

position and his services to the government, he had to wait forty years before his lands were elevated to the status of county and he received his title. Even this seems to have been a conciliatory gesture, made as compensation for the fact that during an illness that threatened to be terminal, the succession to the Intendancy was transferred to Comte d'Angevilliers. It had been promised to Buffon's own son, but "Buffonet" was still a boy at this time. Buffon embarrassed everyone by recovering and it has been suggested that his ruffled feelings were soothed by the title.[69]

The Leclerc family was easily four generations away from manual labour, but they had only recently purchased their way into the noblesse de la robe, and the wealth that had financed the greatest social promotion had been accumulated in a distinctly non-aristocratic profession. Although Buffon had inherited his personal fortune, it had been in the bank for only eighteen years before he claimed his share. Social historians like Barber and Goubert have suggested that the position of the noblesse de la robe, particularly those of recent promotion, was ambiguous, since they had procured status with money in a social structure where position was legitimized by birth.

Barber, in particular, has suggested that mobility created a tension within the society, and within the

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[69] S.Milliken and C.Fellows, Buffon, p.62.

individuals who were ambitious and able to rise, for the bourgeoisie aspired to the values of the aristocracy as well as their privileges. Virtue according to the aristocratic ethic consisted primarily of disinterestedness (to the point of self-sacrifice in some circumstances) and generosity, as well as a paternal concern for public welfare. Consequently extravagance, and a lavish improvidence were customary aspects of aristocratic life. Once the changes in warfare reduced the military significance of the nobility, and after they were methodically excluded from politics, these became almost the only characteristics of aristocratic life. Apart from restricted public service, the nobles hunted, entertained, rode, entertained and hunted. Business enterprises, particularly commercial ones, and anything involving manual labour were legally prohibited as well as socially disdained.

The bourgeoisie who were most likely to climb socially were not particularly egalitarian. They accepted the hierarchical order and supported privilege in society. They too sneered at manual labour; the lawyers, doctors and financiers held the shop-keepers and artisans in contempt. They were however, alienated to some degree from the Catholic value system, and many historians have discerned what they call a "secular ethic", identified historically with this class. It defined a life that received no recognition within the traditional hierarchy of social functions and

was distinct from Catholic moral philosophy because of the great importance placed on the possibilities within this world. The realization of these possibilities was a moral obligation, and the foundations of this achievement were industry and ambition. Wealth and public respect were of course the necessary consequences. Achievement also demanded moderation and personal economy and these practices were transformed into virtues which were maintained by choice, not merely dictated by circumstance. The individual achieved aristocratic status through his own efforts instead of receiving it gratuitously, as an accident of birth or a gift of God; consequently, the individual's control of self and of his environment was imperative. Only through rational exploitation was anyone likely to succeed. Virtue also defined behaviour within the family, perhaps because domestic life had more prominence; consequently, marital fidelity, never particularly important in the aristocratic ethic, assumed great significance.

The bourgeoisie expected that virtue would continue to be rewarded, and there seemed no reason why mobility, once admitted, should be restricted by the boundaries of a single class. Social mobility of this kind, however, created problems of its own. The bourgeoisie apparently shared the belief that their occupations were degrading and abandoned them as quickly as was possible. When the

wealth they had acquired through trades or professions allowed them to do so, many assumed a life of idle luxury and extravagance which was at odds with all the values that had sustained them in their pursuit of social status. A real tension would be created by this existence of two sets of values, competing not only within the society itself, but within many individuals who had to struggle for some kind of reconciliation.

Some historians, like Goubert and Barber, prefer to emphasize the antagonism that existed between the frustrated bourgeoisie and the aristocracy and regard as negligable any tension between the noblesse d'epée and the noblesse de la robe. There is some argument, however, as to whether the noblesse de la robe should be regarded as nobles or as bourgeois. It is of particular importance for our subject then, that Bouchard in his study of the Dijon Parlementaires, considered them to be the highest rank of the bourgeoisie, despite the age of the patents of some families.[70] The argument among historians is revealing in itself, for if the identity of this group is ambiguous today, it cannot have been well defined in the eighteenth century. Consequently, it seems likely that members of this group would have experienced the greatest conflicts and would have

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[70]Bouchard, L'Evolution Des Esprits Dans La Bourgeoisie Bourguignonne (Paris, 1929)

found it imperative to effect some reconciliation of values. The pressure would of course be most intense for those men who had recently secured their titles, and whose industry, ambition and thrift had contributed to their success.

These very characteristics are particularly evident in the conduct of the Burgundian noblesse de la robe. The Parlementaires were very wealthy, had a firm hold on the seigneurial properties in the region and maintained their grip with strict and profitable administrations. They were also particularly alert to all seigneurial privileges, honorary as well as material, and the Burgundian seigneurial regime has been characterized as singularly archaic and oppressive. The Parlementaires not only dominated the political, economic and social life of the region, they also dominated the intellectual life. Wealth was invested in the accumulation of libraries, and the establishment of sedate intellectual circles.[71] President Bouhier, for example, regularly convened an immensely prestigious and equally conservative meeting of "literati" which included the young Buffon among its members.[72] When the Dijon Academy was founded in 1740 it was again a high ranking member of the Parlement, Jouffier, who initiated and financed its

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[71] Lettre VIII, C.G., p.15.

[72] L. Hanks, Buffon Avant L'Histoire Naturelle, p.104.

efforts.[73] According to Bouchard's description, even their intellectual interests run to the practical.

> Ils avaient une curiosité toujours ouverte principalement aux connaissances susceptibles d'apporter des avantages pratiques. Leur science était au service des arts, de l'agriculture plus que tous les autres, et pour prix de temps qu'ils lui accordaient, ils en espéraient des recettes utiles. [74]

Apparently, the Burgundian noblesse de la robe had worked out an effective compromise.

The biographical sketches of Buffon, written by friends and relatives, like Mme. de Blesseau, Pere Ignace and Chevalier de Buffon, and by admirers like Herault de Sechelles and Lanessan are very interesting in this light, for most of the authors appear to be trying to counter his reputation for obstinacy, pomposity and self-interest, with accounts of his moderation, industry and thrift.[75]

Unable to deny that Buffon attached an inordinate importance to public esteem, they turn his single-minded pursuit of "gloire" into a virtue. It became an aspect of his self-restraint, since he subordinated all appetites to

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[73] Editor's note, C.G., ed. J.Lanessan, p.22.

[74] From M.Bouchard, quoted in L.Hanks, Buffon Avant L'Histoire Naturelle, p.142.

[75] Even Condorcet had to admit Buffon's industriousness -- Condorcet, "Eloge", O.C.D., 1:xlix.

ambition and never indulged in dissolute pleasures.[76] When he did marry, it was for love, and without regard to the financial insecurity of his bride. By all accounts he remained faithful to his invalid wife and doted upon her in a manner that was genuinely touching.[77]

Even in youth, Buffon was moderate. His love of study and his devotion to Euclidean geometry, reputedly precluded dissipation. As his step-brother declared,

> Toujours maître de lui-même, et bien different en cela de la plupart des jeunes gens, c'était son amour pour le travail qui l'arrachait au plaisir. [78]

His love of labour was legendary. At Montbard, in his prime, he worked fourteen hours a day on the Histoire, rising at five every morning. As insurance against sloth, he even went so far as to hire a local peasant to remove him forcibly from bed if he refused to rise when called. After rising he worked until 1:30 or 2:00 in the afternoon, then after a short break returned to his study where he occupied himself until 8:00 or 8:30.[79] The extent of his interests

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[76] Journal de Paris (1788) included in C.G., p.414. Similar sentiments are expressed by Ch. de Buffon and Mme. de Blesseau in their "Memoirs" also in C.G.

[77] S.Milliken and C.Fellows, Buffon, p.61 and Chevalier de Buffon, "Memoir" in C.G.

[78] Chevalier de Buffon, "Memoir", C.G., p.397.

[79] M.Godard de Semur, C.G., p.414, and Mme. de Blesseau, C.G., p.404.

alone, at this period -- the responsibilities at the Jardin, his private research, the production of the Histoire, his correspondence, the reconstructions at Montbard and the financial enterprises must have required an awesome amount of energy.

Buffon abhorred wasted time. As many commentators remarked, "aucun homme n'a mieux connu que lui, le prix du temps",[80] and even his distaste for scientific debate has been explained by this trait. His friends said that he refused to discuss his ideas because he believed it was equally wasteful to argue about things you knew were true as to discuss those about which you were not certain.[81] His personal economy extended beyond his use of time. Montbard was decorated luxuriously, but many remarked that it might have been more splendid than it was. The materials were expensive -- Buffon used every trip to Paris as an occasion to purchase more -- but everything was decorated simply, particularly those rooms which were for his private use.[82] The study in his garden contained only a chair and a desk on which there was usually only a single book and manuscript along with writing implements, and the spartan atmosphere was relieved only by the portrait of Newton which

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[80]Chevalier de Buffon, "Memoir", C.G., p.398, and Lettre a Abbe Le Blanc (1738), C.G.

[81]Chevalier de Buffon, "Memoir", C.G., p.398.

[82]Pere Ignace, "Memoir", C.G., p.409.

hung on the wall and presided over Buffon's efforts.[83] These details in the biographies seem intended to underline not only Buffon's lack of ostentation but his thriftiness and his love of order. As Chevalier de Buffon put it,

> Occupé sans cesse à mettre l'ordre nécessaire dans les plus grandes idées, it n'était pas moins ami de l'ordre dans les petites choses. [84]

Buffon kept a close watch on household expenditures, taking account of the budget every Sunday, and he ensured that his expenses never surpassed his means.[85] He did entertain with extravagance. The splendour of the fêtes given to celebrate the birth of Conde's son, and the recovery of Louis XV from illness, made the papers. The locals, both aristocratic and common, were invited to separate feasts, where elaborate meats were served -- calves were cooked within cows, and lambs stewed in rams. Cakes and money were distributed to the commoners and fireworks demonstrations were given for the amusement of all.[86] Buffon combined this lavish entertaining, however, with a scrupulous economy, and never spent more than he earned.

While his friends testified to his thrift, they also

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[83] Journal de Paris, C.G., p.414.

[84] Chevalier de Buffon, "Memoir", C.G., p.397.

[85] Pere Ignace, "Memoir", C.G., p.409. Chevalier de Buffon, "Memoir", C.G., p.401.

[86] Pere Ignace, "Memoir", C.G., p.410.

emphasized his generosity and the examples of his public charity are undeniable. During the grain shortages he distributed grain at a reduced rate, especially during the famine of 1767, when shortages had occasioned riots in some parts of the countryside. On this occasion he purchased grain at 4 livres/boisseau and sold it for three months at only 15 sous/boisseau, and frequently distributed it free to the most distressed families.[87] Members of the business community were accustomed to approach him for loans to extricate themselves from debt.

Buffon apparently assumed some responsibility for the prosperity of his community, and according to Mme. de Blesseau, never hesitated to sacrifice his time or money for the public convenience.[88] The letters and memorials repeatedly refer to the reconstructions at Montbard as a kind of poor-relief project which was sustained for almost thirty years because of Buffon's sense of public responsibility as much as his obsession. Buffon often employed as many as 200-300 workers, always the local unemployed, to move stones, cart earth, construct walls and plant gardens.[89] He frequently remarked that there was no better way to distribute

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[87] Mme. de Blesseau, "Memoir", C.G., p.405, and Pere Ignace, "Memoir", C.G., p.407.

[88] Mme. de Blesseau, "Memoir", C.G., p.404.

[89] Pere Ignace, "Memoir", C.G., p.406.

alms than to provide useful employment, for if he loved the poor he seems to have been wary of encouraging their idleness.

> Si je donne l'aumone aux miserables, j'en fais des paresseux, et en les faisant travailler, j'en fais des gens utiles a l'etat. 90

Buffon also reconstructed a number of local roads, at his own expense, and probably with local labour. He re-paved the public thorough-fare, linked the village streets with the grand-route and laid new roads to the parish church.[91] As his housekeeper stated,

> Il n'y a pas un endroit de cette ville qui ne represente des monuments de sa bienfaisance 92

and there was not a single family in the area who did not feel the effects of his generosity and public spirit. Buffon's paternalistic sense of personal responsibility for the welfare of his immediate community is characteristically aristocratic. His letters display a concern for the burden of royal taxation imposed upon the commoners,[93] and he seems also to have frequently intervened in the local and territorial struggles of the local communities. The letters

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[90] Ibid., p.408.

[91] Mme. de Blesseau, "Memoir", C.G., p.404.

[92] Ibid, p.405.

[93] Lettre LXXXVII a Guyton de Morveau, C.G., p.125 (1762)

"Les reglements de vos nouveaux elus font gemir tout le monde. Ils ont si fort serre la mesure pour les payments de impots, qu'il faudra mettre en prison la moitie de la province et achever de ruiner tous les pauvres, si l'on veut mettre a l'execution ces beaux reglements."

of 1767 refer to a battle between the Abbey of Fontenet and the tenants of Marmagnes, a small hamlet about half a league from his own village. Buffon had intervened in this instance on behalf of the villagers who had contested the right of the monks to tamper with the overflow from a local lake, when their actions had disrupted the normal pattern of water-flow in the valley.[94]

There is evidence, however, that members of the community found his omnipresence annoying, regarded his interventions as meddling and resented his imperiousness. At one meeting of the town council, the village doctor declared in exasperation,

> Buffon est un homme terrible, son avidite est si grande que s'il pouvait atteindre au Pere Eternal il lui prendrait con chapeau et son manteau! [95]

Buffon did not appreciate the public criticism and had the man removed from his post as échevin.[96] Apparently, Buffon's paternalistic concern did not preclude displays of the same kind of aggressive high-handedness that he displayed in his professional career. He enraged neighbours by laying an irrigation canal for his own estates across adjoining properties without deigning to ask for permission.[97] On

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[94]Lettres (1767), C.C. , Lettre CXI a de Drosses.

[95]F.Bourdier, "Principaux Aspects ...", Buffon (M.N.H.N.), p.42.

[96]S.Milliken and O.Fellows, Buffon, p.144.

[97]L.Hanks, Buffon Avant L'Histoire Naturelle, p.127.

another occasion when he discovered several villagers grazing their cattle in his woods he prosecuted them with remarkable severity, and paid no attention to the public outcry.[98]

Buffon's alms-giving too was idiosyncratic. He steadfastly refused to rescue a local tradesman from financial distress (until the son pleaded on his father's behalf) because it was public knowledge that the man had fallen into difficulties through his own improvidence and mismanagement.[99] Present students can detect in Buffon's charity, the studied mannerism of the grand seigneur, and his contemporaries could probably detect it too. He advised his son, on one occasion,

> Il faut qu'un homme bien ne distribue chaque année une partie honnete de son revenu, sans qu'il sache a qui il donne; et bien donner, c'est de donner en grand et dans le silence. [100]

The recommendation reads like social advice as much as moral instruction, but it would be wrong to regard Buffon simply as a hypocrite and a poseur. The industry, thrift and ambition are not assumed, nor are the generosity and concern for public welfare. Buffon was apparently reaching for some compromise between the values of a class to which he belonged by income and taste, and the values of the class

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[98] Perdrizet, Buffon Et La Foret Communale De Montbard (Dijon , 1896), p.38.

[99] Pere Ignace, "Memoir", C.d., p.409.

[100] Ibid., p.408.

from which he derived. He assumed the manners and virtues of the feudal aristocracy, but retained others which, if common to the Dijonnais noblesse de la robe, are really characteristic of another class altogether and were not necessarily prized by the aristocracy in the ancien regime.

The difficulty of reconciling the two ethics could account for the contradictions in his personality. After all, it is extremely difficult to combine personal ambition with concern for the material and spiritual welfare of the public. The kind of inconsistencies that this attempt occasioned are evident from his attitude towards ambition. If we are to believe Chevalier de Buffon, his famous brother once remarked,

> Tout homme doit et peut être l'instrument de son bonheur. Quand on veut disait-il être content de son existence il faut d'abord regarder au dessous de soi, ne lever ensuite les yeux plus haut qu'avec beaucoup de circonspection, être constant dans l'etat qu'on a embrasse; en remplir les obligations avec zele et une probite severe, être consequent dans sa conduite publique et prive ne point s'affliger des preferences que d'autres n'obtiennent quelquefois que par des moyens dont l'homme honnete dedaigne de se servir, et surtout, ne point ouvrir son coeur au poison de cette basse jalousie qui condamne l'homme au supplice continuel de n'etre jamais content de lui-même ni des autres. [101]

This is a curious passage, since Buffon received some of the most surprising promotions during his lifetime. Granted that apart from one letter,[102] there is no evidence he solicited

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[101] Chevalier de Buffon, "Memoir", O.C., p.401.

[102] Lettre XXII a M.Mellot, de L'Academie Des Sciences (1739), O.C.

them by himself, nevertheless, his ambitious industry in pursuit of the Intendancy, in his administration and in his financial and even intellectual enterprises is more than evident. There is even one story which relates that early in his career, Maurepas suggested that Buffon be appointed Superintendant of the Royal forests and parks, but that the promotion was blocked by the Minister of Finance who declared himself to be appalled by Buffon's finagling.[103] Much of the advice given above does not correspond to particulars from Buffon's career, but he was by all accounts placid, quite satisfied, and at peace with himself nonetheless.[104]

Buffon's conservative attitude to social mobility, or at least towards the ambition which is the foundation of social success (his own included) must fall down in the face of his own family origins. The literary world he entered, however, admitted both nobles like Montesquieu and d'Holbach, and those of obscure background like Rousseau and Diderot. Genius claimed title, and in Buffon's opinion, (following a remark made by Newton) genius consisted for the

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[103] Chevalier de Buffon, "Memoir", C.G., p.400, claims the position was offered to Buffon, who humbly declined the promotion because he didn't want to make enemies of the covetous courtiers. The version I have presented comes from Bernard, by way of F.Bourdier, "Principaux Aspects ... ", Buffon (M.N.H.N.), p.24.

[104] Chevalier de Buffon, "Memoir", C.G., p.401.

most part of patience.[105] Certainly intellectual endeavours did not confer nobility, but if they could not provide predecessors, they could secure posterity.

There are several details of Buffon's life that suggest he was not merely conducting himself like every other member of the Dijon noblesse de la robe, even if some of his character traits are identifiable with that class. For example, he was careful to keep all his business enterprises in respectable categories. He confined his entrepreneurship to letters or to agricultural endeavours, and attempted mining, quarrying and iron-foundering, which constituted extensions of his estate so were not derogatory. To my knowledge, he never invested in commercial ventures, nor speculated as a financier, but only capitalized on his rural properties.

He did not, to my knowledge, purchase any office which would bring a title, although his wealth would certainly have permitted him to do so. He scrupulously avoided the path to aristocracy that led through the magistracy (despite his qualifications) and he was never much involved in the provincial parliamentary world. To be sure, he also avoided court circles. He went only three times to the Court,[106]

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[105] Journal de Paris, C.G., p.415. The author of the obituary gave the statement and also recognized its derivation.

[106] Mme. de Blesseau, C.G., p.406. Buffon went to Versailles twice in his capacity as Director of the Academie Francais and once to thank the king for elevating his lands to status of counties.

although he had been granted petit and grande entrées. Still, Buffon seems to have been actually unsympathetic to parlementary ambitions, although he remained on good terms with the great number of his friends who were involved. His letters indicated that he disapproved of the contentious opposition given by the Parlementaires to the Crown, particularly during the sixties and seventies.[107] When the King finally replaced the Parlement of Paris with a council, he was not disturbed, and seems to have regretted the recall of Parlement by Louis XVI in 1774.[108] Admittedly it is difficult to gauge Buffon's political beliefs from such

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[107] Lettre LXXXIX, (13 Mars 1762), C.G., pp.126-7.

"J'ai beaucoup vu et j'aime beaucoup notre ancien premier president, il a beaucoup d'esprit, et n'est pas fanatique comme les trois quarts de votre Parlement. C'est une chose bien singuilere que des gens se mettent dans la tete qu'en acquerent une charge de vingt ou trente mille livres, ils acquierent en meme temps la qualité de tuteurs de rois. C'est bien assez de l'etre de sa propre personne et il me parait que celui des ces messieurs qui a fait le libelle aurait mieux fait de prendre un tuteur qu'une charge. Je suis enchanté de ce que vous n'étes point dans cette vilaine bagarre qui donne fort mauvaise opinion de nos têtes Dijonnaises."

Buffon seems to have disapproved of any opposition to the King, from whatever quarter it came. In 1747 in a letter to LeBlanc (C.G., p.72) he criticizes the clergy for their obstinate refusal to comply with King's request that they declare their goods. When the exasperated monarch sent all the bishops (who were malingering at the court) back to their provincial dioceses, Buffon approved of his firm actions.

[108] Lettre a Gueneau de Montbeillard (1771), C.G.

"L'établissement des conseils superieurs est loué par tous les gens sensees et fera reellement un très grande bien."

sparse evidence, however, it is revealing that he maintained his friendship with Jacques Varenne, a local aristocrat who published a book condemning the prerogatives of the Parlements. Buffon continued to support him although the book was censured by the Parlements in Dijon and in Paris, and although the King's protection was ultimately incapable of shielding Varenne from the fury of the noblesse de la robe.[109]

I think there is sufficient evidence to indicate that Buffon's conduct was not simply dictated by the peculiarities of the Dijon tradition, and that his reconciliation of the aristocratic and the bourgeois ethic was an individual one. If this is the case, the results are of historical interest, not merely because of his prominence, or the individuality of the results, but because he was not alone in his predicament and his solution could provide an example to others. His success proved the positive virtue of order and self-discipline in one's personal, financial and professional life, and his conduct was intended to demonstrate that industry and efficiency were not irreconcilable with aristocratic values. As he stated on one occasion, having a good head on one's shoulders was not a gift of nature but an acquired trait, and depended upon circumstances, companions and above all training. In other words, rational administration was not just a second rate virtue of an inferior class.

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[109] Lettres LXX (1757) and XC (1762), C.C.

CHAPTER II

THE ECONOMIC SITUATION AND THE PHYSIOCRATIC SOLUTION

The social promotion of the bourgeoisie including the famille Leclerc was accomplished through the expansion of the administrative bureaucracy and was financed by the general growth in the French economy. The economy had recovered quickly from the devastation of the closing years of Louis XIV's reign, and the graphs composed by modern historians indicate that trade and manufacturing expanded rapidly, prices steadily rose and agricultural production improved from early in the reign of Louis XV.[1] Nevertheless, the record appears different from the distance of two hundred years than it appeared at the time, and the charts obscure many real problems that existed. Some of these were caused by prosperity itself and others by the means adopted to sustain and protect France's economic advantage.

If prosperity created a potential for increased social

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[1] There is ample evidence in L'Histoire Economique et Sociale de France (Paris, 1970), 2., compiled by E.Labrousse, P.Leon, P.Goubert, et al.; H.See., Histoire Economique de la France (Paris, 1939-41); and Lavisse, Histoire de France depuis les Origines jusqu'a la Revolution (Paris, 1903-1911) to name only a few standard works on the subject.

tension within France, it also exacerbated traditional international enmities. The French commercial success, in particular, inspired xenophobic alarm in Britain. England was determined not to be outdone, and the two countries were soon preoccupied by efforts to collect colonial trading posts and to exclude each other physically from activity in the best markets.

Although many of the largest wars of the period were named after dynastic struggles or simply the length of time they endured, it is nevertheless true that economic rivalry was fundamental to the conflicts. This was as true in 1709 when Louis XIV stated that the Spanish Indies trade was the principle object of the current war, as it was in 1763, when Quesnay reminded his readers that,

> ...battles which are won simply by killing men without causing any other damage do little to weaken the enemy if he still has the wages of the men he has lost and if they are sufficient to attract other men. [2]

France suffered little material damage from the wars fought during the reigns of Louis XV and Louis XVI, but a tremendous amount of money was required to outfit and supply the new large armies in the fields and to manufacture and purchase new weaponry. Even though the nation was not involved in outright war from 1715 until 1748 military

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[2] W. Ashley, History of Europe 1648-1815 (New York, 1973), p.81, and in Quesnay, Tableau Oeconomique, ed. Kuczynski and Meek (London, 1972), p.20.

expenditures were still high because of the nature of international rivalries. French trade was advanced and protected by armed force and the navy was in constant service. Maurepas ordered tours of duty every year in the Mediterranean, the Baltic and the Caribbean, and troop exercises were conducted annually in the Antilles.[3] To maintain this activity, continual construction, and outfitting was necessary, but Naval expansion depended upon natural resources which were already in great demand. French technology was still based upon wood products. Tools, building materials and above all, fuels were taken from the forests, so Navy shipwrights found themselves competing with artisans, tanners, glass-makers, metallurgists, and the civilian population for wood and the competition intensified during the century as population grew and industries expanded. Apart from the use of wood for planking, masts and tools, the Naval industry indirectly augmented the consumption of forest products through their reliance on cannon. The forges that manufactured these new weapons burned immense quantities of wood.[4]

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[3] R.M. Wilson, French Foreign Policy During the Administration of Cardinal Fleury, 1726-43 (Conn., 1972), p.75.

[4] See P.Leon and H.Carriere, H.E.S.E., 2:231-32. Leon and Carriere report that a single foundry such as the establishment at Fort Brillet could consume 10,000 cords of wood annually. In Provence each glass works used 7-15,000 quintaux annually. The rate of increase in the demand for wood could be judged from the works at St-Gobain which used 240,000 quintaux every year at the beginning the the eighteenth century but consumedfive times this amount annually by the time of the Revolution. See also Bamford, Forests and French Sea Power (Toronto, 1956).

The competition for materials inevitably had social and political effects. Most of the forests were in the hands of the King, or the seigneurs -- either ecclesiastical, noble or bourgeois and over the years community access to the forest had been reduced to "customary usage" which tended to suffer against the competition of paying and voracious customers. The effects of the increased demand might not have been significant except for the fact that in many localities de-forestation was chronic and advancing. Public outcry against the depredations made by mills and foundries in particular began as early as 1731 and increased in frequency and violence during the century.[5] Consequently, the management and distribution of natural resources became an issue of great interest to the government since it directly affected social order as well as military strength.

The sustained military expansion also cost money. Between 1726 and 1742 alone, Fleury allotted more money to the Ministry of Marine than did any of his predecessors or even his competitors. Whereas in the Regency, 8 million livres had been allotted to the navy annually, by 1734 the budget was 19,200,000 livres and by 1742 this figure had reached 27 million livres.[6] The peculiar nature of the

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[5] P. Leon, N.H.C.F., p.232. There were violent demonstrations in 1771 in Bourgogne Languedoc, Dauphine and Limousin demanding that mills and foundries be closed down.

[6] R.M. Wilson, French Foreign Policy ..., p.70.

French tax system made the Crown dependent upon the peasant population and upon an agricultural surplus to pay the rising costs of military security as well as finance the ordinary costs of government. Any scarcities or sudden catastrophes in agriculture, then, were matters of national consequence since variations in production or in the level of population reduced the efficiency of the administration and could even compromise national security. Agricultural production apparently improved during the period and the population gradually re-established itself so that by the end of the century France had gained an additional five or seven million inhabitants.[7]

Yet men living at the time were not convinced that any real improvement or growth was occurring. Many administrators and theorists were certain that the tax-paying rural population was dwindling and studies made during the period were often undertaken to ascertain whether the pessimistic assertions about rural depopulation were justified.[8]

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[7] P. Goubert, L'Ancien Regime 1660-1715 (New York, 1969), p. 25.

[8] See "Maximes" in Quesnay, Tableau Oeconomique. The terms of discussions indicate that Quesnay is addressing a general concern with population level and is attempting to shift attention to agricultural surplus produced by this population. See also Messence, Recherches sur la Population (Paris, 1766). In the preface, the author remarks,

> "La plupart des auteurs politiques, dont les ecrits ont ete publies depuis quelques annees ont assure une depopulation dans le royaume et n'en ont apporte aucune preuve."

Messance intended to supply figures from several provinces to disprove alarmist claims.

While it is now apparent that the pessimism was unfounded, nevertheless, the real increase in population did not necessarily mean that the State enjoyed a corresponding increase in rate-payers or in revenues. In fact, the greatest wealth escaped the national Treasury. Profits from the agricultural sectors were siphoned off in the form of seigneurial rents and dues which were squandered on luxuries instead of re-invested in the production. Fortunes made in commerce, finance and industry too were used to maintain social status through ostentation and through the purchase of property in the form of offices, annuities or real estate. Apart from the sale of the public offices the government had little access to this new wealth. The most prosperous groups in the nation were exempt from the elaborate series of direct and indirect taxes, and the inefficient system of collecting revenue from the people who did pay actually created private fortunes, since every group of agents and receveurs exacted both a legal and criminal surplus.[9] The result was that the revenues which supported administration and military expenditure were taken from the very group which had benefited least from the general increase in prosperity.

The situation of the peasantry and the state of agriculture were fundamental aspects of the economic dilemma

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[9] P. Goubert in M.T.M.F., p.128.

facing France. The rise in population, which was an initial effect of improved conditions, had generated its own problems, especially in the countryside. France was already a nation of small-holders -- parcellaires -- cultivating minuscule strips of land, and many rural areas felt the pinch of over-crowding. Under demographic pressure landholdings were divided and sub-divided among heirs into even smaller portions and the effects of this diminution were aggravated because the holdings were anything but "choice" at the start.[10] After a century of bankruptcies, the best peasant holdings and communal properties had been alienated to seigneurs, stock-breeders and bourgeois speculators. By the eighteenth century, the peasants (with the exception of the laboureurs) were farming the smallest, least accessible and least profitable stretches of land.

The loss of communal properties was intensified in the seventeenth and eighteenth centuries by the activities of the seigneurs -- ecclesiastical, bourgeois and aristocratic -- who struggled against the communities to establish an economic authority to replace their waning judicial authority. Victory rarely went to the community and complaints

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[10] Lefebvre estimated that by the end of the period, 85% of peasant families owned less than five hectares (a figure he established as a minimum size required to support a family) and of this group only one-third of the families owned more than one hectare. Although his study was limited to one area at the end of the century, his findings have been accepted as indications of a general pattern. See also M. Bloch, p.116.

were frequently made about abrogation of customary rights and encroachments on communal lands. As the eighteenth century progressed, the pressure of population and the rising prices encouraged land clearance and the extension of cultivation but many enlargements were still made at the expense of commons, as seigneurs claimed "unowned" land or exercised the right of "_cantonnement_" or "_triage_" of the commons.[11] Unfortunately for the small-holders, they were becoming increasingly dependent upon communal holdings and customary access to natural resources just when the lands were becoming the object of intensified seigneurial ambition and when customary usage was threatened by the demands of industry and military expansion. In addition, while holdings were shrinking, the seigneurial "_cens_", "_rentes_", and "_surcens_", the "_formages_", "_dimes_" and "_droits_" were increasing as nobles, new proprietors and the Crown attempted to compensate for the losses in revenue caused by inflation.[12] _Métayers_ found it more and more difficult to pay the tithes, dues, taille, vingtièmes, capitations, and taxes on commodities (that is the _aides_, _traites_ and the _gabelle_) as well as support their families on their half of the crop.

Despite, or perhaps because of, the general increase in prosperity, the domestic economy of the peasant families,

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[11] M. Bloch, _French Rural History_ (California, 1966), p.135.

[12] G. Lefebvre, _L. P. ..._, p.30.

upon whom effective administration and national security ultimately depended, became more precarious. Opportunities for "auxiliary" employment increased, but because peasants depended upon domestic manufacturing to supplement their incomes, they were more vulnerable to recessions in manufacturing and collapses in the market. The shrinkage of land, and loss of essential commons which had allowed families to undertake a miniature polyculture[13], made families more vulnerable to crop losses too, and despite the general improvement in the weather and the market, the eighteenth century was not without its disasters. Some regions experienced drastic scarcities in 1724-26, and in 1744-45, and there were particularly bad harvests in 1748-49 as well as in 1755 and 1763.[14] Although the scarcities only affected limited regions, their significance was heightened by the memory of previous disasters, particularly since the same

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[13] R.Price, The Economic Modernization of France (London, 1975). The author characterises traditional communal agriculture as a "subsistence polyculture" despite concentration on production of grains.

[14] M.Block, French Rural History, pp.187-98. Also see C.C., editor's note, p.72. The conditions in 1763 in particular drew the attention of the central government, since the scarcities occurred right in front of them. Brie, Beauce, and Ile de France suffered most on that occasion and d'Argenson noted in his journal that the King was so upset by the distress that he refused to take his usual route during his migrations to the countryside because he wanted to avoid coming face to face with the misery of the people.

chain reactions were evident. Prices of food continued to fluctuate wildly during the period, and this alarmed many administrators. The price of grain dropped astonishingly in 1756, in 1762, and 1763[15] and there were great regional variations.[16] Although graphs prepared by twentieth century economic historians indicate that these were merely temporary collapses, theorists in the eighteenth century believed, on the evidence of their own studies, that prices were steadily falling.[17] All this was very upsetting, not so much because of the severity of conditions as their instability and unpredictability. The exploitation of natural resources (from forests to fields), the size of the harvests, the distribution of products and variations in prices, were evidently affairs of State, and clearly something had to be done to guarantee a consistently high level of agricultural production, to stabilize markets and to prevent

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[15] A generalization from charts showing prices of grain 1756-1790 in south-west, central, east, north-east and western France, compiled by Labrousse, N.E.E.F., pp.403-416.

[16] See N.E.E.F., p.373. The price of grain in the south-west, for example, was often as much as 60% higher than the price of grain in the north.

[17] Lesseance, in Recherches sur la Population, presented tables comparing prices of grain during the century at Paris, Lyons and London, and his figures indicated sudden and fairly substantial fluctuations in price, especially at Paris. He also concluded that the common price of wheat had fallen and was continuing to fall. He estimated that the common price had dropped from 23/5 (livres and sols) in 1674-1714 in the Paris market, to 18/10 in 1724-1763, and the drop was comparable in other markets within the country and beyond it. See also Quesnay, Tableau Economique, where it is evident that Quesnay shared Lesseance's opinion that prices were gradually falling.

the loss of a taxable population who could contribute a predictable revenue [illegible] which the government could [illegible].

The administration had, of course, attempted to regulate the use of resources. As early as 1669, Colbert drew up legislation restricting access to forests and placing them under the jurisdiction of a hierarchy of officials who enforced ordinances governing planting, cutting and the general use of forest products. But the Ordonnance was not universally effective, many of its regulations were actually harmful to conifers on which the Navy depended, and there were no real provisions for re-forestation.[18] The government had attempted to encourage the development of other natural resources to serve as fuels. In 1744, for example, they encouraged the exploitation of oil deposits[19] and later in the century encouraged the exploration for coal, its extraction and refinement.[20] With the guidance of the Ministry of Marine, scientists like Réaumur, Buffon and Duhamel, busied themselves examining growth patterns, testing the tensile strength of wood, and developing re-forestation techniques.[21]

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[18] Bamford, Forests and French Sea Power, 1660-1789.

[19] T. Leon and M. Carriere, in H.E.S.F., p.232.

[20] "Lettres Inedites de Buffon", Buffon (M.N.H.N.), p.212.

[21] A.M. Wilson, French Foreign Policy ..., p.74. See also Memoires de l'Academie des Sciences -- publications like [illegible] de Courtivrons' Discours sur la necessite de perfectionner des Forges pour diminuer la consommation du bois (17[illegible]) may not have been commissioned by Maurepas directly but indicate growing civic concern with deforestation and also identify the source of the threat to natural resources.

Provisioning policies had long been established to counteract the effect of periodical shortages. These restricted and directed the market in agricultural commodities but they did nothing to guarantee production and did little to prevent sudden swings in prices. Attempts were also made to guarantee revenue to the State, by shifting the tax base, but these only augmented political hostility to the Crown. For example, in the years following the War of the Austrian Succession, Machault proposed two capitations (1747) and a vingtième (1751) which were to be levied upon all classes; however, opposition by the clergy, the parlements and the provincial Estates was virulent and by the end of 1751, the first and second estates had re-established their customary exemptions. The vingtième introduced in 1756 enjoyed no greater success and all of these new taxes were ultimately levied upon the rural population which was ill-equipped to support them.

In place of these various piecemeal measures, the Physiocrats proposed a comprehensive programme which they believed would ensure a constant high revenue for the State by guaranteeing high agricultural production, and reducing capricious fluctuations in the markets. In order to do this they claimed that it was necessary to abandon the restrictions on the circulation of agricultural commodities and to transform methods of cultivation. Finally, to improve the State's access to the anticipated increase

in revenue, they recommended that the taxation system be completely rationalized. Instead of the bewildering morass of direct and indirect taxes, they proposed that an impôt unique be imposed universally on the net product of land, or the surplus, which was ordinarily paid to the proprietor. Ideally this tax would be paid directly by proprietors and only indirectly by cultivators in the form of rents calculated upon potential crop yields of their holdings.

This bare presentation of their intentions obscures the fact that their recommendations effectively reversed about a century of official government policy and that the implementation of their proposals would necessitate significant social, economic and political changes. By declaring that "les biens primitifs d'état sont les hommes, les terres et les bestiaux"[22] Quesnay repudiated the mercantilist economic theory which had more or less informed government policies since Colbert first declared that "trade is the source of public finance and public finance is the vital nerve of war".[23] Nevertheless, Quesnay certainly agreed with the last part of this statement, and it is evident from his writings that Physiocracy, like Mercantilism, was intended to guarantee state revenue so that French military power would not be compromised by administrative bankruptcy. In

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[22] F. Quesnay, "Grain", L'Encyclopédie (Paris, 1757), 7:821.

[23] [illegible] Economic History of Europe, ed. E. Rich and C. H. Wilson (Cambridge, 1967), 5:[illegible].

the concluding paragraphs of the major analysis, the Tableau Oeconomique he carefully contradicted the "vulgar" belief that a large population was a sufficient foundation for armed power, and this entire essay can be viewed as a preface to the discussion of national strength that is placed in the last paragraphs.[24]

Like Colbert, Quesnay believed that armies marched on money. Wealth was necessary to ensure the health and loyalty of the soldiers and to finance modern continental and maritime warfare; that is, to buy cannon and to build ships. Quesnay did not agree with the first part of Colbert's maxim, however, and throughout the Tableau he took pains to define the kind of wealth essential for national power, and to correct the popular misconception that riches consisted in having more gold and silver than the rest of the world, or than one's neighbour. He insisted that agriculture alone, and not a reserve of metals, was the basis of national wealth and power.

> La masse du pécule d'une nation agricole ne se trouve qu'a peu pres égale au produit net ou revenu annuel des biens fonds ... c'est dans ces

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[24] F. Quesnay, Tableau Oeconomique, Maxim 24, p.19. The footnote amounts to an essay of almost 1,000 words. The same sentiment can be found in passages written by Mirabeau, for example, in Philosophie Rurale. He states,

> "Wealth can bring either the destruction or defence of people who possess it. It will constitute their strength if it is employed to build up strong defences and to maintain large armies which are well disciplined and well paid."

Quoted in R. Meek, Economics of Physiocracy (Mass., 1963), p.87.

> richesses renaissantes et non, comme pense le vulgaire, dans le peuple de la nation qui constitue la prosperité et la force d'un état. [25]

A truly productive agriculture would reduce the number of men employed in the fields, freeing them to fill the ranks of the armed forces, and would also generate the wealth necessary to support a nation in arms. Quesnay believed that it was the well-intentioned fiscal commercial and provisioning policies of the government which prevented the realization of this material potential. Like Duhamel de Monceau, for example, he insisted that provisioning actually induced shortages and famines,[26] but aside from criticising the obstructed circulation of market goods, he also blamed

> ... la dépopulation, le manque de richesses dans les campagnes, l'imposition indeterminées des subsides, la levée des milices, et l'excès des corvées, [27]

for undermining agricultural productivity and consequently inducing fiscal embarrassment.

The most crippling of these conditions was apparently the absence of capital. Quesnay was only concerned with depopulation of the rural areas because the peasants who drifted away from the villages -- reduced by the ephemeral prosperity of the cities -- took their money with them.[28]

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[25] F. Quesnay, Tableau Oeconomique, p.17.

[26] Duhamel de Monceau, Traité des Grains (Paris, 1754), p.xiii; cf. F. Quesnay, "Fermiers", L'Encyclopédie, 6:536.

[27] F. Quesnay, "Grains", L'Encyclopédie, 7:816 and F. Quesnay, "Fermiers", L'Encyclopédie, 6:530.

[28] F. Quesnay, Tableau Oeconomique. Maxim 9, pp.7-8.

His fundamental tenet was that farming required cash and that no amount of man-power could replace a substantial bank account.

> Une riche récolte suppose nécessairement une richesse précédente à laquelle les travaux, quelques multipliés qu'ils soient ne peuvent pas supplier. [29]

Quesnay continually compared _métayage_ unfavourably to _grande culture_ and extolled the virtues of the _laboureurs_[30] who implemented it. Physiocratic proposals that taxes be reduced to a uniform, single cash payment (ultimately calculated on the quality of property) were intended to give these farmers an opportunity to accumulate capital so that agriculture could be undertaken on a "proper basis". In a number of articles for the _Encyclopédie_ and in the _Tableau Oeconomique_ Quesnay outlined specific proposals for the restoration of agricultural prosperity, and in most instances he directed his remarks against current farming techniques. The article, "Fermiers", for example, is ostensibly a discussion of the relative merits of cultivating with oxen or horses. Quesnay complained that oxen ploughed too slowly and consumed too much of the harvest during the

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[29] F. Quesnay, _Tableau Oeconomique_, p.5.

[30] P. Goubert, _L.P.S.F._, p.141. A potentially confusing term, _laboureurs_ in this instance refers to farmers who are distinguished from the more numerous workers, the _brassiers_, by their possession of at least one plough team. They are usually secure enough financially to enter into more advantageous land-holding contracts than _métayers_.

winter, and that pasture used to support them could be used more profitably for other herds like sheep. Horses, on the contrary, consumed less feed, although they had to be supplied with better quality forage, and fewer men were necessary to handle the teams. But the advantage of horses is lost where land is farmed in scattered parcels, as was the case in most of rural France, so that oxen are actually better suited to these areas. It is apparent that the criticism of current ploughing practices here screens an attack on land-holding patterns, and social organization. His support for horses is, in effect, support for the elimination of the impecunious small-holders; and Quesnay later (openly) recommended the incorporation of their plots into large farms leased for simple cash rents.[31] This re-establishment of land tenure on a cash basis was intended to emancipate the farmer from arbitrary personal impositions. In general, the physiocratic demands for changes in agricultural methods obscured the real target, which was the confusion of personal obligations attached to land, and the restrictions on individual action imposed by the communal agricultural regime.

In this kind of farming, the kind of crops planted, the sequence of rotation, the number of animals admitted to the common herd, and even the order in which they would

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[31] F. Quesnay, "Grains", L'Encyclopédie, 7:821.

grass was established by community tradition. Private meadows could not be closed to the communal herd, nor could fields in which the crops had been cut. Seigneurs enjoyed special privileges such as <u>trouveau part</u>, access to forests and rights to swarms and other windfalls.[32] In many communities, especially where part of the crop was owed to the lord as payment in kind, legislation prohibited the enclosure of single plots, or individual innovations in planting which would reduce the total yield of the community.[33] In any case, individual experimentation in crop sequence was difficult to undertake on small strips spread out over several "quartiers", since the hedging of tiny plots cost far too much time. Single farmers in a community where the land was ploughed, sown and harvested in concert, could not suddenly decide to try growing hemp or grapes in the midst of a <u>quartier</u> sown with wheat, since the growth cycle in their patches would be out of harmony with the community crop.

When, in his articles, Quesnay criticizes two and three crop rotation patterns with fallow periods, and condemns the maintenance of communal meadows for the nourishment of plough animals, here too he is condemning more than agricultural practice. Although commons were essential for

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[32] A. Goubert, <u>M.E.S.F.</u>, p.102.

[33] M. Bloch, <u>French Rural History</u>, p.35.

the small-holder who could otherwise not afford to maintain his livestock; it was inconvenient for the holder of larger properties to open his lands to support the common herd. The Physiocrats wanted farmers to be free to transform cereal fields into artificial meadows, sown with lucerne, clover and sainfoin, for the support of livestock and plough teams.

> Plus on peut cultiver des menus grains de racines, d'herbage, ou de pres artificiels pour la nurriture des bestiaux, plus on peut par les moyens de cette culture, nourrir les bestiaux dans leurs étables, plus ils fournissent de fumier pour l'engrais des terres, plus les recoltes sont abondantes en grains et en fourrage, plus on peut multiplier les bestiaux. 34

The increase in livestock would serve the double purpose of improving the fertility of the land, and providing an alternate food supply which would allow the development of an export trade founded upon grain. Still, the proposal to intensify animal husbandry is transparently directed against the communal system, since alterations in the rotation system and enclosure would be necessary so that artificial forage crops could be produced in large quantities. Then too, some control over breeding is imperative so practices like communal grazing and inter-commoning would have to be discontinued.

Proposals in the later Tableau also indicated that Quesnay intended to free laboureurs from the restrictions

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34 F. Quesnay, "Fermiers", L'Encyclopédie, 6:533.

of current practices. [illegible] the suggestion that

> ...chacun doit libre de cultiver dans [illegible] telles productions [illegible] interet, ses facultes et la nature du terrein lui suggerent. [35]

The footnote referred specifically to legislation prohibiting the transformation of grain lands into vineyards, which was part of the Royal provisioning policies. Nevertheless, the suggestion has obvious implications for customary communal practice.

The physiocratic emphasis on diversification, their support for the mechanization of agriculture, and a reduction of the number of men actually employed in the fields, was typical of French agrarian theories of the period. For the most part, these were derived from the innovations of Jethro Tull, an English gentleman who lived in the first quarter of the eighteenth century. Tull recommended a continuous rotation of crops, without a fallow period, and depended on the sequence of crops and on an almost constant cultivation (previously restricted to kitchen gardens) to keep the soil productive. He also planted in rows instead of broadcasting seed, and introduced machines like the seed drill and the horse-hoe which he developed to replace recalcitrant laborers

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[35] F. Quesnay, "Maxim 22", Tableau Oeconomique, p.16.

on his estates the suspected the efficiency and the intent of the new methods and refused to implement them.[36]

Although Quesnay did not refer to the New Husbandry, as it was called, his associates at Court included the major agronomists of the period, LeRoy, Dutré and Tatulle,[37] so he must have been familiar with the new techniques. Quesnay also attentively read the works of Duhamel de Monceau, the chief proponent of the new methods in France. Duhamel had translated Tull's writings and conducted extensive experiments on his own estates. He modified the proposals only to the extent of continuing to dung land as well as cultivate it according to Tull's directions, and many French authors including Quesnay followed his lead rather than Tull's and continued to recommend the use of manures.[38]

As Duhamel's experiments showed, the New Husbandry

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[36] G.E.Fussell, Jethro Tull; his influence on Mechanised Agriculture (Reading, 1973), p.20.

[37] E.Fox-Genovese, The Origins of Physiocracy (Cornell, 1976), pp.76-83. We also have the testimony of Madame du Hausset, La Pompadour's chambermaid, to confirm Quesnay's sustained interest in agriculture. She reported,

> "He used to chat with me about the countryside, I had been brought up there and he used to get me to talk about the meadows of Normandy and Poitou, the wealth of the farmers and the method of cultivation. He was much more concerned at Court with the best method of cultivating the land than with anything else that went on there."
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> Quoted by R.Meek, Economics of Physiocracy, p.35-1[illegible].

[38] Duhamel de Monceau, A Practical Treatise of Husbandry trans. J.Mills (London, 1762), p.20.

not only required a large initial cash outlay, but it was also best suited to large farms on which the use of the horses and machines was feasible. It was possible of course for entire communities to switch to a three crop rotation pattern using horses and planting continuously, without making major re-arrangements in property holdings. Granted, this required a level of communal prosperity that was generally absent in France, to tide the community over the interim period, but Quesnay never even considered this possibility in his articles.

Evidently his proposals were not intended to improve present conditions so much as to transform the situation. It is safe to conclude that in the hands of the Physiocrats, the New Husbandry was a weapon in the attack on "feudal" economic and social arrangements. The agricultural changes inevitably had social implications: an agricultural regime is not simply a specific method of planting. It constitutes a complex of economic and social arrangements, sustained by particular attitudes towards property holding and individual right. The communal system in France had evolved as a solution to the difficulties of supporting livestock and its development was encouraged by the size and fragmentation of holdings. But as Bloch has pointed out, the arrangements were not necessarily dictated by land-holding patterns; the practices were also sustained by certain ideas about ownership, particularly the belief that once land has

finished producing it cannot be exploited by individuals and reverts to the community.[39]

Individual rights to the crop itself were restricted in the interest of the community. Villagers had the right to glean fields after the first cutting to pick up materials for thatching, litter and fuel so specific legislation often prevented owners from using implements which would shave the fields too efficiently.[40] Quesnay's criticisms of communal practice and seigneurial privilege in the interest of an entrepreneurial farming can be seen as support for a kind of agricultural individualism which was not only economically impractical within the existing regime but was also socially unacceptable. It was apparently predicated upon an exaggerated sense of a private right to utilise resources that was foreign to the traditional rural organisation. Quesnay believed that it was individual interest and liberty which

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[39] M. Bloch, French Rural History, p.46. This sentiment even found formal expression in the writings of jurist Eusebe Laurierre who wrote during the reign of Louis XIV. He stated that "Once crops have been harvested, land becomes subject to the law of nations and is common property of all".

[40] Ibid., p.43. Many of the restrictions benefited seigneurs alone, for example, they set the harvest date, harvested their crops first, set market dates, and often (as was the case in wine areas) marketed their goods first -- P. Goubert, M.E.H.S., pp.127-28. So the physiocratic criticisms of agriculture and trade restrictions are not simply aimed at communal practices, they attack seigneurial "feudal" privileges.

vivify States. Personal obligations were only the archaic remnants of an earlier feudal tyranny,[41] and in many of the physiocratic writings it is possible to detect his distinct dislike for the traditionally constituted aristocracy which continued to demand such duties. In a brief comparative history of political economies that appears in La Philosophie Rurale, (a kind of Physiocratic handbook published in 1763) his social as well as economic prejudices are quite visible.[42] This work proposed that the highest social form was the agricultural society. Only farming could support large populations and accumulations of wealth and consequently societies based on this activity became more civilized than others since they required more laws and social forms to secure property and to guarantee the benefits of human association. There is some praise for herding societies in the essay but the greatest contempt is reserved for hunting and the societies which develop from it. It is an occupation adapted only to man's brutish character and encourages natural licentiousness, so societies

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[41] R.Meek, Economics of Physiocracy, p.59.

[42] The book attempts to show that there is a certain natural order of development in all things, including the complexities of human association, which follows from given material conditions. As Mirabeau said, "with us, all is physical" (R.Meek, Economics of Physiocracy), by which he apparently meant that according to the physiocrats, all customs, arts and morals were subordinated to physical circumstances, and to the relationship between men and their environment.

which are animated exclusively by this pursuit are necessarily rapacious and piratical.

> Those nations which sooner or later adopted and practised the primitive art of agriculture have sooner or later come to enjoy the benefits of society and of union, of population, of good and equitable laws and of the appropriate arts and skills. The others have grown old in a state of barbarism and have to some extent declined every day in numbers, in skill and faculties of all kinds. [43]

Human development then, both intellectual and numerical, can atrophy if societies are established upon inferior kinds of economic activities.

In an era when the nobility were clinging to hunting rights among other symbolic representations of the traditional functions which justified their pre-eminence, this castigation of hunting and the society which develops from it can be interpreted as an attack on the feudal concept of nobility. The Physiocrats also fired a few broadsides at the First Estate. A superabundance of ecclesiastical and celibatarian institutions in society was not conducive to the increase of human numbers and skills, or the circulation of wealth, so they termed any society dominated by clerical interest, an "ecclesiastical despotism". [44] The physiocrats may not have intended to eradicate or reverse the hierarchical

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[43] Extract from Rural Philosophy cited in R.Meek, Economics of Physiocracy, p.62.

[44] Miscellaneous extracts from Quesnay's marginal notes on Mirabeau's Traite de la Monarchie cited in R.Meek, Economics of Physiocracy, p.65.

social structure, but their proposals would have substantially altered its foundations. It appears that Quesnay at least had little sympathy with the feudal definition of nobility as social prestige and legal privilege guaranteed by sovereign authority and based on an historical role. Granted, when he attempted to counteract public contempt for farming he used the nobility as models. He deliberately emphasised the connection between the aristocracy and agriculture and praised the humanitarian and pious aspects of this pursuit.[45] But his assertion that the nobility had long been connected with farming was a slight distortion, for the connection was a financial, not an occupational one. Young's comment later in the century, that the wealthiest dukes in the kingdom had the most devastated properties, was probably true of any point in the century.[46] The nobility were interested in land because it secured for them intangible honours, and a legal and moral jurisdiction. It was the new aristocracy and bourgeois land-holders who regarded their estates as simple profit-making enterprises. Of course the old aristocracy were not averse to profit, but the means which Quesnay suggested to them for financial re-establishment would have changed the meaning and social

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[45] F. Quesnay, "Maxim 20", Tableau Oeconomique, p.14, footnote b.

[46] A. Young, Travels in France During The Years 1787, 1788, 1789 (London, 1794)

function of the group. In the Tableau he commented,

> Seroit-ce déroger la Noblesse que de leur permettre d'affermer des terres pour étendre leur culture & leur occupations au profit de l'État; sur-tout dans un pays où la charge de l'impot (devenue deshonnête) ne seroit plus établie ni sur les personnes, ni sur les Cultivateurs? Est-il indécent à un Duc & Pair de louer un hotel dans une ville? Le payement d'un fermage, n'assujetit à aucune dependance envers qui que ce soit, pas plus que le payement d'un habit, d'une rente, d'un loyer &c.... Dans les Nations libres le fermage des terres, delivré des impositions arbitraires & personnelles, est fort indifferent en lui-meme; les redevances attachées aux biens & auxquelles les Nobles memes sont assujétis, ont-elles jamais deparé la Noblesse, ni l'Agriculture?[47]

This encouragement reveals little sympathy for the traditional nobility. There is an allusion to their military function, but elsewhere Quesnay stated his preference for the commercialization of military service which would make efficiency predictable in numerical terms alone and would eliminate the need for an hereditary warrior elite.

It is obvious that in the physiocratic society, the aristocrats are to be re-constituted as simple proprietors with an obligation to keep wealth in circulation. The noble has been eclipsed by the rich farmer who is the hero of Quesnay's writings, and he is envisioned as an entrepreneur who governs and increases the value of his enterprise by

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[47] F. Quesnay, "Maxim 15", Tableau Oeconomique, p.11, footnote c.

his intelligence and his capital,[48] and his labour in the public interest gives him an exalted position of importance.

> ...apres les proprietaires distingues par la naissance, par les dignités, par les sciences, ils forment l'ordre des citoyens le plus honnete, le plus louable et le plus important dans l'etat. 49

The physiocrats did not simply want to increase production within the seigneurial system. Their technological, and commercial recommendations indicate that they wanted what amounted to a transformation of the social order. The institution of a single tax, the abolition of customary tolls and dues like riviere and péage, and the elimination of communal agricultural regulations can all be interpreted as aspects of their desire to eradicate the descending order of juridical privilege in the interest of economic and social rationality.[50] Ultimately they hoped to eliminate those inalienable personal rights that were the accident of birth alone and to re-establish the economy and the society

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[48] F. Quesnay, "Fermiers", L'Encyclopédie, 6:535. Also F. Quesnay, "Grains", L'Encyclopédie, 7:821. "...C'est un entrepreneur qui gouverne et qui fait valoir son entreprise par son intelligence et par ses richesse."

[49] F. Quesnay, "Maxim 20", Tableau Oeconomique, p.14.

[50] In this context it is worth noting that the restrictions on circulation of market produce were binding on peasants, laboureurs and fermiers but that the nobility ignored them with impunity. P. Goubert, H.E.S.F., p.362, reports that in 1710, in the midst of widespread famine, the seigneurs continued to export grain from Bretagne to their customary markets.

on "absolute property" or the universal right of man to "enjoy completely those things which he needs to sustain himself."[51] According to Quesnay this right was guaranteed in the order of nature. God quite reasonably provided for man's preservation and increase in his Creation[52] and as population grew, solitary men increased their chances for survival by combining in society where their right to fulfil fundamental needs was guaranteed by human laws. Ideally then, societies should reproduce the natural order ordained by God, since all laws, governments, customs and arts proceed from simple economic arrangements. In other words, individual rights derived directly from God instead of being filtered through a social hierarchy and they were universally not selectively enjoyed. There are evident Newtonian elements in this depiction of a self-manifesting order engineered by the operation of constant forces. While the physicists were transforming gravity into a physical property of matter, the physiocrats had defined their own material force. In the "Philosophie Rurale" they explicitly compared the action of self-interest on individuals in society to the action of gravity on stones in an arch.

> All [stones and individuals] contribute to the solidity of the construction by virtue of the gravitational

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[51] "Natural Right", cited in R.Meek, Economics of Physiocracy, p.43.

[52] Ibid., p.53. Extracts from "Philosophie Rurale", p.61.

> force which should to the contrary detach them, but which actually constitutes its essential stability by the means of the pressure and the totality of the different parts. 53

Still, the physiocrats do not seem to have believed order could be fulfilled in human society by the operation of self-interest uninformed by Reason. If need generated society, laws, customs and arts, Reason, a divine and insubstantial force still completed or fulfilled the arrangements which develop from necessity. The force which organizes human existence comes from beyond the material world and is similar in this fashion to the spiritual interpretation of gravity which Newton himself seems to have favoured.[54] Communities were required to exercise this god-given faculty to analyze and comprehend the Natural order so that actions or laws would be in conformity with its principles.[55]

The economic and social reforms the physiocrats

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[53] From Introduction to l'Ami des Hommes, first published by Mirabeau alone in 1758, later volumes are result of collaboration with Quesnay. Other evidence of Quesnay's Newtonian bias can be drawn from his early medical treatises. Some of his contemporaries labelled him the "French translator of Boerhaave" because he was so heavily influenced by the work of that scientist and his followers who were attempting to find a single cause of all physiological phenomena. From Hecht, Vie de Quesnay, cited in E. Fox-Genovese, Origins of Physiocracy, p.80.

[54] See four Letters to Bentley, in H.S. Thayer (ed), Newton's Philosophy of Nature: Selections from His Writings (New York, 1974).

[55] E. Fox-Genovese, "Quesnay, Physician and Metaphysician", chapter 2, The Origins of Physiocracy.

advocated were intended to make human laws correspond to natural laws operating universally and rationally. They believed that some absolute authority was necessary to enforce law and to ensure that the principle of economic harmony was not violated.[56]

In agricultural kingdoms, sovereignty most suitably resided in a King and the physiocrats expected the sovereign to continually rationalize the economy, and to encourage the self-manifesting pattern of exchange. Quesnay and his followers, like earlier economists Vauban and Boisguilbert looked to the King to inaugurate economic and subsequently social reconstruction. Monarchical authority was to be restricted only by the natural laws in whose name the King governed.[57]

There is an evident ambiguity here, in the idea that the natural order, which manifests itself as human society, requires superintendence and assistance if it is to fulfil

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[56] From --"Natural Right", Economics of Physiocracy, p.54. "There is a sovereign authority standing above all individuals in the society and all the unjust undertakings of private interests for the object of dominion and allegiance is the security of all and the lawful interest of all.

[57] F.Quesnay, "Fermiers", L'Encyclopedie, 6:536, and in Tableau Oeconomique. Quesnay frequently remarks that the government is about to examine economic abuses and take measures to correct the situation. On Vauban and Boisguilbert, see R.Tom-Kenovese, Origins of Physiocracy, p.108.

itself. The ambiguity was encapsulated, perhaps inadvertently, by Dupont de Nemours who coined the term "Physiocracy" for the doctrines. Physiocracy or the 'Rule of Nature' can be interpreted as the rule according to Nature or indeed the superintendence of Nature. The implications of this ambiguity are evident if it is recognized that the natural order which the physiocrats intended to institute was that which is "most advantageous to men". When Quesnay said that God provided for man's preservation in His Creation, he really meant that God provided the Creation specifically for that purpose. He explicitly stated that man not only has the intelligence to contemplate, understand and manipulate natural laws, but that he has a mandate to arrange Creation for his benefit. He admitted, though, that the results may be less than happy for the other inhabitants of the planet.

> The natural order which is most advantageous to men is perhaps not the most advantageous to the other animals but included in man's unlimited right is that of making his lot the best possible. This superiority pertains to his intelligence; it is part of the natural right since man inherits it from the Author of nature who has determined it in this way through the laws which he has instituted in order of the formation of the universe. [58]

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[58] "Natural Right", cited in R.Meek, Economics of Physiocracy, p.54. Quesnay defined natural law as both moral and physical. Physical law constituted "the regular course of all physical events in the natural order which is self-evidently the most advantageous to the human race". Moral law constituted "the rule of all human action in the moral order conforming to the physical order which is self-evidentally the most advantageous to the human race." from "Natural Right" (1765), in Economics of Physiocracy, p.53.

If societies, like nature, exist to ensure the preservation and increase of man, then any changes which increase the national revenue (which guarantees the prosperous enjoyment of natural rights) are justified regardless of the social and ecological transformations they entail, because they bring society back into line with the natural order and fulfil God's intentions. The aristocracy can be re-cast and the communal system of agriculture can be dismantled. The connection between Quesnay's background and his economic theories has often been commented upon. Quesnay was the son of peasants. His father collected rents and tithes for an abbey nearby and the family belonged to the laboureur class he so frequently praised in his writings. Despite a low start, Quesnay's professional life could not have been more successful. He was employed as surgeon to the Duc de Villeroy, and was introduced to Court circles where Quesnay promoted himself through his skill and discretion. By 1749 he was personal physician to Madame de Pompadour and was permitted to purchase the position of first médecin ordinaire to the King -- a post which eventually brought him letters patent of nobility. His ability won the recognition of professionals too. He was appointed permanent secretary of the Paris Academie des Chirurgiens and entered the Academie des Sciences and the Royal Society. But although he was personally successful and benefited from the system of patronage, he was also inconvenienced by the

social arrangements of the ancien regime.[59]

A very distinct professional line was drawn in the eighteenth century between physicians and surgeons, and although surgeons were enjoying increased popularity and increased incomes they did not enjoy a commensurate increase in prestige. They suffered the contempt of doctors, whose professional pretensions were endorsed by a guild system which imposed numerous restrictions on surgical practice. As a surgeon, Quesnay endured social snubs and could not enter upon studies for a doctorate within Paris, but had to obtain it outside the capital. It wasn't until 1743 that the Crown intervened to satisfy the ambitions of the surgeons by removing legislation which classified them with barbers. In view of his personal experience, it is not surprising that in his writings, Quesnay favours talent and wealth, rather than birth, as a prerequisite for noble status, and that he expected the King to guarantee or restore social justice. In this context it is interesting to note that while he later recommended the free exercise of self-interest, he apparently trusted the economic motives of the rural classes alone. He appears to have been suspicious of financiers, merchant capitalists, corporations and orders which had secured their own privileges with legislation at the expense of the community. Of the rural peasants and

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[59] E. Fox-Genovese, Origins of Physiocracy, p.72.

wage-earners, however, he added,

> motives founded upon the possibility of increasing wealth by wealth are the springs which excite them to work, which render them useful and which procure wealth for the State. [60]

Quesnay did not begin writing on political economy until 1755 when he was about sixty-two years old.[61] The Wars of the Austrian Succession had just finished and the national finances were a shambles, so it is not surprising, given his position at the Court, that he turned to economic studies and saw the crisis of the ancien regime in economic terms. Still, his proposals that the national economy could be restored by encouraging the efforts of the "laboureurs" seem to be a kind of social self-justification. But interpreting physiocratic doctrine as bourgeois propaganda is dissatisfying in several ways. In the first place, this interpretation obscures the moral content of Quesnay's proposals. Although Quesnay was not a moral philosopher, he admired and emulated Confucius, because he believed that the Chinese philosopher had made his countrymen aware of a divine force within them which commanded recognition and that this act of recognition provided the foundation of a reformed life. On his part, Quesnay believed that Reason, which illuminated and guided man, was a divine emanation

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[60] F. Quesnay, Tableau Oeconomique, Maxim 14, footnote b.

[61] E. Fox-Genovese, The Origins of Physiocracy, p. 77. "Fermiers" was published in 1756, composed in 1755.

and that the recognition of this fact and the moral responsibility to exercise this gift would provide the foundation for a moral and rational life.[62] Since morality was ultimately subordinate to the net product, man was obliged then to investigate and comprehend the order of nature so that he could provide for himself the economic conditions which make moral action possible. If the laws recognized and enforced adherence to the natural order, discovered by Reason, the moral reform would follow.[63] Consequently, the production of more revenue for the State, through the rational exploitation of Nature, becomes an aspect of man's spiritual obligation to the Creator, and the fulfillment of the Divine purpose.

Interpreting physiocratic doctrines as "class promotion" also fails to account for the support and contribution of the Marquis de Mirabeau, whom recent scholars suggest should be regarded as Quesnay's collaborator rather than his cipher. Mirabeau would hardly be likely to sympathize with bourgeois ambitions. He was a member of one of the older aristocratic families and had an established reputation as a conservative spokesman for his class. His family had suffered from the economic changes of the period -- their fortunes were compromised by imprudent investment in Law's system -- and they

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[62] See F. Quesnay, _Histoire Sommaire de la Chine_ and _Despotisme de la Chine_.

[63] Excerpts from Mirabeau and Quesnay in "Rural Philosophy" in R. Meek, _Economics of Physiocracy_, p. [illegible]. "If the fruits of ownership and recompense due to labour are restored and assured then men will of their own accord set themselves back again [illegible]

had been effected by the gradual exclusion of the nobility from worthwhile political activity. Mirabeau's brother for some reason or another had little success acquiring royal patronage, and Mirabeau himself was possessed of an irascible temperament which prevented him from securing a military command or any other promotion at Court. Other occupations were closed to him either because of his noble status or his lack of capital.[64]

Mirabeau recognized in his personal experience the dilemma of his entire class, and believed that it presented a critical problem for the ancien regime. In 1757 he made his opinions and recommendations public in a book entitled L'Ami des Hommes and when Quesnay and he were introduced the following year through the offices of their mutual patron, Madame de Pompadour, Mirabeau was still basking in the popularity his publication had won for him. In the work, he appears to be a reactionary aristocrat anxiously protecting the traditional social and political privileges of his class. Whereas Quesnay supported the authority of the absolutist King against the claims of privileged corporations and orders, Mirabeau distrusted the centralized monarchy and loathed the despotic administrative agents who represented the King's authority on the local level.

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[64] Information from E. Fox-Genovese, Origins of Physiocracy, based on Loménie' Les Mirabeau (Paris, 1879-1891)

He singled out increased political centralization and the accumulation of wealth in irresponsible hands as the causes of his personal and class alienation. Although many of his criticisms return to the matter of guaranteeing the social, political and economic pre-eminence of the hereditary aristocracy, his support too was not merely the product of class-interest. Mirabeau was genuinely concerned about the moral stability of society. He believed that the financial officers, intendants and farmers were disrupting traditional relationships between peasant, the feudality and the King and that rapidly acquired fortunes (and commercial fortunes in particular) were undermining the social hierarchy and traditional patterns of authority by encouraging restlessness and insubordination. The monarchs themselves had contributed to the imbalance because in their search for income to support their inordinate political ambitions they had favoured the monied groups at the expense of the traditional and responsible aristocracy. In this fashion the Kings had encouraged the erosion of social distinctions and had compromised their own authority.

It was Mirabeau's belief that order in society depended upon religious education and maintaining a proper royal authority which legitimized social arrangements. In

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[65] See L'Ami des Hommes; Traite De La Population by Victo de Riquetti, Marquis de Mirabeau (The Hague, 1758-9).

his opinion, the re-establishment of moral harmony required more than sound fiscal administrations and for this reason he was more interested in social restoration than in economic reconstruction. His solution, in essence, was to eliminate the noblesse de la robe who had purchased their status, to de-centralize the royal government and to increase the administrative jurisdiction of the provincial Etats so that the political authority of the traditional custodians would be restored on the community level. Mirabeau's disapproval of monetary wealth did lead him into economics but most of his proposals were incidental to his conservative social theories. He wanted wealth to consist of land which would impose upon the owner definite social and moral obligations in the community. For this reason, he condemned large concentrations of land which were administered as profit-turning enterprises by agents of absentee landlords. He favoured an agriculture undertaken upon traditional paternalistic grounds, with small estates on which the peasant would enjoy usufruct and could bequeath property to heirs, but would deliver agricultural surpluses to the nobility in recognition of their service. Ultimately, he favoured agriculture because it would keep a large population tied to the land in stable communities protected by benevolent disinterested aristocrats.

The distance between this and Quesnay's economic programme appears to be great, but apparently the two authors

managed to come to some reconciliation based upon their mutual desire to re-establish society on a moral foundation, their distrust of the effects of immoderate wealth and their belief that restoration could be effected by a major reversal in royal policies. During these years, each man affected the thought of the other. In the process of their collaboration Quesnay attempted to add a social dimension to efficient economic administration. He began to consider measures that would protect the members of society from the power of the sovereign, suggesting that the rights and obligations of social groups be delineated. Mirabeau struggled to bring his aristocratic values to terms with the commercialization of society and began to see that some social stability could be guaranteed through economic reforms. Their collaboration has some symbolic significance given the backgrounds and intellectual prejudices of the two men and their intellectual endeavour to reconcile two ethics resembles the one attempted by Buffon in his personal life. Many of the inconsistencies and contradictions in the finished theory may be interpreted as a result of the tension between Mirabeau's conservative view of society and Quesnay's bourgeois impatience with inefficient conventional obligations and restrictions.

It is difficult to understand why Mirabeau would accept universalism. Certainly Quesnay's economic proposals have a double edge. Depending on the circumstances, the

seigneur could profit as much as the peasant from the elimination of personal obligations and of the immense restrictions imposed on the individual by the communal regime. Quesnay's analysis did effectively eliminate the noblesse de la robe and the proliferation of petty authorities that Mirabeau detested, but as we have demonstrated, it also substantially altered the traditional meaning of aristocracy. Some commentators have suggested that Mirabeau was willing to accept universal law because it would allow him to restrict the monarchical ambitions[66], but it is also possible that he saw in the theories an opportunity to maintain an hierarchical structure in which the aristocracy would continue to exercise their moral authority if in a new way.[67]

Quesnay's theories at least provided the nobility with a means to re-establish themselves financially, and although in the physiocratic society, the tenant farmer is given increased respect, the ultimate proprietors are still guaranteed social and moral pre-eminence. Quesnay (grudgingly perhaps) allowed them their traditional function as military

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[66] For example, E.Fox-Genovese, Origins of Physiocracy, chapter 3.

[67] Mirabeau's preoccupation with the social responsibility of the aristocracy continued despite the influence of Quesnay who defined nobility as a "pious fraud". In "Traite de la Monarchie", (their unpublished joint work) Mirabeau persisted in defining nobility as a position in society which consisted of social obligation, rather than simply privilege.

custodians, but what is more important is that he restated their responsibility to their communities as an economic one.[69] They are to incorporate estates and to provide the initial capital which will put agriculture on a better footing, and their duty in the new society is to keep capital in circulation by responsible consumption -- which presumably means some kind of re-investment in the development of natural resources since this is the only productive use of wealth. Quesnay has provided the moral justification for enclosing the commons, consolidating property, and ignoring opposition made by community traditions, because he has expressed moral obligation in economic terms. The responsibility of the aristocracy to society can now be fulfilled by a(recognisably bourgeois) rational exploitation of nature.

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[69] F. Quesnay, Tableau Oeconomique-- table itself and explanation on pp.ii-v (Kuczynski and Meek's edition), also Maxims 1 and 5.

CHAPTER III

BUFFON'S NEW ORDER

The physiocrats were not the only ones trying to reconstruct the material order of eighteenth-century France. Buffon responded to the increasingly chaotic reality of the ancien regime by writing thirty-five volumes of natural history. By this effort, he hoped to elucidate the comprehensible pattern beneath the apparently infinite variety and mutability of Nature and to discover the mechanics of that pattern. The project was an ambitious one from the start, but he accomplished a great deal in the first few volumes, published in 1749. In these Buffon undertook to demonstrate the organisation of matter on a universal as well as a global scale, to indicate the distribution of life on this planet, the relationship between the material environment and the organic forms which inhabit it, and to establish the ties which unite all organic functions -- nourishment, growth, development, regeneration and death -- into a single system. Milliken and Fellows later referred to these first volumes as Buffon's mental baggage,[1] and suggested that despite later alterations in his thought, the

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[1] S. Milliken and O. Fellows, Buffon, p.112.

scientist returned again and again to the general ideas expressed here. The theories contained in these volumes merit some extensive consideration, on these grounds.

Like many other scientists working in Newton's shadow, Buffon endeavoured to explain phenomena in terms of universal forces acting equally upon common substances. In his discussion of the organization of the material universe, he took as his starting point the universal activity of gravity. As he declared in the first volume,

> ... cette force que nous connaissons sur le nom du pésanteur est donc generalement repandue dans toute la matiere; les planetes, les cometes, le soleil, la terre, tout est sujet a ses loix. [2]

His attempt to explain the formation of the solar system, referring only to the action of gravity, brought him into difficulties anticipated by Newton.[3] Gravity will account for the regular pattern of orbital movements but it can not account for such things as the diurnal rotation of the earth, nor does it explain how the orbital movement was initiated in the first place. The conformity in the position and direction of movement indicates that the planets received impulsion simultaneously, and Buffon used mathematical analysis to demonstrate that the planets are nearly equal in density and consequently

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[2] Buffon, C.C.E., 1:140.

[3] "General Scholium", Newton's Philosophy of Nature..., p.42.

> "...though these bodies may indeed continue in their orbits by the mere laws of gravity, yet they could by no means have at first derived the regular position of the orbits themselves from those laws ..." (Newton)

had the same material source. He was anxious, however, to confine his discussion to the physical realm.

> ... la force d'impulsion a certainement été communiqué aux astres en general par la main de Dieu, lorsqu'elle donna le branle à l'univers, mais ... on doit autont qu'on peut, en physique, s'abstenir d'avoir recours aux causes qui sont hors de la nature ... [4]

Consequently Buffon looked within Nature for the source of planetary matter and motion.

He proposed that a comet striking the Sun at an oblique angle furrowed the surface of that planet and dislodged a torrent of fluid matter amounting to a 650^{th} part of the Sun's mass. The obliquity of the blow conferred a spinning motion to all particles which were propelled some distance from the Sun. Then, the liquid particles joined together into fluid spinning globes because of their mutual attraction. This occurred before their outward movement was halted by the Sun's attractive power, but once formed, the globes were constrained to circle the star in regular paths determined by the force of their momentum acting against the attractive power of the Sun. Buffon maintained that the greatest and least dense particles were propelled furthest from the Sun, while the densest particles were joined together close by, so that there was a correlation between the density of the planets and the speed communicated by the impact of the comet.[5] This proposal put him at odds with Newton, on whom

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[4]Buffon, O.C.B., 1:140.

[5]Ibid., 1:156.

his theories otherwise depended, for Newton maintained that the density of the planets was determined by their distance from the Sun.[6] Buffon recognized the divergence of opinion, but declared,

> Malgré le confiance que méritent les conjectures de Newton, je crois que la densite des planetes a plus rapport avec leur vitesse qu'avec ce degré de chaleur qu'elles ont a supporter. [7]

Some commentators have suggested that this was part of a continual attempt at one-upmanship made by the pupil against his master, but the disagreement has wider philosophical implications. It is indicative of what turns out to be a major difference in their ideas on the establishment of order and harmony in the Universe, but I would prefer to leave this discussion till later in the paper. Buffon quickly returned to orthodoxy with his description of the formation of planetary satellites. According to his theory, the fluid globes spun so quickly that the attractive force of the particles was in many instances overcome and matter was separated from the globes forming rings or satellites. Even where no matter was pulled away, the globes were at least elevated at the equatorial regions where centrifugal force is felt most acutely. So in their first fluid state,

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[6] Newton may not have been consistent in his explanation or perhaps Buffon misunderstood him, for in a Letter to Richard Bentley, 10 Dec., 1692 (in Newton's Philosophy of Nature..., p.49) Newton suggested only that the density of the planets was one of the qualities that determined how far from the Sun God placed them.

[7] Buffon, O.C.B., 1:154.

the planets acquired asphcroid shape corresponding to the figure Newton proposed for the Earth.[8]

Buffon minimized differences in density and maintained that the planets were nearly equivalent in density, and were nearly homogeneous in composition. The Earth itself was not hollow at the centre, nor composed of concentric rings of various densities. It was uniform, and differences like that which exists between air and gold were only surface irregularities. The term "centre of the Earth" ceased to have any real meaning; since all particles were nearly equivalent in density. "Chaque particule est un centre"[9] and gravity acts equally on all. Underneath the surface of the Earth then, is a matter that is consistent with the rest of the Universe and is the common source of all terrestrial matter. Like the other planets, the Earth lost its fiery light at separation and spun in an opaque fluid state until it cooled and hardened like glass. Buffon suggested that all the present metals, minerals, clays and rocks were derived in some manner from the original vitreous matter. Only shells seemed to be a class apart and could be regarded as intermediaries between the organic and inert materials; tools used in the formation of stones like chalk and lime-stone. By declaring that "la verre parait être la veritable

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[8] Ibid, 1:159-160.

[9] Ibid, 1:167.

terre elimentaire" Buffon successfully reduced all inert matter to one common substance.[10]

On the principle that "la physique de la terre tient à la physique celeste"[11] Buffon explained the emergence of surface features on the Earth according to the same laws which he used to explain the formation of the solar system. He suggested that atmospheric vapours (like those in a comet's tail) enveloped the Earth as it cooled, and that these condensed as water and air. Once collected into large bodies, the waters would be subject to the constant and powerful pull of gravity. In Buffon's opinion, the movement of this first ocean upon the surface would account for all initial formations.[12] Eventually beds were elevated in some spots beyond the reach of the water, and formed continental stretches. Once exposed to the air, the continents were subject to further alteration by the sun and wind and the continual subtle action of rain and rivers which shift surface layers of soil.

In his first volume, Buffon attributes everything to the activity of water, since it is the element that is most visibly obedient to the power of attraction, and because the movements of the Sea symbolized the unity of heaven and

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[10] Ibid., 1:302.

[11] Ibid., 1:133.

[12] Ibid., 1:99.

earth. "Notre correspondance avec le Ciel n'est nulle part mieux marqué".[13] Some new islands were explained by volcanic uplift, but for the most part he insists that they are formed by sedimentation and the retreat of seas, or the flooding of lowlands. Even volcanoes are ascribed to the gradual infiltration of water into the earth where it mixes with pyrites and flammable materials. Subsidence, as great as the collapse of mountains is attributed to gradual internal erosion.[14]

Buffon takes great pains to elaborate the patterns in the Earth's features which will support his contention that these are all the specific effects of the same active force. The beds of sea shells found in continental strata, the horizontal disposition of rock layers and the correspondence of angles between neighbouring mountains is proof for him that surface features were formed, for the most part, by inundation. He points out that mountains not only have corresponding angles, they extend in wave-like chains across the continents. The great rivers run from east to west and one can even see comparable formations in each part of the globe. The old and new continents are inundated to the same degree at the equator. Each has a great chain of islands, (the Phillipines and the West Indies) and each a great

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[13]"Premier Vue" (1764), Ibid., 1:33.

[14]Buffon, Article XVII, "Des Îles Nouvelles, Des Cavernes, Des Fentes Perpendiculare", Ibid., 3:6-30, and Article XVI, "Des Volcans", Ibid., 1:369-406.

mediterranean sea (the Gulf of Mexico and the Mediterranean) and both are tapered to a southern cape. What has occurred in the Old has also occurred in the New because they are both the effects of the same universal force acting with regularity on the oceans.[15]

There are some correspondences between his account and the Mosaic one -- the separation of light and darkness, and the universal inundation -- but it is easy to agree with d'Argenson's comment that Buffon contradicted Genesis in everything, or what is more to the point, ignored it completely. When Buffon reviewed the work of a number of other authors like Woodward, Whiston, Burnet and Scheuchzer, his common complaint was that they mistook the narrative of Biblical events for observation of physical phenomena and consequently joined physics to theology in a grotesque mésalliance. Most of the authors he reviewed worked with the same materials and priciples as Buffon. Comets, atmospheric vapours, condensation attraction and centrifugal forces all appear in their explanations, but they willingly suspend the laws of motion and introduce supernatural causes in their efforts to link their natural histories to the Biblical account.

The results not only contradict Scripture, but more important for Buffon, they contravene the laws of physics.

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[15] Ibid., 1:201.

Buffon objected to the willingness of the authors to abrogate natural laws, their inability to recognize these laws as the immutable foundation of universal harmony and their lack of any sense of process in Nature. He would not accept theories like those proposed by Bourget, Whiston, Woodward or Scheuchzer which suggest that the character of men, animals and the Earth itself was substantially transformed by some global holocaust or deluge.[16] The basis of his natural order is general continuity despite local change. To forestall the religious party, he left bothersome elements of the Biblical narrative to one side and refused to rationalize them. The Flood, is a miracle, something outside of Nature, which cannot be reconciled with the orderly progress of natural events, and those scientists who wish to explain it are in error.

> Rien ne caracterise mieux un miracle, que l'impossibilité d'en expliquer l'effet par les causes naturelles. Nos auteurs on fait de vains efforts pour rendre raison du déluge. [17]

Buffon defeated the defenders of orthodoxy with their own sword. His emphasis on consistency made him object to theorists like Stenon and Ray, who proposed that tremblings in the earth's crust were responsible for surface changes. Buffon believed that they oversimplified a complex process

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[16] Buffon, Article V, "Quelques Autres Systems", and articles on Whiston, Burnet and Woodward, Ibid., 1.

[17] Ibid., 1:200.

and made the orderly effects of constant forces look like haphazard and capricious events. The accidental catastrophes proposed by these authors annoyed Buffon as much as the apocalyptic visions of the others did.[18]

He did accept the possibility of revolutionary eruptions in Nature, such as the formation of the Mediterranean sea by a breach of an isthmus at Gibraltar, or the formation of the Atlantic Ocean by the collapse of an inter-continental land mass. The revolutionary aspect of these changes was their immensity not their suddenness.[19] Every catastrophe was the particular effect of a long chain of events depending upon constant general forces, and neither catastrophe or ordinary change was worked with any rapidity -- "ces mouvements ne soht pas faits tout à coup, mes successivement et par degrés." The phrase, "dans la succession du temps" becomes a refrain in the chapters of explanation and proof.[20]

Changes are still worked on the old foundations as sea and land continue to exchange places, and on the land masses rivers and rain-water erode the mountain-tops and

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[18]Buffon, Article V, "Quelques Autres Systems", Ibid, 1.

[19]Buffon, Article XIX, "Des Changements De Terres En Mers et De Mers En Terres", Ibid., 3:112.

[20]These remarks are repeated throughout the first three volumes of C.C.B. and without undertaking an exhaustive word analysis, they can be described as "characteristic phrases" of Buffon. Some of the instances in which they were used, and which I made note of, were in "Histoire et Theorie De La Terre",1:82,84; "Formation Des Planètes", 1:175; Article VIII,"Coquilles",2:40; Article IX,"Fleuves", 2:120.

silt up the valleys and river-mouths. So, the Creation has been transformed from a unique event into a continual process.

> La surface de la terre, qui est ce que nous connaissons le plus solide, est sujette comme tout la reste, de la nature, à des vicissitudes perpetualles. 21

If one is looking for permanence in Nature, it is not to be found in the shape of surface formations but in the universally active principles which dictate those shapes and their ceaseless alterations.

In his discussion of the organic universe, Buffon was also attempting to find that which was constant behind the overwhelming succession of births, deaths and new births, and the bewildering variety of beings which fill the earth. One manner of rationalizing the organic world was to eliminate the arbitrary and artificial classification systems which had been imposed upon the natural order. Buffon took classifiers, especially Linnaeus, to task for their work, which in his opinion encouraged a proliferation of categories without any real system; or no system that was true to nature as he saw it. He suggested that if there was any order in Nature it was based on the relative simplicity or complexity of organized beings, so that the broadest categories -- mineral, vegetable and animal -- would suffice. Even these traditional distinctions were less serviceable than might be imagined, since they incorrectly drew a strict line

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[21]Article XIX, "Des Changements", Ibid., 3:117.

between the three categories -- a line which Buffon demonstrated did not exist in Nature.[22]

Certain qualities like extension, impenetrability and weight belong to members of all three categories. If minerals seem to be clearly separate from live matter, even this distinction can be minimized, as it was by Buffon who declared that life was only a minor qualitative difference between matters, a physical property. "Le vivant, l'animée, au lieu d'etre un degré metaphysique est un propriété physique de la matiere".[23] It is also difficult to distinguish between plants and animals in any definite way. Both have organization powers of growth, development and reproduction, and after examining both categories as to their sensibility, their ability to act voluntarily, to choose nourishment and to reproduce sexually, Buffon concluded that these powers cannot be allocated exclusively to one class. Some beings which must be considered animals are incapable of voluntary movement, others like polyps or "pucerons" reproduce parthenogenetically. In the discussion of generation, Buffon even found correspondences between vegetable, animal and mineral production. A new willow, or elm for example can be produced from the root, stem, seed, or even sliver of bark taken from any adult tree, and a

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[22]"Des Animaux", Ibid., 12:18.

[23]Ibid., 12:18.

new polyp can be produced from any part severed from the adult polyp. Buffon suggested that these plants and simple animals could be considered as analogous to sea-salt in their formation. The individuals could be regarded as bodies composed of like bodies, in the way that sea salt is composed of an agglomeration of crystals, each identical to the whole of which it is a part.[24]

From his attempts to characterize the animal and vegetable kingdoms, Buffon concluded that there are no essential differences between the two worlds and that any system must recognize that Nature, in truth, proceeds imperceptibly from the most complex forms of life to the lowest in the chain of being.

> La Nature descend par degrés ét par nuances imperceptibles d'un animal qui nous parait le plus parfait, a celui qui est le moins et de celui-ci au végétal. Le polype d'eau douce sera, si l'on veut, le dernier des animaux et le premier des plantes. [25]

The discovery of this nuance suggested to Buffon that an analogous one might well exist between the vegetable and mineral worlds, smoothing the transition from inert to active matter. He looked for intermediate beings, lacking the power of reproduction but possessed of a kind of life and movement.[26] Buffon found these on the microscopic level,

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[24]"Réproduction En General", Ibid, 12:20.

[25]"Des Animaux", Ibid., 12:9.

[26]"Reflexions", Ibid., 12:287.

in 'spermatic animalcules', which he believed were the first organized bodies; combinations of an organic particulate matter which was the essential substance in all animal and vegetable tissue.

In effect, he reduced the organic world to a universal substance, primitive and incorruptible (although subject to almost infinite combination) which is the foundation of all life.

> ... il y a une matiere organique toujours active, toujours prete à se mouler, à s'assimiler et à produire des êtres semblables a ceux qui la recoivent ... un matiere organique animée, universellement répandue dans toutes les substances animales ou végétales, qui sert egalement à leur nutrition, à leur developpement, et à leur reproduction. 27

Not only did he obliterate the distinctions between the most simplistic categories, but any hierarchical arrangement of beings is rendered artificial since vegetable and animal bodies are founded upon the same matter which serves for all organic functions.

Buffon refrained from discussing the origin of these particles, in the same way he avoided discussing the origin of the comet, but the activity of both is dictated by fixed laws and active penetrating forces.

> ... il parait qu'il existe dans la nature, des forces comme celle de la pésanteur, qui sont relatives a l'interieur de la matiere et qui n'ont aucun rapport avec les qualitiés exterieur des corps,

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[27]"Recapitulation", Ibid., 12:520,522.

> mais qui aggisent sur les parties les plus intimes et qui les pénétrent dans tous les points. 28

All organic functions, the assimilation of organic particles, their dispersion through the body, and ultimately their union to form new beings, were completed by means of penetrating forces which work on the interior of matter.[29] When the particles collected in any abundance within the bodies, they would unite into some kind of figures -- taenia, ascaradies or worms, which grow by a kind of vegetation. When they collect in a suitable matrix, however, they united to form a small body similar to the first. In complex beings, which reproduced by sexual means, the superfluous molecules were gathered in the sexual organs and composed seminal fluid, which must be mixed before new beings will form. In Buffon's attempt to minimize differences within the organic world, he was willing to believe that even sexual organs, apparently so dissimilar, might be fundamentally the same, only more or less developed.[30] In the seminal mixture, the particles from each sexual organ nevertheless constituted disharmonious elements which interrupted the rapid movement of the organic particles. Those in preponderance, either male or female, provide the foundation

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[28] "Nutrition", Ibid., 12:49.

[29] Ibid., 12. See "Nutrition" and "Recapitulation".

[30] "Formation Du Foetus", Ibid., 12:428.

point for the arrangement of the foetus from the mixture.[31] At this point Buffon uses vague phrases saying particles "dispose themselves" or that they "naturally assume" the appropriate position in the new body, all of which suggests that the pattern is internalized.[32] Symmetrical development was ensured by the operation of the same or similar penetrating forces which assimilated particles and dispersed them through the body, and conducted the male semen into the womb.[33]

The experimental basis of Buffon's theories was completed during the forties in collaboration with Needham and with the assistance of Daubenton. The men dissected a number of animals and gathered slide samples of vegetable and animal tissue, seeds, and seminal fluid from the organs of both sexes for microscopic analysis. Probably the most significant experiment for Buffon and for his subsequent apologists was experiment XXVI, when he and Needham and Daubenton examined the fluid taken from the womb of a bitch

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[31] "Formation Du Foetus", Ibid., 12:423.

[32] Ibid., 12:410.

"Les molecules organiques qui ont ete renvoyées de chacune des parties du corps de l'animal prendrent naturellement la meme position et se disposerent; dans le meme ordre qu'elles avaient lorsqu'elles ont ete renvoyées de ces parties."

[33] Ibid., 12:455.

"Il doit, resister dans ces parties simples une force qui agit egalement de chaque côté or ce qui revient au meme, que les parties simples sont les points d'appui contre lesquels s'exerce l'action des force qui produisent le developpement des parties double."

and observed spermatic animalcules, identical to those they had witnessed in seminal fluid from the males.[34] This was fairly significant since it meant that Buffon could sidestep all the preformationists -- animalculists and ovists alike -- and insist that the female and the male contributed identically to the production of new beings. The male did not provide the spiritual form to shape an inchoate matter provided by the female; they both provided a full complement of organic particles and the foetus took shape according to mechanical laws.

The experiments provided evidence for Buffon's contention that animated organic particles could be found in every vegetable and animal substance and were present in greatest concentrations in grains, seeds and semen which provided the matter for reproduction. What Leeuwenhook had called "spermatic animalcules", and had observed only in semen, could be found everywhere.[35] These were the first union of organic molecules and constituted intermediate beings in the formation of more complexly organized forms.

> ... on pourrait croire que ces corps organisees ne sont que des espèce d'instruments qui servent a perfectioner la liquer seminale et a la pousser avec force et que c'est par cette action vive et interieur qu'elle penetre plus intimement la liquer de la femelle. [36]

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[34] Ibid, 12:221.

[35] "Refexions", Ibid., 12:328.

[36] "Des Experiences", Ibid., 12:246.

In beings which reproduced sexually, these "corps organisées" were instruments or, as Buffon calls them, "Machines naturelles",[37] kinds of pumps which emptied themselves of the spermatic liquid they contained. The mixture of seminal fluids encouraged by their activity fixed the rapid movement of organic particles, and they arranged themselves into the appropriate configuration. The foetus only began to grow when heat from the womb communicatéd itself, and activated the particles so the foetus began to "live".[38]

The Newtonian elements in Buffon's theories are unmistakable. In the animate as well as the inanimate world, he explained all phenomena, including life, by the activity of penetrating forces, inherent to matter.[39] Despite the

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[37]"Reflexions", Ibid., 12:290.

[38]"Formation Du Foetus", Ibid., 12:435.

[39]Only a few instances can be provided here but it is evident that a great Aristotelian element survives in Buffon's biological and social theories. The influence of Aristotle is evident for example, in Buffon's belief that the three simple categories were useful enough for purposes of classification; in Buffon's arrangement of organic nature according to simplicity or complexity of form; in his discussion of organic functions in terms of vegetable, animal and rational, "soul"; and particularly in his organic view of Nature as a continual realization of form. He did disagree with some fundamental Aristotelian theories. He rejected the interpretation of generation in which matter is "informed" and he obliterated the distinctions between organic functions, distinguishing only two functions -- material and rational. It is interesting that he reduced life to heat (that is, made it the result of motion) so that his more radical interpretations can still be understood against an Aristotelian framework. Still, the dictum "Nature is the principle of motion and rest and to understand Nature we must understand motion" (Aristotle, Physics, Bk.III) is light years away from an interpretation of life as a property of matter.

mechanistic aspect of his own explanations, he protested on a number of occasions against scientistswho used only "mechanical principles" to explain phenomena.

> Il est evident que ni la circulation du sang, ni le mouvement des muscles, ni les fonction animales ne peuvent s'expliquer par impulsion, ne par les autres lois de la mécanique ordinaire. Il est tout aussi évident que la nutrition, le developpement et la reproduction se font par d'autres lois. Pourquoi donc ne veut-on pas admettre des forces pénétrantes et agissantes sur les masses des corps, puisque d'ailleurs nous en avons des exemples dans la pésanteur des corps, dans les attractions magnetiques, dans les affinités chimiques. 40

Most of this was aimed at the Cartesians, for although Descartes himself, like Buffon, suggested that the foetus was formed by a kind of fermentation occasioned by a mixture of female and male seminal fluids,[41] his disciples, particularly the Academicians in the thirties and forties, were averse to admitting the existence of penetrating forces. Buffon's debt to Newton is a matter of record. Apart from inspiration -- symbolized by the picture of the mathematician which hung on his study wall -- Buffon derived from him several of his fundamental ideas. The laws of attraction and repulsion amounted to a first principle for Buffon, and even heat, which plays such an important role in his theory

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[40] Buffon, "De La Generation Des Animaux", O.C.B., 12:67. and "Nourriture", Ibid., 12:55.

"... le défaut de la philosophie de Descartes est de ne vouloir employer comme causes qu'un petit nombre d'effets generaux en donnant l'exclusion a tout le reste".

[41] "Exposition Des Systemes", O.C.B., 12:101.

of generation was explained by him as an effect of repulsion. Buffon's reliance upon analogy has been traced to Newton too, since in Book III of the Principia he had recommended the principle of analogy as one of two rules for the study of physics.[42]

Newton also provided the foundation for Buffon's earliest researches. If, as Milliken and Fellows remarked, the Theorie de la Terre constituted "mental baggage", Hanks has carefully shown that all the fundamental ideas synthesized in the Histoire Naturelle are scattered through work done by Buffon in the thirties and forties, and that these are ultimately Newtonian in derivation. Buffon's submissions to the Academy between 1733 and 1748 include memoirs on mathematical probability, mechanical problems, ballistics and rocketry, optical phenomena, the laws of attraction, refraction of lights, mathematical scales and a report on a deformed calf, in addition to the seven reports on reforestation and the physical properties of wood which resulted from work done with Duhamel de Monceau.[43] All except the one on the calf could be regarded as investigations in areas delineated by Newton's work. The one on mathematical scales, delivered in 1740, is directly related to the trans-

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[42]"Les effets du meme genre doivent toujours etres attribues, autant qu'il est possible, a la meme cause", from du Chatelet's translation of the Principia, opening of Bk.III, tII, 1759, pp.2-3 -- given in L.Hanks, Buffon Avant L'Histoire Naturelle, p.95.

[43]For a list of reports, see J.Piveteau, Buffon: Oeuvres Philosophiques (Paris, 1954), p.52.

lation of Newton's Fluxions, which Buffon published the same year. Even the work on the physical properties of wood was Newtonian in derivation. Buffon was greatly influenced in these experiments by a work entitled Vegetable Staticks by Stephen Hales. Hales was a follower of Newton who attempted to explain the mechanics of plant and animal physiology according to Newtonian principles, and supported his theorizing by relentless statistics-gathering. Having accepted that God created the Universe according to number, measure and weight, Hales transformed Solomon's dictum into a methodology and weighed and measured all manner of vegetable and animal fluids.[44] Statistical analysis would provide the key to understanding Nature. Buffon translated Hales work in 1735 and the research undertaken with Duhamel demonstrated the effects of his reading. Buffon cut down whole forests, measuring and comparing configurations for his conclusion on the effects of frosts on trees and the cause for eccentric growth patterns.[45] The idea that animal and plant physiology could be explained in Newtonian terms was more enduring than the methodology, and provided an important impetus for the Histoire Naturelle.

Buffon established himself in these efforts as one of

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[44]L.Hanks, Buffon Avant L'Histoire Naturelle, p.96.

[45]Editor's note, C.G., ed. J. Lannesan, p.177.

the leading Newtonian supporters. In 1739, Voltaire praised Buffon in his writings as second only to Maupertuis among the scientists in France who were introducing the methods and concepts of Newton to a primarily Cartesian scientific community.[46] In his private correspondence of the same year, Voltaire sniped at an enthusiasm which threatened to overshadow his own.

> Je suis un enfant perdu d'un parti dont M. de Buffon est le chef, et je suis assez comme les soldats qui se battent de bon coeur sans trop entendre les interets de leur prince. [47]

Buffon's preoccupation can be judged by a letter from Leblanc to Bouhier describing a visit he made to Montbard with Helvetius in 1739.

> We lived a life of three hermits, who met only at table where Newton was the topic of discussion. [48]

Many of the French Newtonians were included in Buffon's circle of close friends-- Maupertuis, for example, who had published Discours sur les differentes figures des Astres in 1732 and lectured on the laws of attraction in opposition to Fontenelle and many others in the Academy.[49] Buffon also

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[46] L. Hanks, Buffon Avant L'Histoire Naturelle, p.90.

[47] S. Milliken and O. Fellows, Buffon, p.54.

[48] S. Milliken, "Buffon and the British", Ph.D. thesis, unpublished (Columbia, 1965), p.199.

[49] L. Velluz, Maupertuis (Paris, 1969), p.7.

fraternized with La Condamine,[50] and the geometer Clairaut[51], and Buffon's patron Maurepas, who seemed to have been sympathetic to the cause of Newtonian science, was very helpful to Maupertuis on several occasions during his career.[52] Buffon and Maupertuis both enjoyed the patronage of La Pompadour too, and they continued in her favour despite the disgrace of the Minister of Marine.[53]

Buffon's identification with these Newtonians was intellectual as well as social. In particular, his ideas resemble those of Maupertuis, whose Venus Physique was published just one year before Buffon composed his book on reproduction. A comparison of the two works reveals many similarities, and the similarities can be taken as evidence that Buffon's theories were not simply the work of an isolated

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[50] L.Velluz, Maupertuis, p.10 and Editor's note in C.G., p.51 -- Condamine, one of Buffon's friends from childhood, led an expedition to equatorial Peru while Maupertuis conducted a group to Lapland to test Newton's hypothesis on the spheroid shape of the earth by measuring an arc of the meridian in both locations.

[51] Editor's note, C.G., p.59 -- Clairaut accompanied Maupertuis to Lapland.

[52] L.Velluz, Maupertuis, p.10. Maurepas' influence won governmental and financial support for the expeditions to Lapland and Peru and he was of personal assistance to Maupertuis. He arranged a pension in 1743 in recognition of the scientist's contribution to navigation and engineering, and the same year he combined with Montesquieu to nominate Maupertuis to the Academie Francais.

[53] L.Velluz, Maupertuis, p.24.

and eccentric genius. For example, the objections Maupertuis raised against the pre-formationists, that is the existence of mules and mulattos, were also raised by Buffon and in very similar language.[54] Both works too show the impact of Tremblay's discoveries about the polyp and Reaumur's publication on pucerons. These provided evidence that reproduction could be effected by animals through other means than sexual union, since these creatures seemed to be parthenogenic. Both authors expressed sympathy with Descartes' ideas, but admitted to being dissatisfied with mechanical explanations of Nature. The greatest similarity between them was their use of Newton's gravity to suggest that analogous forces might be capable of producing patterns in the organic world. Maupertuis used the example of arborescent silver, a mixture of silver, spirits of nitre, mercury and water in which the various fluids invariably arrange themselves into the shape of a tree with roots and branches.[55] Admitting that this was a rather simple mechanism, he asked at one point in Venus Physique if there might not be more complex examples of this kind of organization, and if they might be effected by forces resembling chemical affinity and gravity.

> These forces are nothing but what other philosophers called attraction ... The astronomers were the first to feel the need of the new principle to explain the

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[54] in Maupertuis, Venus Physique, trans. G.M.Boas, chapter 13, p.43, and Buffon, O.C.B., 12:73,75.

[55] Maupertuis, Venus Physique, chapter 17, p.56.

> movements of the celestial bodies ... and the most famous Chemists admit Attraction and extend its function. Why should not a cohesive force if it exists in Nature have a role in the formation of animal bodies? If there are, in each of the seminal seeds, particles pre-determined to form the heart, the head, the entrails, the arms and the legs; if these particles had a special attraction for those which are to be their immediate neighbours in the animal body, this would lead to the formation of the foetus. 56

This passage could be compared with Buffon's discussion of penetrating forces active in the formation of the foetal body. He merely extended their activity to account for nourishment, assimilation of material for growth, development and generation and the dispersal of particles through the body.

Despite the debt that all this work owed to Newton, it is important to point out that Buffon in particular deviated in several ways from Newton. Milliken suggested that Buffon was very different from Newton as a mathematician, and that despite Buffon's support for Newtonian calculus, his own understanding of it remained essentially Leibnitzian. His definition of numbers as a collection of homogeneous units, also separated him from Newton, who accepted irrational ratios as numbers.[57] Hanks too, demonstrated that for all Buffon's praise of calculus, he rarely employed it as a

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[56] Maupertuis, Venus Physique, chapter 17, p.59.

[57] S.Milliken, "Buffon and the British", p.207.

scientific tool.[58] There are, however, more significant differences, of which the most important may be Buffon's refusal to admit final causes into his Natural History; having isolated the force of attraction, and the force of repulsion he refused to look any further for causes.

> ... puis donc que la force d'attraction et la force d'expansion sont deux effets generaux, on ne doit pas nous en demander les causes; ils suffit qu'ils soient generaux et tous deux reels, tous deux bien constates pour que nous devions les prendres eux-memes pour causes des effets particuliers. 59

Newton, however, believed that it was impossible to give any coherent account of causation without referring at some point to the intelligent and powerful Author of Creation.[60] The difference between their view on the origin of design in Nature can be judged from their treatment of Burnet. Buffon reviewed Burnet's work Theoria Telluris Sacra (1681) in the Histoire Naturelle where he dismissed the author as a heterodox theologian and judged his work to be an amusing but not particularly instructive novel.[61] Newton, however, rather appreciated Burnet's endeavour and in private correspondence with the author in 1682, commended him, remarking that he had given the most plausible account of

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[58] L. Hanks, Buffon Avant L'Histoire Naturelle, p.26.

[59] Buffon, C.C.B., 1:6.

[60] From a letter to Thomas Burnet (1682) in Newton's Philosophy of Nature..., 1:64.

[61] Buffon, C.C.B., p.184.

the formation of the earth, and one which was in some respects more probable than anything he himself could suggest. Nevertheless, he ventured to suggest some refinements and it is revealing to analyze his remarks since they present a distinct contrast with Buffon's cosmogony.

Like those scientists Buffon curtly dismissed, Newton took the Bible as his starting point and suggested that the spirit of God moved upon the Chaos, separating it into parcels of matter. He also interrupted himself at almost every turn to square his version with the Mosaic account and he laboured to reconcile the time period allotted for Creation in the Bible, with a rational conception of Time.

Newton believed that the first sea was even-bottomed and that the formation of land masses occurred as a result of coagulation of the limus as it dried, in the way that a drying mixture of milk and beer, or salt petre mixed with water will form clumps and veins of matter. When the water finally evaporated and drained from the clay, subsidence occurred and great cracks and cavities were formed, filled variously with air and water. Some of these were large enough to form the subterranean seas "which might be the great deep of Moses".[62]

He then proposed that the collection of air and waters compressed by the weight of the crust eventually

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[62]Letter to Thomas Burnet, in Newton's Philosophy of Nature..., p.59.

breached the surface and the vapours forced the water out before them, with such force that great spouts were formed which took forty days to fall to Earth. Not only was the surface of the Earth drastically upset by the deluge and accompanying subsidence, but the physiological quality of life was altered. The liberated vapours were so noxious that they affected man's health and caused that shortness of life that has been common ever since.[63]

It is apparent from this reduction that Newton was disposed to exactly those things which Buffon dismissed most contemptuously. He introduced final causes, believed that there was a substantial change in the earth during the flood, and interpreted the Biblical narrative as observation. Newton believed that difficulties in the account in Genesis proceeded from the fact that Moses had addressed himself to the untutored, and thus described phenomena in "a language artificially adapted to the sense of the vulgar." In addition, he believed much confusion could be dispelled if it was recognized that Genesis gave a "man's eye view of Creation" and not a bird's eye view, as it were.[64]

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[63] Ibid, p.59.

[64] Ibid, pp.61-62. Given Buffon's distaste for Fundamentalism one wonders how he would have greeted Newton's Chronology, which was an attempt to synchronize events reported in Egyptian, Assyrian, Babylonian, and ordinary classical annals with Biblical chronology using astronomical tables.

The greatest difference between the two scientists was the role they assigned to God in Nature. Newton believed that the arrangement of bodies in the Universe owed more to God's judgment than to anything else. There was one body giving heat and life to the rest because the Author of the system thought it convenient.[65] Similarly, the characteristics of Jupiter and Saturn, their great size and number of satellites did not depend upon their position in the system, but were the causes why the Creator placed them at a great distance -- so they would not disrupt things.[66] In Newton's version, the Universe was the result of deliberation, by an intelligent Mechanician.

> To make this system, therefore, with all its motions, required a cause which understood and compared together the quantities of matter in the several bodies of the sun and planets and the gravitating powers resulting from thence, the several distances of primary planets from the Sun and of the secondary ones from Saturne, Jupiter and the Earth, and the velocities with which these planets could revolve about those quantities of matter in the central bodies; and to compare and adjust all these things together in so great a variety of bodies argues that cause to be not blind and fortuitous but very well skilled in mechanics and geometry. [67]

If the formations in the skies were not convincing enough, one had only to look at the consistent design in organic

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[65] Letter to Bentley, #1 (1692) in Newton's Philosophy of Nature, p.47.

[66] Ibid., p.47.

[67] Ibid., p.48.

Nature, the symmetry in animal forms and the suitability of all organs to the external conditions they must utilise, to be certain of God's direct participation.[68]

Whereas for Newton, design was evidence of the imposed will of an all-powerful Creator, for Buffon it was evidence of the Universal operation of impersonal forces, and in Buffon's Universe, the design was self-manifesting. After the impulsion was communicated to the comet, the inherent penetrating forces took over and material arranged itself. This was true on the biological as well as the cosmological level. Buffon, in his analysis of generation, explicitly rejected the idea that each birth was an immediate effect of God's will (the result of his direct intervention) and he rejected preformationist theory which interpreted each birth as a secondary result of God's will.[69] Buffon's idea of the manner in which order was established in the world, his more materialistic philosophy, accounts for his application of Newtonian theory. In the Histoire Naturelle, Buffon transformed spiritual forces acting upon matter, into physical properties of matter. Newton had studiously refrained from doing this. Twice in letters to Bentley,

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[68]"On Universal Design", in D.Brewster, Memoirs of the Life, Writings, and Discoveries of Newton, 2:347-47.

[69]Buffon, O.C.B., 12:35.

he cautioned his correspondent against interpreting gravity as a material property. In 1692 he stated in the second letter,

> ... you sometimes speak of gravity as essential and inherent to matter. Pray do not ascribe that notion to me, for the cause of gravity is what I do not pretend to know. 70

Again in the third letter he stated,

> Gravity must be caused by an agent acting constantly according to certain laws, but whether this agent be material or immaterial, I have left to the consideration of my readers. 71

Presumably, Newton feared that interpreting these forces as physical properties would result in a purely materialist philosophy divorced from any spiritual or moral concern. His private opinion might be judged from a manuscript included in Brewster's volumes where he declared that

> God made and governs the world invisibly ... In His house are many mansions and he governs them by agents which can pass through the heavens from one mansion to another. 72

Newton demanded that God be omnipresent, not once-removed, and insisted that He governed His Creation, "not as the Soul of the World, but as Lord over All."[73]

Despite Newton's caution, his readers were not as circumspect. Buffon (like many other French scientists)

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[70]Letter to Bentley (1692/93), Newton's Philosophy of Nature ..., p.53.

[71]Ibid., p.54.

[72]From Manuscript in D.Brewster, Memoirs ..., 2:354.

[73]"General Scholium", in Newton's Philosophy of Nature..., p.42.

blithely interpreted attraction and analogous forces as physical properties of matter, and in his Universe, God was deliberately relegated to the wings, from which he may have hurled the comet. The similarity of Buffon's work with Maupertuis' for example, suggests that there were other intellectuals in France who had adapted Newtonian theory in the same fashion, and, I suspect, with similar intentions. It would require another thesis to prove conclusively that they were all turning to Newton's universal laws and "forces" to invalidate institutionalised social privilege based upon qualitative distinctions between men, and that they were attempting to free individual action from traditional restraints. Maurepas' support for Newtonian science certainly suggests that this is true.[74] In any case, it would appear that Buffon at least was using Newtonianism for these purposes, and despite his present obscurity, he enjoyed popular acclaim during his own day, which lends his effort some significance in itself.

One of the most important elements of his natural history is the role Buffon assigns to Man in this self-regulating Universe, for the independance of action he

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[74]It has been suggested that the Navy would have an immediate interest in efforts to invalidate traditional particularism and could only profit from the development of theoretical justifications for the rationalization and universal application of laws, for example, those regarding exploitation of natural resources.

grants him suggests that his science is aimed at the annihilation of traditional restraints. We have seen that God is way out in the Empyrean; his function as designer is largely taken over by Nature and his dominion is exercised by Man. Although in the sections on generation, Buffon effectively obliterated hierarchy in the organic world by refusing to recognize any essential differences between plants and animals, when it came to the discussion of the animal kingdom, Buffon attempted to elevate Man above the rest of Nature. In a passage which reads very much like the First Commandment on Animal Farm, Buffon stated,

> ...quoique les ouvrages du Createur soient en eux-mêmes tous également parfaits, l'animal est selon notre facon d'apercevoir l'ouvrage le plus complet de la nature et l'homme en est le chef d'oeuvre. 75

His discussion of animal behaviour was really an attempt to make a qualitative distinction between Man and animals. He insisted that since Nature proceeds by degrees there would be a degree between the apes and Man if Man was of the same nature as animals. Since this intermediate degree did not exist Man must be substantially different.[76] Buffon was unable to make any distinction on the physiological level, but he concluded that only Man had a "spiritual sensibility"; an ability to perceive and compare perceptions , which was

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[75] Buffon, "De La Nature De L'Homme", O.C.B.,10:10.
[76] Buffon, "La Nature Des Animaux", O.C.B., 16:32.

exercised by the soul.[77] Without relinquishing his materialist Newtonianism, Buffon proposed to distinguish a spiritual realm from the material one and suggest that Man alone was animated by an immaterial force, the divine ray of intelligence, as well as by material forces.

> ... l'étincelle divine dont il est animée le rend participant aux mystères divines; c'est par elle qu'il voit et lit dans le livre du monde comme dans un exemplaire de la Divinité. 78

Buffon retained a moral content in a materialist philosophy by creating a distinction between humanity and Creation, which carried with it a divine responsibility. Man was the only being capable of understanding Nature and of admiring God in his works, and he was consequently obliged to study the rationality of Creation so that he could assist as well as admire. Man was given a responsibility to extend the rational order.

> ... fait pour adorer le Créatur, il commande à toutes les creatures; vassal du Ciel, roi de la Terre, il l'ennoblit la peuple, et l'enrichit, il établit entre les etres vivans, l'ordre, la subordination, l'hormonie; il embellit la Nature meme, il la cultive, l'entend et la polit. 79

Even Man's stature and the disposition of his limbs, and their shape -- formed to extend and grasp instead of trailing on the ground -- testified to his superior nature and

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[77] Ibid., 16:23.

[78] "Premiere Vue" in J.Piveteau, Buffon, p.33.

[79] Ibid., p.33.

function. Buffon declared "son attitude est celle du commandment"[80] and from his description it is evident that Man in his natural state was not innocent, so much as regal. The relationship which Buffon believed should properly exist between Man and Creation is clear from his description of the gradual awakening of Adam and his sensual explorations. Seeing a tree heavy with apples, Adam seizes one and devours it. I leave it to the reader to consider the implications of his choice of fruit, but the manner in which he obtains it has implications of its own. The account is given in first person:

> J'avais saisi un de ses fruits, j'imaginais avoir fait une conquete et je me glorifais de la faculté que je sentis, de pouvoir contenir dans ma main un autre être tout entier; sa pésanteur, quoique peu sensible me parut un resistance animée que je me faisais un plaisir de vaincre ... enfin je goutai et je crus que le substance de ce fruit était devenue la mienne et que j'étais le maitre de transformer les êtres... [81]

Buffon has suggested here by careful selection of words, what he elsewhere openly declared;[82] that Man reigns in Nature by right of conquest.

Nature too was in need of government. There was pattern and design but left to its own devices the design could not be trusted to manifest itself in completion. When

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[80] Buffon, "L'Age Viril", O.C.B., 13:121.

[81] Buffon, "Des Sens En General", O.C.B., 13:340.

[82] "La Premiere Vue", in J.Piventeau, Buffon, p.34.

producing complex beings, Nature was far from making them complete. Buffon regarded the Sloth as an example of one of the "imperfect sketches" in Creation, incomplete and flawed creatures who only survived because they inhabited deserted areas, where they were unchallenged.[83] In addition, Buffon believed that Nature acting alone could distort its own works. The general model for everything in Nature could be debased or improved according to circumstances and the influence of climate, soil and food. Under the constant influence of local conditions, grain, flowers and animals would take on a tincture of the climate,[84] and only in moderate climates would one find more wholesome herbs and roots, sweet fruits, docile animals and polished men. In extreme climates, productions were puny and vicious: poisons, drugs, and malodorous perfumes, ferocious beasts and intemperate men were common.[85]

Buffon remarked that there was an overwhelming preponderance of low or less complex creatures. This was not the result of mutation or deviation from the design, it was just that Nature was overly eager to organize itself, or to put it in Buffonian terminology, the organic particles were overly eager to unite themselves. Consequently,

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[83]Buffon, O.C.B., 27:143.

[84]"Cheval", Ibid., 16:224.

[85]"Des Animaux Sauvages", Ibid., 18:350.

combinations often occurred fortuitously outside suitable matrices.[86] Left to itself then, everything might turn out worms. The effect of this impulsive creativity was that Nature tended to choke on its own profusion.

> ... la terre, surchargée par le poids, surmontée par les debris des ses productions, n'offre au lieu d'une verdure florissante, qu'un espace encombre, traverse de vieux arbres, chargés de plantes parasites, de lichens, d'agarics fruits impurs, de la corruption... [87]

Man's rational control over Creation consisted of clearing away some of the vegetable and animal effects of Nature's over-productivity and providing space for the design in Nature to manifest itself.[88] To exercise this authority he was required to first establish some control over himself.

> Il a fallu qu'il fut civilisé lui-même pour savoir instruire et commander, et l'empire sur les animaux commes tous les autres Empires n'a été fondé qu'apres le societé. [89]

Like all other phenomena in Buffon's universe, society is explained as a uniform effect of a general cause. It is inspired by Love -- the desire to combine with another and

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[86] Buffon, O.C.B., 12:362.

[87] "La Premiere Vue", J.Piveteau, Buffon, p.33.

[88] In the description of the New World, Buffon indicates that Nature does have a plan, but that without human guidance, the plan is frustrated.

> "La plus grande partie des continents de l'Amerique était une terre nouvelle, encore hors de la main de l'homme, et dans laquelle la nature n'avait pas eu le temps d'établir tous ses plan, ni celui de se developper dans toute son etendue ... (from "Des Animaux Communs Aux Deux Continents", O.C.B., 21:63.

[89] Buffon, "Discours Sur La Nature Des Animaux", O.C.B., 16:177.

to produce new beings -- and Buffon describes this motivation in terms which suspiciously resemble his description of gravity and other forces active in matter.

> L'amour est un precieux sentiment qui peut seul amollir les coeurs féroces et glacés en les penetrant d'un douce chaleur, cause premiere de tout bien, de toute societé, qui reunis sans contrainte et par les seul attraits, les natures sauvages et dispersées. 90

Society not only guaranteed the increase of humans, but it was the source of human knowledge and consequently human power. When men congregated they perfected their reason, developed arts and sciences and extended their authority. Man canalized rivers, drained marshes, cut back forests, domesticated tractable animals and annihilated the vicious ones or exiled them to the fringes and wastelands of his territories.[91]

Although Man was animated by this penetrating force to establish primitive "societies", that is families, he could also deliberately ignore the possibilities of human association and avoid increasing or using societies, but

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[90]Buffon, "Discours Sur La Nature Des Animaux", O.C.B., 16:82.

[91]Buffon, "Les Animaux Domestiques", O.C.B., 16:177.

> "Mais lorsqu'avec le temps l'espece humaine s'est étendue ... et qu'a la faveur des arts et de la societé, l'homme a pu marcher en force pour conquerir l'univers, il a fait reculer peu a peu les bétes feroces ...

the consequences were severe.[92] If he did not exercise his authority, everything reverted to the control of Nature, with whom Man ordinarily shared dominion, and the rational order would become confused as Nature suffocated on the wild profusion of products.

Nowhere were the effects of this irresponsibility more evident than in the New World, a continent which Buffon regarded as an appalling wasteland. There the inhabitants roamed around in savage bands, few in numbers and limited in industry. Without supervision water collected and stagnated in marshes and clogged rivers; thick forests and weeds choked the Earth, increased the humidity and lowered the temperatures so that the heat necessary for life and growth was reduced. Animated nature in general was less active, less vigorous and less varied. Insects and reptiles thrived and multiplied in the decay and mud, but the other species diminished in number and the individuals in them were reduced in size and pinched in temperament. Even those transported from the Old World quickly degenerated in the inhospitable environment. The savages, like all other things in this

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[92]Buffon, "La Nature Des Animaux", O.C.B., 16:98. Only Man, then, congregated in large groups out of choice, and Buffon had very harsh words for philosophers like Réaumur who were suggesting that bee-hives, beaver colonies or packs were miniature natural republics. In a long discussion of industry and government in animal societies, Buffon showed that animal association was the result of reflex and necessity.

ruined world had been enfeebled.

> ...l'homme sauvage, n'existait pour la Nature que comme un être sans conséquence; un espece d'automate impuissant, incapable de la reformer ou de la secouder. 93

They were weaker and less well-developed than Europeans, were timid and indolent, and acted only from need or fear and never acted from deliberation or independent will. Having neglected Nature, they were in turn neglected by her, and were treated like step-children. Nature refused them the sentiment of love and the desire to multiply themselves so society had no attraction for them.

> ... le plus precieuse étincelle de feu de la nature... leur a été refusé ... ils sont indifferents ... et cette indifference pour le sexe est la tache originelle qui flétrit la nature qui l'empêche de s'epanouir; et qui détruisant les germes de la vie, coups en meme temps la racine de la societé. 94

The savages brutalized or ignored their wives, neglected their children and lost all the knowledge and improvement which was to be derived from human concourse. This was true derogation, and Buffon has made Man's rational administration of Nature a moral imperative, just as the Physiocrats did.

He did not believe that environmental and human collapse were irreversible. In the Premier Vue, a kind of promotional summary published in 1764, Buffon depicted an

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[93] Buffon, "Des Animaux Communs Aux Deux Continents", C.C.B., 21:52.

[94] Ibid., 21:53.

oppressed savage who in an epiphanic moment, suddenly recognized his potential and his degredation and cried,

> La Nature est hideuse et mourante. C'est Moi! Moi seul qui peut la rendre agréable et vivant; dessèchons ces marais, animons ces eaux mortes ... mettons le feu a cette bourre superflue, a ces vielles forêts et, etc., etc., ... 95

All that was required of the inhabitants was spiritual reformation, and if the natives couldn't be reclaimed, their land at least, could be. After several centuries, when the Earth had been drained, forests had been felled and rivers controlled, Buffon was certain the New Continent would prove fruitful and healthy, as it appeared to be where Europeans had already taken things in hand.[96]

Buffon recognized that Man exercised a tyrannical rule over the vegetable and animal kingdom, and his accidental contact with wild animals actually increased their viciousness. Their organization and limited arts were abandoned in areas where Man invaded. Pressed by fear, animals concentrated only on survival, but once they had been taken directly under human government they would be immeasurably improved, becoming sensible, affectionate and intelligent. If many were also

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[95] "Premiere Vue", J.Piveteau, Buffon, p.35.

[96] Buffon, "Des Animaux Communs...", C.C.B., 21:62. Like animals, savage tribes are improved by the government of civilised Europeans, and improve as their habitat does. Buffon's theories would be useful to the Imperialists, as there are indications that the "tyranny" of man can be exercised to good effect over other men. Buffon criticizes the unnecessary abuse of negroes but doesn't object to enslavement in principle. Good governments will develop the savage's embryonic virtues.

radically deformed in service to human needs and interests, this was a lamentable side-effect of Man's dominion which was founded upon inalterable laws and granted by God as a sign of Man's spiritual superiority.[97]

Man's Empire, however, was not absolute, and several animals escaped his control either by strength, craft or inaccessibility. Buffon actually expressed some disappointment that no amount of technology or cunning had enabled men to eliminate the wild cats, for example.[98] There was also a group including snakes, insects and the like which were distinguished only by their nuisance value. They were

> ...betes immodes, incommodes, et inutile, qui semblent n'exister que pour former la nuance entre le mal et le bien; et faire sentir a l'homme combien, depuis sa chute, il est peu respecté. [99]

This opinion is reminiscent in many ways of the sentiments of Abbe Pluche, another natural historian in the period whose works were great favourites with the aristocracy. He stated that

> Some animals are pre-ordained by Providence to live with and be serviceable to mankind, others reside in woods and deserts to prove a scourge to all such of the human species as grow profligate and abandoned wretches. [100]

Buffon would agree, but believed that the scourge was

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[97] Buffon, "Les Animaux Domestiques", O.C.B., 16:174.

[98] Buffon, "Degeneration Des Animaux", Ibid., 25:49

[99] Buffon, "Les Animaux Domestiques", Ibid., 16:125.

[100] Cobban, "The Enlightenment", in The New Cambridge Modern History, ed. J.Lindsay (Cambridge, 1970), 7:103.

not pre-ordained; Man could take the situation in hand, redeem himself, and extend control. In Buffon's opinion, Nature did not correct Man, Man corrected Nature.

It would appear that Buffon's idea of the relationship between Man and the animal kingdom dictated the shape of the Histoire Naturelle. His work includes not only the habitat, food and habits of specific animals, but also "le service qu'ils peuvent nous rendre et toutes les utilités ou les commodités que nous pouvons entirer".[101] Buffon's understanding of human nature and Man's responsibility in creation may be responsible for his composition of a natural history which reads like a primer on agriculture and animal husbandry. The chapter on the degeneration of the species digresses into a discussion of how to improve the meat, wool strength and size of Flanders sheep by cross-breeding, the chapter on Oxen consists of detailed instructions on care, feeding and breeding of the beasts, and the chapter on sheep contains a summarized account of the best forage materials and advice on the establishment of flocks for profit, including the acclimatisation of new breeds. In the chapter on the buffalo, Buffon begins a discussion of the evils of castration and restricted stud-farming, and in the chapter on Elk and Reindeer he discusses the advisi-

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[101]Buffon, "De La Maniere D'Etudier Et De Traiter D'Histoire Naturelle", O.C.B., 1:30.

bility of introducing llamas and pacas into Europe as domestic wool producers and beasts of burden.

The purpose of all the industry Buffon chronicles and proposes is to increase human numbers. Since Man is the masterpiece of Creation, it stands to reason that his increase fulfils Nature's design if not the Divine purpose.

> Il en fait lui-même le pricipal ornement, il en est la production la plus noble; en se multipliant il en multiple le germe le plus precieux, elle-même aussi semble se multiplier avec lui. 102

Population increased Arts and Sciences and these in turn were augmented by population, but more important, each acquisition of knowledge and power elevated Man spiritually. As Buffon remarked in the Premier Vue,

> ... la Nature est le trône exterieur de la magnificence Divine; l'homme qui la contemple, qui l'étudie, s'éleve par degrés au trône interieur de la toute-puissance. 103

Man's self-promotion, however, occasionally has some nasty repercussions in the vegetable and animal kingdoms. Buffon recognized this and some of the contradictory aspects of his writing appear to result from his desire to assure men that although they advance the species at the expense of other things in Nature, the destructiveness of their actions is superficial. His position on the fixity of species, for example, seems to depend upon the context of

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[102] "Premiere Vue", J.Piveteau, Buffon, p.35.

[103] Ibid., p.33.

his remarks. In the chapter on the Sloth, Buffon was trying to demonstrate that Nature does not or cannot always bring her works to completion. He compared the Sloth to animals which have been effaced from the list of beings because they were imperfect and incapable of sustaining themselves. Elsewhere, however, he stated adamantly that the species were fixed in number.

> ... tant qu'il subsistera des individus, l'espèce sera toujours toute neuve, elle est autant aujourd'hui qu'elle était il y a trois mille ans; toutes subsisteront d'elles-mêmes, tant qu'elles ne seront pas anéantis par la volonté du Creatur. 104

God ceded only the powers of alteration, destruction, development renewal and production to his lieutenants. He reserved creation and annihilation to Himself,[105] and Man had power only over individuals, not the species itself.[106] Buffon also suggested that the consequences of men's actions were reduced because the fecundity of Nature was irrepressible and the quantity of life on the planet unalterable.

> ... la mort n'attaque que les individus, ne frappe que la surface, ne détruit que la forme, ne peut rien sur la matiere, ne fait aucun tort a la nature, que n'en brille que d'avantage que ne lui permet pas d'aneantir les especes, mais la laisse moisonner les individus et les détruire avec le temps. 107

Since Nature appeared to be indifferent as to which

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[104] Buffon, "Recapitulation", O.C.B., 12:522.

[105] "Premiere Vue", J.Piveteau, Buffon, p.32.

[106] Buffon, "Des Animaux Domestiques", C.C.B., 16:176.

[107] Buffon, "De Boeuf", Ibid., 17:2.

species was more or less destroyed, Man had to be on his guard. Buffon seemed unwilling to accept any stoical interpretations of Nature as an intricately balanced system in which each element contributed to and was responsible to the whole. In his chapter on swine, for example, he explicitly rejected the notion that each part of the body has an integral function. If he rejected this idea when discussing the composition of bodies, it is unlikely that he would accept it as a realistic interpretation of the natural order. The question he asked concerning the parts of the body, could as well be asked concerning beings in Nature,

> Ne suffit-il pas, pour qu'elles puissent croitre sans obstacle, et se développer sans s'obliterer mutuellement? 108

Unfortunately, peaceful co-existence was not always possible. Buffon not only believed that Nature existed for Man's convenience, he also believed that some animals like wolves and wild cats were actually enemies of human society.[109] If Man was immoderate in the exercise of his rights -- waging continual war on animals, birds and fishes -- it was a necessary war. Buffon believed that there were only so many living organic particles in the world at any given moment and that if Man was to have them for his own development and reproduction he must take them from others. Consequently,

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[108] Buffon, "Du Cochon", O.C.B., 17:219.

[109] Buffon, "Du Loup", Ibid., 18:427.

Man continually fought the carnivores who threatened his flocks and the rodents and insects who devoured his crops.

Buffon's rejection of stoic theory can be interpreted as the result of a desire to prevent men from being paralyzed by a concern for maintaining a harmonious balance in Nature. His occasionally confusing remarks on the equilibrium of population can also be interpreted this way. Here again his remarks appear to depend upon his intentions. When Buffon is trying to emphasize man's creative potential, he discusses the annhilation of obnoxious species,[110] but elsewhere he will insist that Nature preserves almost the same number of individuals in every species, regardless of human depredations.[111] Occasional imbalances occur; insects, rats or ants sometimes swarm upon the Earth, and there have been similar eruptions in human kingdoms. Normans, Goths and Huns have descended upon continents, ravaging, pillaging and destroying empires, then breeding new and equally barbarous offspring in the debris of civilisation.[112] These are momentary interruptions, nonetheless, for Nature is generally constant in its movements, oscillating between

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[110] Buffon, "Des Animaux Domestiques", O.C.B., 16:177. "Il a fait reculer peu a peu les bêtes feroces, il a purge la terre des animaux gigantesques dont nous trouverons encore les ossements enormes, il a détruit ou reduit a un petit nombre d'individus les espèces voraces et nuisibles ...

[111] Buffon, "Du Lievre", O.C.B., 18:285.

[112] Ibid., 18:284.

fecundity and decimation. The boundaries of material in the universe maintain an equilibrium so that Man needn't fear that he will be overwhelmed by obnoxious species, or that his own industrious multiplication will continue without limit.

> ... a prendre la terre entiere et l'espèce humaine en general, la quantité des hommes doit, comme celle des animaux, etre en tout temps a tres peu pres la meme, puis qu'elle depend de l'equilibre des causes physiques. 113

Natural checks, like war, famine, disease and dispersal operate independently of human efforts to regulate population and any inordinate increases in one area will be followed by reductions. Buffon believed that Man need not be subjected to such vicious oscillations in population; through conscious effort their wild rapidity could be reduced. Man had traditionally attempted to exercise control by regulating population and preventing increase. Laws were established which permitted the mutilation, sale or extermination of unwanted infants, men practised abstinence or "condemned themselves to perpetual celibacy",[114] to use Buffon's language. For the most part, moral conditions, stringent or lax, had no effect on the base population since morals themselves depended upon physical circumstances and would become more

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[113] Ibid., 18:285.

[114] Ibid., 18:286.

stringent as resources dwindled. In Buffon's opinion, strict morality was an unnecessary torture and contrary to Nature. Man was made to multiply himself -- the natural state after puberty was marriage[115] -- and Man had a moral obligation to increase his numbers and his knowledge. Monasticism and infanticide were not solutions; what was needed were measures which would encourage the increase of population to its natural limits without initiating an uncontrollable reaction.

This would seem to be the core of Buffon's work; his desire to ensure that Man could multiply his numbers in safety. Man should secure himself from the natural disasters which drove starving populations to war in an attempt to secure sustenance, or prompted merely uneasy nations to attempt to guard and increase their reserves. Buffon believed that this security could only be achieved if Man exploited resources rationally, without interference from traditional social, economic and now ethical restrictions. Control of Nature was more important than control of self, at least in the traditional sense, and knowledge gained through contemplation of the Universe was to be employed to reconcile Creation to Man and not the reverse.

Buffon composed his work against a background of increasing social, economic and administrative disorder,

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[115]Buffon, "De La Puberte", O.C.B., 13:90.

but he believed that through conscious and unrestricted efforts Man could transform the surface of the Earth. The result would be an ordered world in which one could see

> ... les collines chargées de vignes et de fruits, leurs sommet couronnés d'arbres utiles et de jeunes forêts, les deserts devenus des cites habitées par un peuple immense qui circulant sans cesse, se répand de ces centres jusqu'au extremités; des routes ouvertes et frequentées, des communications établies par-tout comme autant de témoins de la force et de l'union de la societé. 116

116"Premiere Vue", J.Piveteau, Buffon..., p.33.

CHAPTER IV

DOMINION AND CHARITY AS REVOLUTIONARY PROPOSALS

There is evidently a general correspondence between the theories of Buffon and those of the physiocrats. Both suggested that there was a self-manifesting order (either economic or material) in Nature which developed through the action of inherent forces, and both proposed that some superintendance was necessary to ensure that the order was completed. In Buffon's account of Nature, Man exercised a God-given "legal despotism" as superintendant of organic processes, and Buffon, like the Physiocrats, believed that if Man acted in his own best interest, that the results would be in the best interests of Creation, too, even though his activity might provoke some incidental destruction.

There are other more specific similarities between Buffon's writings and Quesnay's or Mirabeau's. The utopian vision included at the conclusion of the previous chapter, for example, is curiously pastoral. There is no mention of manufactures or even trade, although the existence of both is implied in the description of cities and communications networks. The passage, which is taken from the Premier Vue goes on to encourage a kind of industry promoted by physio-

cracy; that is, agriculture, mining, forestry and environmental engineering. Buffon never discusses trade, tariffs, or commercial organisation (apart from one condemnation of the malign effects of monopolistic trading companies like the Compagnie des Indes)[1], but there are many passages in the Histoire Naturelle in which he expresses a distrust of metallic wealth and a preference for the development of natural resources, which resembles the physiocratic bias. In the chapter on cattle, for example, he stated that agriculture was the real foundation of national prosperity and that it provided more stability than the accumulation of precious metals.

> ... la base d'opulence des Etats ne peuvent se peuvent se soutenir et flourir que par la culture des terre et par l'abondance du bétail, puisque ce sont les seuls biens réels, tous les autres et meme l'or et l'argent n'étant que des biens arbitraires, des répresentations, des monnaies de credit qui n'ont de valeur qu'autant que le produit de la terre leur en donne. [2]

He referred to beasts of burden, like the ox or the camel, as real national treasures and when recommending that domestic animals of the New World (like the llama and the paca) be introduced to Europe, Buffon stated that the acquisition of these breeds would produce more real advantage than the acquisition of all the metals of South America.[3]

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[1]Buffon, O.C.B., 1:244.

[2]Buffon, "De Boeuf", O.C.B., 17.

[3]Buffon, O.C.B., 14.

In Buffon's opinion, iron was the most useful ore to extract.[4] Gold and silver only loaded the society with a useless weight and continually decreased in value as they increased in supply. Buffon, like Mirabeau was concerned about the distortion of social values caused by inordinate and irresponsibly spent fortunes and by gold and silver themselves which had acquired an arbitrary and inflated value. In a discussion of sartorial ostentation and the artificial value of precious metals, he declared,

> ... tout ce qui est rare et brillant sera donc toujours de mode, tant que les hommes tireront plus d'avantage de l'opulence que de la vertue, tant que les moyens de paraitre considerable seront di differents de ce qui merite seul d'etre considere ... 5

and he punctuated his remarks with the question,

> Combien peu y en a-t-il en effet qui soient capable de separater la personne de son vetement, et de juger sans mélange l'homme et le métal? 6

If Buffon appeared to distrust commerce and finance, there are also indications that he was not totally satisfied with the conduct of agriculture. There are passages in which he expressed exasperation with the traditional organisation of the rural economy. In the chapter on degeneration of species he pointed out the lamentable contrast

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[4]Buffon, O.C.B., 14.

[5]Buffon, "Varietés Dans L'Espèce Humaines", O.C.B., 14.

[6]Ibid., 14.

between French cattle and the Swiss and Savoy animals which were nearly twice as large. In Buffon's opinion, the difference in proportions could be attributed to the difference in pasturing practices. In Switzerland and the Savoy, cattle were pastured in meadows after the first melting of the snow, when the grass was fresh and tender. Whereas, in France the cattle were only admitted to pasture (according to community tradition) after the horses had cropped. Buffon called for change, and like the physiocrats, apparently expected the initiative to come from the central government.

> ... ils ne sont donc jamais ne largement, ne convenablement nourris, et ce serait une attention bien necessaire bien utile a l'état, que de faire un reglement a cet regard, par lequel on abolirait les vaines pâture en permettant les enclos. 7

Buffon also argued for the institution of enclosures in his article on sheep, where he proposed that confined pasturing and consequently intensive manuring of small areas would increase soil fertility.

> En les laissant se journer sur les terres, qu'on veut améliorer, il faut pour cela enclore le terrain et y renfermer le troupeau toutes les nuits pendant l'été; le fumier, l'urine et la chaleur de corps, de ces animaux ranimeront en peu de temps les terres épuisses ou froides et infertiles ... 8

Buffon's concern with the poor state of agriculture is evident in the Histoire where he criticized the contempt

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[7]Buffon, "De Boeuf", O.C.B., 17.

[8]Buffon, "De Brebis", O.C.B., 17.

shown for farming and lamented the absence of informed supervision of agriculture in France. He too used the ancients as examples of a sophisticated people who nevertheless did not disdain involvement in agriculture.

> ... les anciens faisaient leurs délices de l'etude de l'agriculture, et mettaient leur gloire a labourer eux-memes, ou de moins a favoriser le laboureur, a epargner le peine du cultivateur et du boeuf; et parmi nous ceux qui jouissent le plus des biens de cette terre sont ceux qui savent le moins estimer, encourager, soutenir l'art de la cultiver. [9]

Buffon also shared the physiocratic interest in increasing livestock for food, wool and manures, and the forage he recommended for herds -- lucerne, sain-foin and turnips,[10] -- indicates that he was aware of the current agricultural theories the physiocrats drew on. Although Buffon never specifically mentioned the New Husbandry he was a member of the Royal Agricultural Society of Paris,[11] and the first publication of this association (in 1761) mentioned his name, in conjunction with Daubenton's, presumably in recognition of the work the two had done to further animal husbandry and arborculture.[12] Buffon would have been acquainted with Tull's practices through his own studies too as well as

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[9] Buffon, "De Boeuf", O.C.B., 17:14.

[10] See articles in O.C.B. on sheep and cattle for detailed feeding recommendations.

[11] S.Milliken and O.Fellows, Buffon, p.56.

[12] C.G., p.80.

through his collaboration with Duhamel de Monceau. Buffon had read Tull's book and apparently had attempted to translate it sometime in the late thirties, but he had found it too idiomatic and prolix, and had to give up the project. Duhamel translated the book instead.[13] Like Tull, Buffon believed that the Earth had a certain degree of fertility which had been augmented over the years by cultivation.[14] This was the fundamental principle of Tull's theories although in Buffon's work at least we can see that this idea would have philosophical implications in connection with his belief that Man working in combination with Nature could accomplish much more than Nature could alone.

When it comes down to specific proposals for the improvement of agriculture and the rationalization of the rural economy there are some dissimilarities between Buffon's suggestions and those which the physiocrats took over from the agronomists. Unlike Quesnay, Buffon valued the ox over the horse as a farm animal and his chapter on oxen includes innumerable references to their superiority.[15] This might be the result of regional eccentricity or it might also

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[13] G.E.Fussell, Jethro Tull: his influence on Mechanized Agriculture. (Reading, 1973), p.50.

[14] Buffon, O.C.B.

[15] Buffon, "De Boeuf", O.C.B., 17.

merely be an aspect of Buffon's aristocratic conservatism. He had a hunter's enthusiasm for the horse, and at one point in his discussion of their unsuitability as farm animals he cinched the argument by stating that their suppleness, grace and gait would deteriorate if they were reduced to peasant labour.[16] Quesnay's recommendation of horse-teams was part of an attack on irrational communal agriculture and established land-holding patterns, but Buffon's approval of oxen is not necessarily a conservative support for traditional arrangements. I suspect that it is a minor difference since Buffon too openly advocated enclosure, which in most parts of the country and particularly in Bourgogne had been proceeding at the expense of communal territories and the customary rights which were the pre-requisites of an agriculture carried out by small-holders.

It is possible to delineate abstract correspondences between the theories of the physiocrats and those of Buffon to pick out any number of parallel passages in their writings or even to find Buffon's business practices corresponding to fundamental physiocratic tenets,[17] but all of this can be

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[16] Buffon, "Le Cheval", C.C.B., 16.

[17] in Bertin, "Buffon; L'Homme d'Affaires", Buffon (M.N.H.N.), p.88. Buffon clearly shared the physiocratic belief that a good return required a good investment. When he was director of the Pepinerie he spent prodigious amounts, investing 1,157 livres one year, 1,686 the following year, and 2,800 livres the next. The États grew alarmed at what they considered to be a reckless prodigality and insisted, after 1738 that he submit a yearly budget for their approval.

rather artificial. What is undeniable and probably most significant is that Buffon's analysis of the natural order legitimised and called for the rational exploitation of Nature and that he expressed in his writings a comparable concern for moral order in society. His social concern really predominates over ideas of technical reform for while there are detailed, lengthy discussions of stock-raising techniques there are few specific proposals for the rationalization of the rural economy. His criticisms of the traditional organisation seem really to be directed more towards the irresponsibility of the leaders of society; those absentee seigneurs who were neglectful in their administration of their estates, but over-zealous in their collection of the returns and niggardly in their distribution of the benefits. Buffon declared,

> ... l'homme riche, au lieu de réparer a mésure qu'il détruit, de renouveler lorsqu'il anéantit, il met tout sa gloire a consommer ... il abuse egalement et des animaux et des hommes dont le reste demeure affame, languit dans la misere, et ne travaille que pour satisfait a l'appetit immodere et a la vanité encore plus insatiable de cet homme qui détruisant les autres par la disette, se détruit lui-meme par les exces, au lieu de jouir moderement des biens qui lui sont offerts, au lieu de les dispenser avec equité. 18

It is clear from other passages that Buffon too connects this irresponsibility with the luxurious excesses of aristocratic urban life.[19] He reportedly believed that

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[18] Buffon, "De Boeuf", O.C.B., 17.

[19] Ibid., 17.

the rural economy could be in some measure restored if only the aristocracy would assume more local activity. As his housekeeper, Mme. de Blesseau remarked,

> Combien, M. de Buffon, n'a-t-il pas dit de fois que pour que tous les pauvres fussent heureus, il faudrait que tous les seigneurs passassent 4 ou 5 mois dans leurs terres, pour s'occuper a les faires travailler a bien des choses qui periclitent et que cela empècherait qu'ils ne fussent aussi malheureus. 20

The energetic utilisation of resources combined with concern for the economically and socially oppressed, which characterised Buffon's writings was evident in his personal behaviour too. Mention has already been made of the solicitousness he displayed towards his tenants -- a concern which was genuine, if irritating. His activities on his estates provide good examples of his philosophy of human dominion over Nature, put in action. He undertook numerous projects to transform the abandoned and over-grown wilderness of Montbard into a civilised garden which later visitors (Stendhal for example) compared to Versailles because of its order and regularity.[21] Commentators most susceptible to Buffon's influence (like his step-brother) did not fail to remark upon the utility as well as the beauty of the changes, in terms which indicated how industry had brought to perfection the works of Nature. In a passage

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[20] C.G., p.404.

[21] S.Milliken and C.Fellows, Buffon, p.31.

that reads very much like parts of the Histoire Naturelle, Chevalier de Buffon described the garden as one that ...

> ... il avait rendu aussi agreeable qu'utile, en forcant la Nature a reproduire sur des rochers, ce qui croitre dans les plus fertiles vallons, ... C'est ainsi qu'il attire le rossignol et la fauvette dans les lieux que depuis plusiers siecles n'etaient habités que par des oiseaux de nuit ou par des oiseaux a proie. [22]

Buffon, true to his philosophical ideal had eliminated or pushed aside the beasts (or in this case birds) of prey, and made flowers bloom in the wilderness.

It has been pointed out that this project, and many others became a form of charitable industry, a sort of eighteenth century Tennessee Valley Authority plan. He employed droves of local indigents, over a period of twenty years to cart small baskets full of earth and materials up the hillsides to establish terraces and garden beds. The same combination of personal and public interest is evident in his restoration of the small forge which he inherited with the estate. He re-activated and expanded it in 1768 or 69 and the establishment not only turned over a handsome profit for him, and provided him with equipment for some profitable scientific researches, it also provided employment for at least 200-300 workers.[23] Buffon installed living quarters and bath-houses and provided some measure of

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[22] C.G., pp.397 & 401.

[23] Mme. de Blesseau, "Memoir", C.G., p.404.

spiritual comfort for his workers by building a chapel near the works. It is probably not insignificant, that when the forge was being erected, the "locals" were so confused by the scale and design of the forge itself, that they presumed it was to be a church and insisted on genuflecting before the portals.[24] I tend to think that they identified the structure correctly but mistook the God -- human industry was the object of worship in this temple.

Most of the improvements on his estates involved characteristically elaborate efforts in environmental engineering. Buffon elevated the water level in a near-by river and drew part of it away by means of an alimentary canal, to provide a motor force for the forge,[25] and constructed a subterranean aqueduct and pumping system to raise water up for the gardens.[26]

Buffon was always attentive to the usefulness or the potential of "natural machines". For example, on one of his tours of the pépinerie he noticed that the activity of birds attracted to thickets was particularly helpful in dispersing seeds (and consequently initiating the establishment of new saplings). To encourage their labours he ordered that

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[24]From Buffon, Sa Famille, Ses Collaborateurs et Ses Familiers, Memoirs Par M.Humbert-Bazile, quoted in S.Milliken and O.Fellows, Buffon, p.48.

[25]L.Bertin, "Buffon; L'Homme D'Affaires", Buffon, (M.N.H.N.), p.87.

[26]Bouchard, quoted in Hanks, Buffon Avant L'Histoire Naturelle, p.127.

quantities of these thickets be planted so that large numbers of birds would congregate and their activities would eventually reduce the labour of his employees.[27]

For the most part, his endeavours supplied profits for Buffon as well as employment for the community. While Buffon was always concerned with local prosperity and criticized spendthrifts who did not re-invest their revenue in their community, some of his actions on his estates suggest that productivity and the rational utilisation of resources came first and social conscience second. This is evident in his behaviour concerning the Montbard forest.[28] Since the late sixteenth century seigneurial advances on communal lands and privileges in Burgundy had been particularly aggressive. Much of Buffon's own wooded property had formerly belonged to the village of Montbard, and had been put up for auction in the seventeenth century when the village was overwhelmed with tax arrears and the Crown was demanding restitution. The seigneur of Montbard at the time bought up the forest and it was ceded as part of the estate to the Leclercs. Historians of the nineteenth century, particularly Perdrizet, labouriously investigated the circumstances surrounding the purchase to demonstrate that Buffon had clear "legal" title

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[27] L. Hanks, Buffon Avant L'Histoire Naturelle, p.182.

[28] Perdrizet, Buffon et la Foret Communale de Montbard (Dijon, 1895).

to the woods could legitimately do whatever he wanted with it, and exclude anyone he wanted from it. Still, within the traditional organisation of the rural economy or rather according to the assumptions on which it was based, the seigneur could not ever have enjoyed "legal" title to the commons. Perdrizet's account also does not obscure the fact that Buffon obstinately refused to negotiate the return of the commons to the village although the council attempted for years to regain their lands. Perdrizet recorded that the community had abused and ravaged the woods, over-cut the forest, and damaged the saplings with their herds. He seems to have felt, as perhaps Buffon himself did, that this mismanagement somehow justified Buffon's subsequent possession of the property. Buffon could excuse his stubborness by the knowledge that he was maintaining the property more rationally and producing more and better wood which would ultimately benefit the community and the nation.

It was Hanks who first remarked that it was easy to discern the pre-occupations of a Bourgignon seigneur in the Histoire Naturelle, and he attributed Buffon's philosophy of the conquest of brute Nature to the predilections of the noblesse de la robe in Buffon's home province.[29] Certainly this group held the greatest part of the lands in

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[29] L. Hanks, Buffon Avant L'Histoire Naturelle, p.200.

Burgundy and were busy maximizing production on their estates by introducing new crops, animals, rotation patterns and machinery. Many of the local office-holders could be found enrolled in economic and agricultural societies within and beyond France. Pierre Daubenton, for example, the brother of Buffon's assistant, served as mayor of Montbard (among other things), belonged to the Lyon, Dijon and Berne agricultural societies and attempted on his estates to acclimatize fruit-producing trees and to establish the Louisiana red mulberry bushes for the improvement of the silk industry.[30] There were many others like him. J.M. Louis Daubenton spent much time and money attempting to introduce merino sheep to the area,[31] Buffon's nephew, Nadault de Buffon was an hydraulic engineer who developed irrigation techniques and machinery, and who (with his famous uncle) was a corresponding member of the Turin Academy.[32] Even the seigneurs-ecclesiastiques were preoccupied by the same interest. One of Buffon's frequent guests at Montbard (according to Chevalier d'Aude) was Dom Gentil, the prieur de Fontenet. The prior carefully observed the administration of the abbey estates, and after many years of reflection

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[30] C.G., p.20, footnote to Lettre XI.

[31] C.G., p.134.

[32] Ibid., p.126.

published his conclusions on the diet of vegetables and the efficacy of chemical fertiliser.[33] Buffon himself, apart from his efforts with the pepinerie, had made attempts to acclimatise hops. Since Dijon was not a particularly good wine-producing area, he hoped that a good beer could be produced instead and enlisted Abbe LeBlanc and the botanist Berthelot du Paty in his attempts.[34]

Industry of this kind was carried on by public administrators in the area as well as by individuals -- the Elus of Bourgogne, for example, who undertook drilling explorations for coal in 1750.[35] Buffon did associate socially and professionally with these men and his proprietorial interests were identified to some extent with those of equally energetic seigneurs. He was apparently consulted (or simply offered his opinion) as a kind of authority on any number of subjects from the hardiness of certain mulberry bushes to geological formations. Nevertheless, letters addressed from Picardie, soliciting his advice,[36] and those written by him concerning arborcultural experiments sponsored by the government in Languedoc, indicate that these activities were not confined to Burgundy alone.[37] The formation of groups like the

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[33] C.G., p.104.

[34] Lettre XVIII, C.G., p.34.

[35] Lettre XLVI, C.G.

[36] Ibid.

[37] Lettres Inedites in Buffon (M.N.H.N.), p.192.

Royal Society of Agriculture in the generality of Paris, and the agricultural societies in provincial towns like Rouen, Auxerre or Dijon suggests that the rationalisation of methods of exploiting material resources had attracted nation-wide attention.

So Hanks'statement of the connection between Buffon's proprietorship, native Burgundian traditions and the philosophy of domination of Nature risks distorting Buffon's writings by making them appear simply to justify the ambitions of a specific class. It omits the recognition that Buffon addressed issues which occupied men throughout the nation, and it fails to account for Buffon's combination of exhortations to "conquest" with demands for the exercise of a paternalistic concern for social welfare. It seems likely that Buffon's philosophy, like the physiocratic doctrine is actually established upon a concern for guaranteeing national prosperity and security, and that like them, he has found the guarantee requires some alteration in the economic relationship between man and the natural resources, and some social reconstruction.

There is little mention of warfare and armies in the Histoire Naturelle, but the record of Buffon's professional career shows the identification of his interests with those of the government -- particularly the Ministry of Marine. A good number of Buffon's experiments and financial adventures contributed directly or indirectly to the growth of

military technology and to the conservation or utilisation of material resources which were essential for military expansion. The experiments on re-forestation and increasing the strength of wood on which Buffon established his reputation, were commissioned by the Marine, and his interest in re-forestation was sustained in his work at the pépinerie where he started saplings of various hardwoods that were used to re-stock seigneurial parks and woods.[38]

Many of his experiments and researches were useful in the development of weapons, for example his work in the thirties on rocketry and ballistics, and once he re-established his forge in the 1760's he began investigating methods of raising the quality (and incidentally the price) of Burgundian iron, and improving the manufacture of cannons.[39] On the strength of his research he received several military contracts to construct cannons so he contributed quite directly to re-armament in the 1770's, not to mention the regional economy. Even the much publicised experiment with burning mirrors had military applications. In 1746, to the delight of an aristocratic and regal audience, Buffon

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[38] F.Bourdier, "Principaux Aspects ... ", Buffon (M.N.H.N.) p.43. Buffon feared the forests would be exhausted, and he remarked in "Memoire sur la conservation et le Rétablissement des forets", Memoirs de l'Academie Royale des Sciences MCCXXXIX pp.140-56, "There's hardly enough wood for necessities. We are menaced by absolute want."
quoted in Bamford, Forests and French Sea Power, p.140

[39] Ibid., p.43.

reproduced Archimedes legendary feat by incinerating a pile of logs at a great distance using only light reflected from a group of small mirrors. This had been interpreted as Buffon's dramatic refutation of the Cartesians (who denied the accomplishment was possible) and a victory for the Newtonians who accepted the action of forces at a distance.[40] This interpretation is probably correct but it is clear from Buffon's own comments that he was also interested in the practical applications of the device. He quite seriously believed that Archimedes idea was worth resuscitating since the invention had great potential for setting ships on fire and for setting alight standing fields of corn (presumably the enemy's). The device could have a secondary importance for the Navy since he predicted its usefulness in extracting salt from sea-water -- a process which was then consuming vast quantities of wood that could be used more profitably for ship-building or in the forges which manufactured arms.[41] The research he made in preparation for his public demonstration also profited the Navy, for Buffon had to make a number of investigations into the grinding of lenses which could also be employed for telescopes.[42]

Buffon directed much research and even some of his

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[40] S.Milliken and O.Fellows, Buffon.

[41] Buffon, "Supplements: Light, Heat & Fire", O.C.B.

[42] L.Hanks, Buffon Avant L'Histoire Naturelle, p.107.

fortune into efforts to discover alternate fuels or to at least devise better ways of using the existing ones. In 1778 he contributed 39,000 livres to help establish a company that was formed in response to government concern over increased wood consumption and the depletion of the forests. The company proposed to investigate substitute fuels and concentrated particularly upon examining means of extracting and refining coal. The company received the active support of Necker and Maurepas, but eventually foundered because it lacked consistent direction, reliable geological information, and because of a scarcity of good coal that would yield a good coke. Buffon never recovered his investment and consequently suffered a substantial loss through his efforts in the public interest.[43]

Hanks identification of Buffon with the Burgundian Parlementaires, not only overlooks the national implications of his and their efforts, it also erases a distinction that I think Buffon attempted to make between himself and the noblesse de la robe, but in the long run, his aloofness may be inconsequential -- the result of social and political conservatism. Despite his reservations, Buffon's theories legitimised "acquired nobility" by denying the existence of a fixed hierarchy of matter, and obliterating any qualitative distinctions between categories in the natural order. Experi-

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[43]"Lettres Inédites", Buffon (M.N.H.N.), p.212.

ment XXVI, the microscopic analysis of samples taken from the womb of a bitch, was essential to Buffon's argument because the discovery of "spermatic animalcules" or organic molecules (depending upon whose terminology you employ) in the female, helped him to establish that these particles were common to all living matter.

The only hierarchy in Nature was a graduated scale of complexity, and complexity of form ultimately depended upon chance. Whether living organic particles were assimilated to and took the form of a toad or a human being was the result of circumstance, although the process of arrangement and combination followed invariable laws. Buffon's microbiology destroyed the natural foundation for any hierarchical arrangement of privilege in society that was posited upon qualitative distinctions between classes. His demonstrations of the essential uniformity of matter and the uniformity of life processes throughout Nature would provide a foundation for arguments that society (in order to be true to Nature) must reproduce this sliding scale, and repudiate any qualitative distinctions between men.

Buffon himself was less interested in issues of social equality. It was suggested earlier that he had attempted to reconcile in his personal life, two very different systems of values, and it is possible to interpret the Histoire Naturelle as an attempt, on the intellectual level, to effect the same reconciliation -- to redefine the concept of nobility

so that it incorporated new virtues. Where Buffon discusses the aristocracy, it is easy to discern very standard elements in his ideas of their function. They are to exercise self-restraint and self-discipline in a life of service to the public.

> Toujours environnés, obsedés, genés, pour ainsi dire, par le nombre, toujours en botte à leur demandes, a leurs empressement, forcés de s'occuper de soins étranger et d'affaires, agités par de grand interêts, et d'autant plus contraints qu'ils sont plus élèvés, le grands ne sentiraient que le poids de la grandeur et n'existeraient que pour les autres, s'ils ne se dérobaient par instants a la foule, meme des flatteurs. 44

The escape from this preoccupation is hunting, and the article on the Stag, from which this discussion of nobility is taken includes lengthy praise of the virtues of the chase. Buffon's promotion of a sport that had such definite class connotations irritated many of his contemporaries. Grimm, for example, implied that Buffon was grovelling before aristocratic pretenses.

> ... je ne veut pas le soupconner d'avoir voulu faire sa cour aux grands et flatter leur gout dominant au mepris de la verite et de ses droits sacrés, se serait bassesse impardonable. 45

But Grimm may have missed the point. Buffon was not discussing hunting as a sacred right but as the privileged diversion of those who exhaust themselves in public service. The chase is the sport of public servants, not kings. He

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[44]Buffon, "Le Cerf", C.C.B., 18.

[45]C.G., p.109.

does admit the usefulness of hunting as a school of military arts, since it provides knowledge of horses, and arms and inculcates physical endurance and courage necessary in war. Still, he is far from depicting it as an auxiliary to military duty, just as he is far from identifying the nobility with arms. It is a natural pleasure which satisfies a taste common to all men.

> ... le gout de la chasse, de la peche, des jardins, de l'agriculture, est un gout naturel de toutes hommes. 46

The effect of the entire discussion, and particularly the last quotation is to destroy the idea of hunting and consequently agriculture as class occupations. Only in simple societies are classes segregated according to occupation -- the aristocracy fighting and hunting, while the underlings farm. In societes policees, such as France, occupations are perfected as arts. Hunting, for example, can be practised by those who can afford the equipment or who require the diversion.[47]

Buffon seems to be aiming less at social equality than at broadening the scope of aristocratic activity, for he has implied that if hunting is elevated to an art, so too is agriculture. Like Quesnay, he has managed to suggest that rational administration of estates, the development of agricultural technology and the exploitation of material

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[46]Buffon, "Le Cerf", O.C.B., 18.

[47]Ibid., 18.

resources are not incongruent with nobility. His scientific research, the discussion of the natural order and Man's role in Nature established that rational administration was a material necessity and a moral obligation. So the leaders of society should be out there on the estates, establishing nurseries, forges, introducing new crops, investigating chemical fertilisers, increasing agricultural productivity and consequently guaranteeing the material welfare of their communities. Although Buffon's proposals may be less specific than the physiocratic programme, it is clear that his work is premised upon the same assumptions -- the necessity for rational exploitation of resources, balanced by social responsibility. The economic and social consequences of his solution vary only in the degree that his social allegiance is to the aristocracy.

While Quesnay's model was Confucius, Buffon may have patterned his philosophy on the example of Solomon and his belief that the essence of the Universe was mathematical, may have derived from a Biblical rather than a Pythagorean tradition. Certainly, the Reverend Stephen Hales, whose writings influenced Buffon greatly at the beginning of his career, drew upon Scripture to support his belief that the Universe was quantifiable. Hales declared in his book,

> Les Écritures-Saintes nous assurent que cet Être tout sage, s'est fait une loy de creer avac nombre, poids et mesure. Il a garde dans ses ouvrages les proportions les plus exactes ... Pour les penetrer; nombrons, pesons et mésurons. [48]

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[48] Hales, La Statique Des Vegetaux (London , 1735), p.1.

It is interesting to discover Buffon compared by his friends quite consciously to Solomon. LeBlanc wrote from England during the thrities, when Buffon was engaged in reforestation experiments, and praised his efforts in this fashion:

> They claim (the English) that Solomon, who was acquainted with every plant and tree, from the hyssop to the cedar, wrote a book on the manner of cultivating trees and plants, which we have lost. Have you not rediscovered it? 49

Certainly the figure of Solomon corresponds in several aspects to Buffon's ideal. The King possessed an encyclopaedic knowledge which was bestowed upon him as a result of his concern for his people and he employed his knowledge of all birds, animals and plants and the proportions thereof, to transform Nature. He set nations of men to work to carve the Mountains, cut down the forests and perfect the products of Nature in praise of God, and his direction ensured the security of his people from pestilence, agricultural disaster and military defeat.[50]

This use of knowledge to transform and dominate Nature is distinct from the Pythagorean tradition in which knowledge of universal harmony provided the foundation for Man's reconciliation to the order of Nature.

In seventeenth and early eighteenth-century England

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[49]S.Milliken, "Buffon And The British" (Columbia, 1975), unpublished Ph.D. thesis, p.144.

[50]Kings I and Chronicles II.

the competition between these two different philosophies took the form of a controversy between "ancients" and "moderns", and there is evidence to suggest that the debate spilled over into agricultural theory.[51] Tull, at least, was attacked vehemently in the early part of the eighteenth century, by a man called Stephen Switzer, who was supported by a society of Husbandmen and Planters. There was much discussion of Tull's rejection of classical Virgilian agriculture, but Switzer capped his criticism by accusing Tull of atheism.[52] It is difficult to tell without examining the pamphlets first-hand, but appearances suggest that in the argument over whether knowledge should be used by man to dominate Nature or to reconcile himself, the proponents of the New Husbandry emerged on the side of those who believed domination was necessary. If this is the case, an admiration for Solomon, would be consistent with Buffon's certifiable enthusiasm for Tull. Both figures would represent the necessity of Man's superintendance of Nature.

While Buffon discussed the activity of Man in Creation in general terms, the moral lesson of his investigations was really directed towards the socially pre-eminent, the

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[51]This interpretation of the "ancients"-"moderns" controversy in the seventeenth century depends upon invaluable work completed by Peter Black, "Natural Philosophy Modified: Pythagorean Elements in Wren's Protestant Architecture", M.A. thesis (unpublished), 1978.

[52]G.E.Fussell, Jethro Tull; his influence on Mechanized Agriculture. p.60.

seigneurs who should acquire comprehensive knowledge of Nature and utilise this information to exploit their properties to the full advantage of the community. From the popularity of his works it is possible to conclude that some aspects of his philosophy attracted a favourable audience. Certainly many seemed willing to accept his demonstration that there was no qualitative hierarchy of matter or function in the organic universe. Although subsequent scientific research has shown that Buffon could not have seen "spermatic animalcules" in a sample from a womb, nevertheless, Buffon saw them, and his observations were confirmed by his assistants, Needham and Daubenton.[53]

Unsympathetic contemporaries believed that Buffon's analysis of Nature owed more to philosophical preconceptions than to objective research -- not that this distinguishes his work from their own, but it was already the easiest way to discridit his results. When the volumes appeared under the title Histoire Naturelle, Voltaire sniffed and remarked acerbically that the work was not so natural as all that,[54] and several scientists suggested that Buffon saw Nature less "in its operations", than in his own head.[55] Other critics varied in ascribing his errors to either ignorance or improper

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[53]Buffon, "Des Experiences", O.C.B., 12.

[54]L.Bertin, "Buffon; Homme D'Affaires", Buffon (M.N.H.N.) p.102.

[55]Grimm's remarks in C.G., p.136.

methodology[56] and modern historians, in their attempts to account for the erroneous aspects of his science have tended to accept both these interpretations. Milliken and Hanks, for example, demonstrated that Buffon was unable to grasp some of the fundamental principles of mathematics and that his understanding of the discipline remained superficial or at least incomplete.[57] Consequently he relied upon analogy far more than calculus, and far more than strict scientific practice should admit. Hanks also demonstrated by a painstaking analysis of Buffon's research in forestry, that his experimental method was inadequate. Buffon impatiently plunged into all his research, grasped the "essential" significance of the results then left it to his assistants to mop up the work.

This depiction is certainly accurate. Buffon's attitude to systematic verification of theories can be judged from a

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[56] D'Alembert, in a letter to Cramer (1749) remarked, concerning Buffon's theories ...

"...il est vrai qu'avez du calcul et de la geometrie, il n'eut peut-etre pas tant hasarde de choses sur la formation de la terre et qu'il en aurait meme raye plusiers..." (from L.Hanks, Buffon Avant L'Histoire Naturelle, p.27

Duhamel De Monceau, wrote to a friend, of his opposition to modern "physiciens",

"Qui n'ont aucun doute sur tout ce qui presente à leur imagination. Trois petites volumes en 12° qui viennent de paraitre contre l'histoire du cabinet de Jardin du Roi contribueront a me rendre plus circonspect a jamais." (from L.Hanks, Buffon Avant L'Histoire Naturelle, p.150.

[57] S.Milliken, "Buffon And The British", and L.Hanks, Buffon Avant L'Histoire Naturelle, p.27.

remark he made to the chemist Guyton de Morveau, who had offered to test one of Buffon's assertions about heat loss, by subjecting a body to the crucible. Buffon dissuaded him from this waste of scientific energy by saying, "the best crucible is the mind".[58] So much for empirical science, but Buffon nevertheless adhered to the doctrine that the Universe was ordered mathematically and admired those men, like Hales who penetrated its mysteries through painstaking statistical analysis. It is possible to blame errors in his system of thought upon intellectual inadequacies and psychological or physiological handicaps, but this does not really explain why he continued to maintain an allegiance to the principle that number, measure, and weight were the keys to understanding Natural order. It is also not adequate to refer to Buffon's eccentricities to account for the fact that such a methodical man as Daubenton would believe he saw spermatic animalcules nor will it account for the fact that his large audience was willing to believe that they existed. Buffon wrote to his friend de Brosses that the second volume, in which he explained natural processes and recounted his experiments, was the most well received of all.

> ... tout l'ouvrage a eu un grand success; mais cette partie du second volume a plus encore réussi que tout le reste. 59

His peers were aware of the breadth of appeal his

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[58] C.A.Ste. Beuve, Portraits of the Eighteenth Century; Historic and Literary. (London, 1964), 2:248

[59] Lettre XXXVIII, C.G., p.65.

doctrines had and called him one of the great popularizers of science. This was intended as insult, since then, as now, obscurity and esotericism had their own following. As Linnaeus put it, "Buffon did not extend the boundaries of science but he knew how to make it popular",[60] and Condorcet accused him of encouraging hordes of amateur specimen collectors and dilettantes.[61] We might assume that the surge of interest in natural science and in Buffon's theories in particular, was not simply the result of some increased thirst for information about the marmoset or the tapir. The botanical, geological and zoological specimens of the collectors were not only interesting in themselves, they had acquired new connotations through his efforts. The willingness of his audience to believe his theories could only result from their desire for some new direction and a new interpretation of reality. Buffon's own enthusiasm for a mathematical interpretation of universal order must be accounted for with reference to his desire to establish universal law instead of particularism and privilege as the basis of harmony in Nature. He believed in statistical analysis because this was the best method to prove the truth of "Newtonian" theories but the urgency of his desire to establish this universe compelled him to disregard his own

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[60] C.A. Ste Beuve, Portraits of the Eighteenth Century ..., 2:264.

[61] Condorcet, "Eloge", O.C.B., 1:xi.

models and led him into errors.

The popularity of the vision Buffon presented can be judged from the enthusiasm for agronomy and the response to Physiocracy, for although Buffon's natural history, Physiocracy, and the New Husbandry differ in particulars, they are all predicated upon the same fundamental belief -- that it was imperative to escape traditional restrictions and begin exploiting natural resources rationally. The growth of interest in economic administration of this kind and the commitments to statistical analysis can also be gauged by the proliferation of publications on these subjects during the century. In addition to the Journal Oeconomique established in 1751, there was a Journal du Commerce, and a bi-weekly Gazette du Commerce established in 1763, the Journal de l'Agriculture, du Commerce et des Finances, and finally, the Ephemerides du Citoyen published from 1767.[62] This last is typical of the enumerations of all kinds which were undertaken with increasing frequency during the century as private individuals and government departments attempted to add, subtract, multiply and divide their way through the chaos of the Ancien Regime. The prefaces of private works like that by Messance or Cerfvol indicate that these were undertaken for the same reasons as those initiated by the

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[62] "Les 'Bons Prix' Agricoles Du XVIII^{e} Siecle", L'Histoire Economique et Sociale de France, ed. E.Labrousse, (Paris, 1970), 2:378.

authorities, for the authors refer to the need to maintain the military corps or to establish whether the population was actually increasing or diminishing.[63] Assessing the "tax-paying" population and guaranteeing real revenue and military power seem to have provided the impetus for all endeavours.

It would not be accurate to suggest that the Physiocrats initiated these activities, or even that the rationalisation of the economy originate with them. There had been a gradual liberalisation of economic administration during the eighteenth century as officials relaxed legislation governing internal and international trade in grain,[64] made attempts to establish a single customs duty[65] and introduce uniformity of taxation. There were even some government attempts to increase agricultural productivity by encouraging reclamation of uncultivated land,[66] but it was not until the Physiocrats had formulated their doctrine that attention really shifted from the distribution of resources to their exploitation

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[63] Cerfvol, Memoire Sur La Population Dans Lequel On Indique Le Moyens De La Retablir; Et De Se Procurer Un Corps Militaire Toujours Subsistant Et Peuplant (London, 1768) Preface. The title alone indicates the author's preoccupation.

[64] R.M.Wilson, French Foreign Policy During the Administration of Cardinal Fleury, 1726-43. (Connecticut, 1972), p.50, and "Les 'Bons Prix' ...", H.E.S.F., p.380.

[65] see J.F.Bosher, The Single Duty Project: A Study Of The Movement For A French Customs Union in the Eighteenth Century (London, 1964).

[66] "L'Expansion Agricole", H.E.S.F., p.420. See also M.Bloch, French Rural History (California, 1966).

and from the size of the population to the deployment and prosperity of the people. The physiocrats gave economic rational administration a new direction by providing a theoretical foundation and a coherent programme.

Once the physiocrats had outlined specific proposals they built up quite a following among administrators who were engaged in finding immediate solutions to French difficulties and legislation enacted in the sixties, seventies and eighties looks like applied physiocracy. Legislation invited owners or tenants to drain and cultivate "wastelands" by promising a number of tax exemptions and the Arrets du Conseil intervened to over-ride customary laws on the regional level which might prevent this activity. Inter-commoning and rules prohibiting enclosures were attacked piecemeal by d'Ormesson while he was minister and the rights of _fouages_, _franc-fief_ and _terrages_ which would discourage agricultural expansion, were suspended.[67] All these declarations were contrary to the traditional system of communal agriculture and tended to drive small-holders to the wall. For the most part it was the seigneurs or speculators who made the extensions, since the legislation which was based on the premise that the seigneur was the proprietor of waste-lands gave him authority to dispose of them as he wished.

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[67] M. Bloch, _French Rural History_, p.200.

More legislation was implemented during the last years of the Ancien Regime to establish a self-regulating market. Turgot, for example, reduced the droits de peage and de marche on grains, and the preambles to legislation introduced from 1763-87 indicate how far ideas of the fundamental right of private enterprise had progressed against traditional ideas of authoritarian regulation and provisioning. By 1787 even royal edicts discussed the fundamental right of the individual to dispose freely of agricultural products and legislation referred to the inadequacy of government attempts to furnish the needs of the people, who could be better served by private business.[68]

Even a cursory examination of the period reveals that administrators, private individuals, and members of the scientific and intellectual community were uniting in an attempt to end economic privilege and to rationalise the production and distribution of resources by implementing physiocratic policies. To effect this, they deliberately over-ruled communal practices and traditional privileges in the interests of achieving high production and sustaining high revenues. The physiocrats themselves do not seem to have been perturbed by the social re-arrangements their policies might entail. Granted, Mirabeau and Quesnay were

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[68]"L'Expansion Agricole", H.E.S.F., p.382.

dismayed by the political conclusions they drew from their theories, and locked their completed manuscript on the abuses of monarchy away in a drawer. Their followers, like most followers, were less apprehensive as well as less cautious. Mercier de la Rivière stunned several guests one day in 1763 by remarking quite casually in the midst of conversation with Quesnay and Mirabeau that the deplorable state of the kingdom could only be rectified by a conquest, as in the case of China, or by some great "bouleversement".[69]

Despite their private qualms, Mirabeau and Quesnay continued to recommend policies which would substantially alter traditional social arrangements. Certainly their solution did not win universal approval and their policies went in and out of administrative favour. Necker, for example, a reformer of more paternalistic bent, was concerned with the detrimental effects of absolutely free trade on small-holders and the rural proletariat. Still, physiocracy, like agronomy continued to acquire supporters. Marc Bloch described this sustained interest in physiocratic doctrine and agronomy as a craze; these were "literary fashions which were an emotional and intellectual indication of the presence of a mighty groundswell",[70] but this rather vague statement trivialised the activity of the theorists like

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[69] R. Meek, Economics of Physiocracy (Mass., 1963), p.41.

[70] M. Bloch, French Rural History, p.200.

Duhamel, Quesnay and Mirabeau, the administrators in central and regional governmental bodies, and all the men in economic and agricultural societies or on provincial estates who invested time and money in experimental projects for the improvement of agricultural technology. Bloch's remarks miss the implications of their efforts. Physiocracy, and to some extent agronomist theories, were statements of dedication to a new ethic which would guarantee prosperity and security to the nation. Unrestrained domination of nature, within the context of social responsibility was a revolutionary proposal.

Buffon's own effort, although it can be expressed in these same terms, was intended to re-establish a status-quo and give new direction to the traditional leaders of society by legitimising new virtues. Buffon was conspicuously loyal to the established authority, although he avoided the Court, and it is probable that his scatter-brained son was executed during the Revolution[71] to pay for the aristocratic and monarchistic sins of his father. Like many thinkers in the eighteenth century, Buffon anticipated revolutionary change, but he regarded the prospect with resignation and dismay. Towards the end of his life, when it appeared that his reconciliation was not acceptable, he remarked nostalgically

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[71] S.Milliken and O.Fellows, Buffon, p.63. The authors only refer generally to the enduring 'personal enemies' of Buffon to account for Buffonet's execution.

to a companion that there was a great change coming in which he and his kind would be swept aside. It would require another lengthy section discussing the relationship between Buffon's ideas and the legislation introduced in the early years of the Revolution to define the connection between his intellectual effort and political revolution, but it is revealing that Buffon's writings were still subject matter for lectures during the Revolutionary period. In 1795 one talk was delivered by Daubenton, then Professor of Rural Economy at the École Normale, and it provided the lecturer with an opportunity for revenge upon his former employer. Daubenton interrupted himself while reading the article on the Lion, to remark "No, the Lion is not the King of Beasts; there is no King in Nature".[72] The ammendation was greeted with thunderous applause, but the fact that Buffon's works were still serviceable in the period is more significant than the fact that they were subject to minor editing. Buffon's theories were apparently not inimical to revolutionary ambitions. Buffon would not have sympathised with the Revolution, and there are indications that he did not even appreciate the physiocratic programme. He was friendly with Necker and his admiration for Necker's works[73] suggests

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[72]Editor's note, C.G., ed. J.Lanessin, p.53.

[73]Journal de Paris, C.G., p.415. He especially admired Compte Rendu and Administration Des Finances which he reportedly reread many times and spoke of with enthusiasm

that he shared the minister's paternalistic concern for the disadvantaged and his distrust of the physiocratic theories. He certainly loathed Condorcet, who was one of the more prominent physiocratic supporters, but this may have been a question of personalities rather than policies. In the end, whether Buffon approved of their proposals or not is immaterial for it remains true that his vision of the natural order made their programme possible. He demonstrated that order in Nature was indeed self-manifesting and that it was established through the operation of forces acting with equal strength throughout the universe. His analysis of matter and of process in Nature destroyed the idea of any qualitative hierarchy of material or function in Nature which had provided the foundation for traditional social and economic relationships. Finally, his analysis of human nature provided a basis for the belief that Man's unrestrained domination of Creation was within the natural order -- required by Nature and demanded by God.

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