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<td>Chitnis, A. C.</td>
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**Digitisation notes:**

- Page numbers 251 & 313 are skipped in the original thesis.
THE EDINBURGH PROFESSORIATE 1790-1826 AND THE UNIVERSITY'S CONTRIBUTION TO NINETEENTH CENTURY BRITISH SOCIETY

Anand Chidamber Chitnis

Doctor of Philosophy University of Edinburgh March 1968.
SUMMARY

This dissertation endeavours to show the faith in education, the talent and enthusiasm of professors at the University of Edinburgh from 1790-1826; how they made the University an impressive training ground for, among others, politicans, economists, educationists, engineers, geologists and doctors; and how they pioneered many schemes and ideas which had repercussions well into the nineteenth century.

The first chapter sets the scene with a consideration of the intellectual and material background against which the professors were operating. The second chapter considers Dugald Stewart, Professor of Moral Philosophy 1785-1810, the legend that grew around him, his life, his students, his personal connections, and his links with developments in nineteenth century politics, economics and education. Chapter Three considers John Robison, John Playfair and John Leslie, Professors of Mathematics and Natural Philosophy, their lives, their students, their work, especially their awareness of and contributions to research. Chapter Four briefly notes Thomas Charles Hope's Chemistry and Robert Graham's Botany courses and the Botanical Garden. The bulk of the chapter is devoted to Robert Jameson, Professor of Natural History, the Natural History Museum, the Huttonian-Wernerian debate in Edinburgh and its implications for the nineteenth century erosion of providentialism and biological evolution. The fifth chapter considers the medical education available in Edinburgh, compares it with that available elsewhere and discusses certain medical specialists it produced. The third, fourth and fifth chapters illustrate how scientific teaching and research were becoming increasingly practical in the period, by means of field excursions, museums, dispensaries and hospitals. After a concluding chapter, an Appendix considers the professional and student societies in Edinburgh which complemented and supplemented the professors' teaching. In the student societies, some of the gifted students who attended the
University in the period, were able to give early evidence of their ability and of the advantages they derived from their education, which was to be witnessed in their later careers.
Preface
This study of professors in Arts, Science and Medicine at the University of Edinburgh from 1790-1826 endeavours to show their faith in education, their talent and their enthusiasm in the pursuit of knowledge. The professors’ ability made the University an impressive training ground for, among others, politicians, economists, educationists, engineers, geologists and doctors. Furthermore, the professors pioneered many schemes and ideas which had repercussions well into the nineteenth century.

The scene is set in the first chapter which reviews the intellectual and material environment in which the University was operating - this was the age of the Enlightenment, the Industrial and French Revolutions. While the second, third and fourth chapters are based on assessments of the professors of Moral, Philosophy, Mathematics, Natural Philosophy, Chemistry, Botany and Natural History, a different approach is adopted in Chapter Five. Here, products of the Edinburgh medical school and other forms of medical education are considered before an appraisal is made of the teachers, courses and facilities in Edinburgh. The University’s contribution is mainly limited to the internal concerns of nineteenth century Britain and comparisons with other educational institutions are largely confined to those in Britain.

I owe much to Professor D.B. Horn and Professor G.F.A. Best, who have supervised my work. I would also thank Dr. Nicholas Phillipson for providing perceptive insights and comments. I have benefitted from the criticisms and advice of Professor Neil Campbell of the Chemistry Department; Dr. George Davie of the Philosophy Department; Dr. Donald Duff of the Department of Economic Geology; Dr. Douglas Guthrie; and Dr. Robert Schlapp of the Department of Mathematical Physics - all in the University of Edinburgh.
I am indebted for their assistance to Mr Charles P. Finlayson, Keeper of Manuscripts in the University of Edinburgh Library; the librarians there and in the National Library of Scotland; Miss Helen Armet, until lately Keeper of the Burgh Records; Miss J.P. Ferguson of the Edinburgh Royal College of Physicians; Miss D. Wardle, Librarian at the Edinburgh Royal College of Surgeons and the keepers at the Scottish Record Office. Finally, I would like to include in my appreciation my friends at the University of Edinburgh for their less tangible but invaluable co-operation.
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Evidence, I.

Evidence, Oral and Documentary, taken and received by the Commissioners appointed by His Majesty George IV, July 23rd, 1826; and re-appointed by His Majesty William IV, October 12th, 1830; for visiting the UNIVERSITIES OF SCOTLAND. 4 vols., London, 1837. Volume I: University of Edinburgh.

Report

Report made to His Majesty by a Royal Commission of Inquiry into the State of the Universities of Scotland, October 7th, 1831.

C.U.L.

University of Edinburgh Library.

N.L.S.

National Library of Scotland.

S.R.O.

Scottish Record Office.

Sel. Comm.

Report from the Select Committee on Medical Education; with the Minutes of Evidence and Appendix, 1834.

H.S.S.

History of the Speculative Society of Edinburgh from its Institution in 1764, (Edinburgh, 1845).

CHAPTER ONE

The Northern Athens and her University
Commissioners: "Looking to the Continental Professors in the double character of men of science and teachers of youth, would you say that the comparison is favourable to the professors of this country, or the reverse?"

Professor Robert Jameson: "I think upon the whole it is favourable." (Evidence, I, 147).

The Scottish contribution to the eighteenth century European intellectual ferment - the Enlightenment - was made by men of the calibre of Adam Smith, David Hume, Adam Ferguson and William Robertson. The Enlightenment had, in its turn, consequences in Scotland: in the country's university system, the place of philosophy in the Arts curriculum and traditional ties with the Continent were strengthened. The two points were closely related from 1768 when, in imitation of Continental universities, the regents in Scotland taught Grammar, Logic, Ethics and Physics (in that order) in four successive years. The emphasis on Logic, Mental and Natural Philosophy is evident. Later, other subjects, not overtly philosophical, took on a philosophical dimension: Professor Jameson told the Royal Commission on Scottish Universities (1826 and 1830) that he considered Logic and "the rules of philosophising" very useful in advancing the study of Natural History. "Natural History itself is a species of Natural Logic" he said; "it serves to exercise the mind in as correct a way as Logic properly so called. The boys who attend the class acquire

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1. see John Leslie's evidence to the 1826 Commission, Evidence, I, 124.
a distinct conception of numerous natural objects, and reason with
great accuracy, owing to their being obliged to use precise and
accurate language in everything they do.¹ Thomas Newte, thirty
years earlier, had remarked on the "logical acuteness" of the legal
profession in Edinburgh. He ascribed it in part "to that spirit of
Philosophy, which has been excited by the Professors of the University,
and certain individuals, inhabitants of Edinburgh, particularly the
celebrated David Hume".²

By the end of the eighteenth century the only schools of
philosophy in Britain were to be found in Scotland.³ The prevalence
of the Scots in matters philosophical was attributed "to the manner
in which our studies at the university are conducted".⁴ A contributor
to the Edinburgh Magazine in 1817 expressed the Scottish view most
succinctly: "Indeed, I think I have always perceived that whenever
an individual has given much attention to this study in his youth, he
never fails to display in after life a depth of understanding, a
philosophical mode of considering his subject, with which no other
sort of preparation could have so effectually gifted him".⁵

"It deserves to be remarked," wrote Dugald Stewart in a
note to his Dissertation, "as a circumstance which throws considerable

1. Evidence, I, 145
2. Thomas Newte, Prospects and Observations on a Tour in England and
   I, 51, and Anthony Quinton, "The Neglect of Victorian Philosophy",
   Victorian Studies, I (March, 1958), 252.
   Magazine and Literary Miscellany, I (August – December 1817), 420.
5. Ibid.
light on the literary history of Scotland during the latter half of the eighteenth century, that, from time immemorial, a continued intercourse had been kept up between Scotland and the Continent.\(^1\) The results of the contact have already been mentioned in respect of the Arts curriculum, but they were even wider in their implication. One of the pillars of the University's reputation, the Medical School, had been organized on the Dutch basis by Alexander Monro primus. Dr. Douglas Guthrie has pointed out that medical knowledge spread through definite routes and centres - from Salerno in 1000 A.D. through to Padua (1212), Leyden (1575), Edinburgh in the eighteenth century and thence to Philadelphia.\(^2\) The connections with Leyden were of long standing: not only did Edinburgh professors and students study there but similar methods of teaching and treatment were employed in both schools. It is known too, that it was also traditional for those training to be lawyers to go to a Dutch or a French university and Scottish clergy studied in Holland and Germany.\(^3\)

Stewart partially attributed the Scottish Enlightenment in the literary sphere to "the constant influx of information and liberality from abroad" and "the art of English composition."\(^4\) As a result of the Enlightenment, Scottish philosophy in its turn impressed the

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4. Ibid., I, 551. A similar view was expressed in the Preface to the first Edinburgh Review, (Edinburgh, 1755), iii: the authors saw two obstacles to the progress of "science" in Scotland - the difficulty of proper expression and the slow advances in the art of printing, both of which were solved at the time of writing.
Continents so that by the time of the 1826 Commission Professor Jameson could testify that Stewart's works had been translated into French and German\(^1\) and that foreign "philosophical men" desired to publish in Edinburgh journals.\(^2\) Rev. Dr. William Ritchie, the Professor of Divinity, who had spent all of his eleven years on the Continent in university towns, spoke to the Commission about the "very high" standing of Scottish literature and the general superiority of the Edinburgh professorate. At "Mentz" (sic) the Germans "thought the example of a Scottish University worthy of being followed".\(^3\)

In the period 1790 - 1826, the Scottish universities could be more fairly compared to their counterparts in France, Germany and Italy than to Oxford and Cambridge. English and Irish universities required a lengthy preliminary education, offered a limited curriculum, lacked professional courses of study in theology, law and medicine and subdivided the sciences incompletely among their professorates.\(^4\) While Mathematics and Natural Philosophy were indispensable for the preliminary education in Scotland and the European countries, they did not figure in English preparatory courses. (Cambridge can be excepted with her mathematical tripos). Scottish university courses, as Dr. George Davie has explained, were then a distinctive blend of the elementary and the

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1. Evidence, I, 147.
2. Ibid., I, 148. Jameson continued: "those philosophers on the Continent who do send contributions to this country consider it complimentary that their writings are inserted in our respectable journals".
3. Evidence, I, 150 and 151.
4. For a contemporary assessment of the situation, see "State of the Universities", in Quarterly Review, XXXVI (1827), 216 - 268. The author of the article was the geologist, Charles Lyell, according to Samuel Smiles, A Publisher and his Friends: Memoir and Correspondence of the late John Murray with an account of the origin and progress of the house, 1768 - 1843, 2 vols. (London, 1891), II, 267
Comparisons with the English universities are made below but it is clear that Scottish universities were consonant with European thought and Oxford and Cambridge were not. Edinburgh and her sister Scottish universities were not by any means always on the receiving end of the traditional cultural link with the European Continent.

The Enlightenment had further and more provincial consequences for Scotland than an increased and extended emphasis on philosophy and the two-way traffic in ideas with the Continent. Dr. Davie has suggested that the eighteenth century intellectual ferment hit Scotland as she was going through her post-Union "crisis of national existence". Francis Hutcheson had proposed that patriotism accompanied by progressive ideas, operating through native institutions, could resolve Scottish backwardness. Adam Smith saw that the Scottish system of education was well suited to the coming industrial era, - "that the professional classes get not blinkered and merely specialized training, such as is all they received in England, but also general courses in science and philosophy such as might encourage a balanced view of the human situation". Thomas Reid saw education as a factor for unity. Duncan Forbes has also stressed the significance of the Enlightenment to Scotland's specific situation in the eighteenth century. For him, Adam Ferguson, Adam Smith and John Millar "were primarily humanists

and moralists, but as such they were deeply concerned with the nature of that commercial civilization which had begun to change the face of Scotland so dramatically, for better and for worse.¹

In a time of national crisis, backwardness and the Industrial Revolution, one of Scotland's universities deserves particular study. Scotland had been left three distinctive national institutions after the Union - her Church, her Law and her educational system. Only the last could reach out beyond the borders and make a contribution to British society as a whole. Scotland believed in education as a factor for social unity, in an age when her great thinkers were preoccupied with social man. Scotland also believed in education as a preparation for the challenges that lay ahead. The University of Edinburgh was the most distinguished of the Scottish Universities in the years 1790 - 1826. She was a "late Enlightenment Academy" in the sense that ideas from Scotland and Europe had been incorporated into her curricula and gave them a particular purpose. Many of her professors at the time were great contributors to science, building on the work of the early Enlightenment. The earlier Scottish moral philosophers considered man as a "social" being. The Edinburgh professors were among those who in the late eighteenth and early nineteenth centuries had the mental and technical equipment to implement the desirable society, to pursue that knowledge which their predecessors had sought.

The Report of the 1826 Commission might almost be interpreted as a verdict on how the University came to terms with the Enlightenment:

"It is quite apparent, from the minute view which has been given of the

Present State of the University of Edinburgh, combined with the History of it in the earlier periods of its existence, that extensive improvements in conducting Education have been introduced; that the parts of Science originally taught have been disencumbered of the scholastic jargon by which they were for ages corrupted; that the proper modes for investigating and enlarging them have been employed; and that the attention of the youth at this Seminary of instruction has been directed to new topics and new inquiries, of vast moment for advancing the Literature, the Science and the Philosophy of our country". 1

Contemporaries were concerned that the Scots should be seen as those who had paid most attention to and derived most benefit from Isaac Newton, who had suggested that the experimental method of reasoning be introduced into both science and moral philosophy. 2 The Report of the 1826 Commission congratulated the Scottish universities as "they early abandoned the erroneous systems of education which prevailed in the dark ages, and followed the guidance of the inductive philosophy, at a time when it was denounced and proscribed in the more splendid and wealthy schools of the English Universities". 3

The place of moral philosophy in Scottish education did not die out with the increased emphasis on practical science. It was important

2. Ernest Campbell Mossner, "The Enlightenment of David Hume", Introduction to Modernity, (Austin, Texas, 1965), 48. Newton had written in Opticks in 1704: "If natural philosophy in all its parts by pursuing the inductive method, shall at length be perfected, the bounds of moral philosophy will also be enlarged".
as a preparation for a study of science and long after 1826, the traditions of Scottish philosophy were continued by Sir William Hamilton and James Ferrier. However, Thomas Carlyle did feel that the philosophical age declined in his time and that thought and energy were being channelled into science instead. His "Signs of the Times", written in 1829, bewailed the onset of "the Mechanical Age", when "the Metaphysical and Moral Sciences are falling into decay, while the physical are engrossing, every day, more respect and attention".¹ His might well have been comments made by any visitor to the University of Edinburgh's museums and classrooms: "No Newton, by silent meditation, now discovers the system of the world from the falling of an apple; but some quite other Newton stands in his Museum, his Scientific Institution, and behind whole batteries of retorts, digesters and galvanic poles, imperatively interrogates Nature, - who, however, shows no haste to answer".² He continued: "The science of the age, in short, is physical, chemical, physiological, and, in all shapes, mechanical".³

Almost twenty years previously, the Quarterly Review had made a similar protest: "The interest of the public in that important branch of philosophy which Mr Stewart has so much illustrated and adorned has been, we think, for some time greatly on the wane. All labour of an intellectual kind, which is not given to politics or polite literature,

¹. Thomas Carlyle, "Signs of the Times", Edinburgh Review, XLIX (1829), 444. The article is to be found from pages 439 - 459.  
². Ibid., XLIX, 443.  
³. Ibid., XLIX, 445.
is wholly engrossed by the more brilliant and profitable pursuits of physical science". What is true in these nostalgic yearnings is that the intellectual life of Scotland, and particularly Edinburgh, had become so rich by the early nineteenth century that science and philosophy went hand in hand. While the University of Edinburgh had a philosopher of the repute of Dugald Stewart, its scientific and medical chairs were occupied in the period by John Robison, John Playfair, Sir John Leslie, Robert Graham, James Gregory, the Andrew Duncans, Alexander Monro secundus T.C. Hope and Robert Jameson. John Leslie drew a valid distinction between the Scottish and English approach to science and literature. While in London, he wrote to Dr. James Brown of St. Andrews complaining about English science having "the same confined mechanical cast". Of the literary people he commented: "Nothing original - no exercise of understanding - The semblance of knowledge without its reality - In the North you are philosophers, here we are quacks." The prominent place given to philosophy in Scottish university education, promoted the development of science as well as literature.

Within scientific teaching there was a change at the University of Edinburgh from about the 1790's. As will be seen, more emphasis was placed on practical demonstrations and activities, especially in Natural History, Chemistry and Medicine, because they had a didactic purpose. The pursuit of knowledge, as professors in all subjects learned, was best achieved by a direct appeal to the facts, and they communicated that lesson to their students. Scottish philosophy created a favourable environment for the cultivation of scientific research; people were also

showing an increased interest in the world around them. For example, the fact that Edinburgh became the centre of the great geological debate in the early nineteenth century can be partially attributed to the "appearances characteristic of the rocks which surround this metropolis"\(^1\) which favoured the Huttonian theory.

The concern with man and the natural world, shown in the increasing development of science, was expressed at the University by the establishment of new chairs and a broadening of course material. In 1770, the first professor of Natural History was appointed. There followed the creation of professorships in Surgery (1777), Astronomy (1786), Agriculture (1790), Clinical Surgery (1803), Military Surgery (1806) and Medical Jurisprudence (1807). Other subjects, like political economy and mental diseases, while incorporated into the Edinburgh curriculum, had to wait for the creation of separate chairs.

Dugald Stewart taught economics in his Moral Philosophy courses at the turn of the century, and his part in disseminating the doctrines of Adam Smith had significant repercussions. He, perhaps, more than any other Scottish professor, was also responsible for elaborating ideas on social ethics, education and aesthetics, which could have affected many of his students.\(^2\) A further spur to progress was the system at Edinburgh whereby the greater part of a professor's remunerations

\(^1\) Edinburgh Magazine, I, 421.
\(^2\) see Chapter Two.
took the form of fees from his students. In order to attract them,
he had to be offering courses consonant with the age.

Most of the professors discussed in the ensuing chapters were outstanding teachers as well as contributors to specific fields. Their ability when added to the challenges and excitement of the time, made the University a particularly profitable place to study. A recent writer has suggested of the final years of the eighteenth century that "There are three invariable characteristics of renaissance, which strikingly disclose themselves in the Edinburgh of this period. The first is that the excitement of new ideas transcends the conventional opposition between succeeding generations: the second that intellectual ferment is a social rather than an individual phenomenon. Genius may come to birth in isolation, but it can only grow to its full stature in a reciprocal society. And it enlarges itself as much by what it gives to sympathetic spirits as what it receives from them. Finally, a renaissance is never merely an effervescence of the corporate intellect. To sustain itself it must issue in action: the abstract must become concrete, and the general, particular".¹ The intellectual climate, the professoriate, the University and the City as well as other conditions which are disclosed in this and subsequent chapters, together account for the presence in Edinburgh of these three characteristics from 1790 - 1826.

¹ Allan Frazer, "Sydney Smith and the Spirit of Criticism", Edinburgh in the Age of Reason, 60.
The intellectual background to developments in the University of Edinburgh, with the theme of the Enlightenment, has so far been considered. The material background is equally important: by the end of the eighteenth century economic progress was being felt. The rise of cities and urban societies created needs for specialized professions - and not simply those of the old-established lawyers and medical practitioners. Britain had to cope with the maintenance and the furtherance of progress for which these specialists were required, notably in administration and technological development. There was a need for men with particular skills but who were at the same time, cultivated. In this situation, the institutions of higher learning had a vital part to play. The Dissenting Academies and the Scottish universities did their best - the English universities were not doing so in 1790. The number of Dissenting Academies diminished from the mid-eighteenth century: doctrinal difficulties meant that their work was restricted to the training of ministers, and orthodoxy was secured by tests. Only more liberal academies like Warrington strove to maintain the open door principle.¹ This state of affairs could only have caused an extra influx to the Scottish universities and hence, thrust extra responsibility upon them. At the end of the eighteenth century the British universities should have been producing men for the new age. Oxford and Cambridge did not; the remaining academies and the Scottish universities did.

The University of Edinburgh played an outstanding part. The intellectual forces at work in the University are vital to an understanding of the chapters that follow. In those chapters it will be seen that the calibre of the professors, their teaching ability as well as contributions to research, and the facilities which the University and Town Council provided, made it possible for the University of Edinburgh to be a fine training ground for various requirements of British society, well into the reign of Queen Victoria - be those requirements Antarctic explorers or Commissioners in Lunacy. A remarkable cross-section of students at Edinburgh from 1790 - 1826 fulfilled vital functions in the nineteenth century, which maintained the impetus of the Industrial Revolution and attempted to cope with the problems arising therefrom.

A third force at work on the University of Edinburgh at the time was the environment, particularly the educational environment of Edinburgh itself. Called by a visitor "the Birmingham of literature" and described by Groome's Gazetteer as concerned with intellectual matters as Manchester was with cotton manufacture Edinburgh's situation was most favourable for education and research, for all sections of society and for all nationalities. As the capital of Scotland, it was the centre of national life and an attraction for professors who had made their names elsewhere, to take up Chairs at the University. Thomas Hume wrote in

1. Louis Simond, Journal of a Tour and Residence in Great Britain, during the years 1810 and 1811, 2 vols. (Edinburgh, 1815), I, 375.
1791: "when any of the Professors in the other Scottish Colleges have distinguished themselves in their several departments, they have generally been invited to Edinburgh, where the greatest abilities in every branch of education have been concentrated as in a focus". In this way, the University could count on a professoriate of higher general standing than any other Scottish university.

The Gazeteer enumerated the attractions of the City - the surrounding beauty, the excellence and cheapness of education for families, and the opportunity to gratify cultivated tastes. Clubs and societies existed for the purposes of amusement and recreation, embracing golf, curling and hunting. The Edinburgh Magazine in 1817 had had a similar impression to give but also elaborated on the positive advantages of Edinburgh over London (as a capital), other cities and Oxford and Cambridge (as scholarly habitats). Edinburgh was free to diffuse taste as it was not riddled with the spirit of business. As the lawyers were numerous, they set "the prevailing tone of conversation", - there was a predilection for literary pursuits among those not engaged in the business of education. The fashionable world resorted to Edinburgh because it was a capital but unlike London it was not too extensive in its range of concerns. Unlike Oxford and Cambridge, Edinburgh was not filled almost entirely by students and scholars.

2. Gazeteer, II, 534.
Lord Cockburn saw co-operation between literature and society to the benefit of both. He thought that several of the greatest names in the Scottish Enlightenment had taken up residence in Edinburgh solely because of the "consideration" given there to science and letters and because of "the facilities, or rather the temptations, presented for their prosecution." Men like Robertson, Joseph Black, Hope, Monro secundus, Gregory, Robison, Playfair and Stewart were not "monks over their books" but participated in the world's enjoyments. As philosophy had become indigenous to the City, all classes, "even in their gayest hours" were proud to have philosophers present. Hence, there was the mutual improvement of society and learning.

As befits a capital and a place of education for the upper classes as well as the more humble ranks of society, Edinburgh offered a wide range of opportunities for learning the social graces. In 1775 it was possible to learn modern languages, music, painting, fencing, riding and dancing. An Italian master was attached to the Royal Academy for Fencing and Riding and the "Riding-house" was well adapted to the purpose and of much benefit. Dr. Alexander Law has given for the eighteenth century a detailed list of literally hundreds of private teachers in Edinburgh engaged not only in teaching the subjects mentioned, but also

5. Topham, 220.
Geography, Navigation, Surveying, Cookery, Sewing, Embroidery and Art.¹ Thomas Young, later the celebrated Egyptologist and Professor of Natural Philosophy at the Royal Institution in London, studied medicine at Edinburgh from 1794 - 1795. He "learnt Spanish, German, music in theory and by playing the flute, dancing; and he went as much as he could into society and to the play".² As private teachers were being attracted to the City it was possible, by the end of the eighteenth century, to be instructed in almost any subject, and there was a demand to be met.
While Edinburgh might be called the "Northern Athens" because of its intellectual splendour, it can also be seen as socially very much alive. It was an exciting and stimulating place in which to be.

The intellectual, educational and social activities of Edinburgh were taking place against the background of the building of the New Town. The Proposals for carrying on certain Public Works in the City of Edinburgh were put forward in 1752 and carried out over the next eighty years. As Professor Youngson, the historian of this very significant development, has said: "Bridges were built and high roads repaired; the city was enlarged and improved and adorned with public buildings; people of rank came to live in it and it was constantly visited by strangers; Edinburgh indeed became a capital of learning and the arts of politeness and of refinement of every kind".³ Professor Hanham has succinctly summarised

3. A.J. Youngson, *The Making of Classical Edinburgh 1750-1840*, (Edinburgh, 1966), 15. The building either of the New Town or the University is not discussed apart from an occasional reference, as in the case of the Natural History Museum in Chapter IV. However, it should be remembered that they were continuing during the years under consideration. The story has been comprehended by Professor Youngson's book and that of Professor D.B. Horn, *A Short History of the University of Edinburgh 1556-1889*, (Edinburgh, 1967).
the position: "Indeed, as a cultural centre the Edinburgh of Adam Smith, Dugald Stewart, Sir Walter Scott, Robert Burns and the Edinburgh Review, set the tone not merely for Scotland, but for England and for most of Europe".  

II

Given the Enlightenment, the Industrial Revolution and the stimulating environment, the University also had to work with an established eighteenth century tradition that she produced and attracted particular students. In 1951, Dr. Nicholas Hans published his New Trends in Education in the Eighteenth Century in which he analysed the educational background of 3500 men of national repute from 1685 - 1785 who had merited inclusion in the Dictionary of National Biography. They were known for their publications or part in national life, the majority being clergy, school or university teachers, physicians, lawyers, statesmen, inventors, reformers and authors. The University of Edinburgh produced 343 of these as against 307 from all the other Scottish universities, 842 from Oxford, 777 from Cambridge and 170 from Trinity College, Dublin. Of Edinburgh's total, 152 were English. Before 1790, English Dissenters were having to go to universities other than Oxford and Cambridge.

3. Ibid., 18.
(in, for example, Scotland and Holland) and Anglicans went to Edinburgh and Leyden because of their medical schools and advances in science.\textsuperscript{1} Of the 680 scientists\textsuperscript{2} the percentage produced by Oxford and Cambridge declined from 67% in the seventeenth century to 20% by the end of the eighteenth. The percentage of scientists graduating from Scottish universities increased from 10% in the seventeenth to 23% by the end of the eighteenth century.\textsuperscript{3} Edinburgh produced 16% of the scientists between 1685 and 1785, compared with Oxford's 12.1% and Cambridge's 17.2%.\textsuperscript{4} A similar study has not been undertaken for the fifty years after 1785 but Edinburgh may well have improved its good record. Quantitative terms, however, never tell the whole story - it is individuals who make the impact. Edinburgh University trained James Mill, Francis Horner and J.R. M'Culloch in economics, for example, and their influence on Thomas Malthus, David Ricardo and economic thought in the early years of the nineteenth century is considerable. Some of the individuals who studied at Edinburgh from 1790 - 1826 will be considered later.

If Dr. Hans' conclusions show one aspect of the intellectual prosperity of Edinburgh, the statistics of attendance submitted to the 1826 Commission show another. In 1791 the total number of matriculated students was 757 and rose to a high point of 2071 in 1822.\textsuperscript{5} Well over half (427) of the 1791 total were medical students while in 1822 there

\textsuperscript{1} Ibid., 24.
\textsuperscript{2} i.e. those engaged in medicine, surgery, chemistry, natural sciences, physics, mathematics, astronomy, technical subjects, archaeology, history and political economy.
\textsuperscript{3} Hans, 34.
\textsuperscript{4} Ibid., 34 in the table given on that page.
\textsuperscript{5} Evidence, I, 1287. The figure of 757 is the lowest ascertainable in the period of this study. 127 gave 1110 attending in 1790 but up to and including that year each professor matriculated his own class and as students might attend more than one, the aggregate is erroneous.
were 930 studying literature and philosophy, and 867 studying medicine. The tables show that between 1817 and 1824 there was a consistently greater number of Arts than medical students.1 Previously there were only isolated occurrences of this, in 1794, 1804, 1809 and 1813.

The students' countries of origin are even more instructive than the trebling of matriculated students in twenty years. Professor James Gregory compiled a table illustrating the cosmopolitan character of the students in his Practice of Physic class from 1785 - 1790.2 The average attendance was 215, including 91 from Scotland, 55 from England, 35 from Ireland and twelve each from the West Indies and America. The others came from Portugal, Brazil, France, Italy, Germany, Switzerland, Geneva3 and Flanders, and included East Indians of English extraction.

Subsequent to 1790, no figures distinguishing the nationalities of the students are available until the years 1811 - 1829. Then, however, the number of medical students from England increased from 138 in 1811 to 259 in 1816. The highest total was 261 in 1822. As a result, it can be seen that the number of English medical students was more than half the Scottish total:

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1. Arts would include Natural Philosophy (embracing physics), Natural History and Mathematics.
2. Evidence, I, 128/.
Year | Scots | English | Total no. | Medical Students
--- | --- | --- | --- | ---
1818 | 391 | 214 | 804 |
1819 | 345 | 214 | 739 |
1820 | 361 | 208 | 726 |
1821 | 399 | 237 | 782 |
1822 | 444 | 261 | 854 |

The great increase in medical students also showed itself in the number of graduates, although as in Arts, the number of graduations bears little resemblance to the total number of students. In 1794, 29 M.D.'s were granted but in 1821 the number rose to 103. The highest point was 140 in 1825. One difference between the number of medical students and medical graduates was that while the Scots always outnumbered the English as students, there was no such discrepancy when it came to graduation. Indeed, in several years the Irish outnumbered both the Scots and the English. For example:

Year | Scots | English | Irish | Total no. | Medical Graduates
--- | --- | --- | --- | --- | ---
1795 | 5 | 13 | 15 | 44 |
1800 | 14 | 14 | 17 | 50 |
1805 | 18 | 10 | 25 | 60 |
1810 | 16 | 16 | 15 | 55 |
1815 | 39 | 14 | 22 | 88 |
1820 | 31 | 34 | 41 | 121 |

In the fifty years 1776 - 1826 Edinburgh University provided the world with no less than 2792 doctors of medicine, and countless thousands

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3. *Ibid.*. The reasons for the numbers of Irish students and graduates are discussed in Chapter Five.
more had spent some time in medical study there. It is regrettable that similar figures for the Arts and science students are unavailable but a perusal of the matriculation albums shows that there was a cosmopolitan air about them too. For example, in 1818 and 1819, Sultan Katte-Ghery Krim Ghery from the Caucasus and Crimea, and Count Constantin Zamoyski from Warsaw were listed.¹

The figures show that the medical school was a great attraction, The reputation of the medical school was based on the calibre of the professors, the facilities available, the lack of adequate alternatives in the period and by the high standards of the Royal Colleges and private lecturers in Edinburgh. If the private lecturer served no other purpose he kept the University professoriate up to the mark. Dr. William Pulteney Alison, Dean of the Medical School at the time of the 1826 Commission, believed that the usefulness of a university depended on "the characters of the teachers and the adaptation of the rules of the school to the general demands of the public",² If the Edinburgh medical school from 1790 is judged by his criteria, both points would be met.

Contemporaries relied heavily on individual professors, judging the reputation of the University by them. Early in 1788, John Leslie wrote: "I am afraid that the College here will sink in its reputation – Mr Robison, it is thought, will never recover – Dr. Black has been confined for above a month with a pulmonary complaint - He recovers extremely slowly - I am afraid his exhausted constitution will hardly surmount the shock - Even Dr. Cullen is worse this winter than usual".³ Leslie was not to

¹ Matriculation Rolls, III, 830 and 836.
² Evidence, I, 196.
³ Letter 127a of Leslie to Dr. James Brown, from Edinburgh, February 21st, 1788. E.U.L. MS. Dc. 2. 57.
know that such professors would find worthy successors, including himself.

George Bell of the Edinburgh College of Surgeons, maintained to the 1826 Commission that the contents of a medical professor's lectures were much less important than the personal influence of the professor over the minds of the young men. He told how the lectures of Monro secundus, Black, Cullen and Gregory had been taken down in short hand, written up verbatim, but were never read to a class despite their containing a mass of valuable information. If the attempt had been made, Bell felt, it would have been abortive: "The value of these lectures resided in their authors, themselves masters of their arts, who, by their genius and talents and industry, and scientific discoveries and zeal, acquired a mastery over the minds of the pupils". It was the personal ability of the professors prior to 1790 and after, to make a lasting impression on the minds of students (and not only in medicine) which led to the attribution of high standards to a particular department. Between 1790 and 1826 many departments could boast outstanding teachers.

Alison's second point was the adaptation of the medical school to public demands. The Edinburgh Medical School, earlier in the eighteenth century, had met such demands by medical discoveries, the foundation of hospitals and dispensaries, and providing clinical teaching in medicine. In 1803, clinical teaching was extended to cover surgery; in 1806 the Government founded the Chair of Military Surgery in answer to the great

1. Evidence, I, 447. Thomas Neute, 362, wrote: "Thus, by the abilities, attention, and industry of a few men, not only eminent in their own profession, but an honour to their country, and to human nature, the College of Edinburgh has, within this century, arisen, from almost nothing to be the first Medical School in Europe".
demand for training by army and naval medical officers. In the 1820’s, the Statuta Solennia governing graduation were revised. The Edinburgh medical school also flourished because of the lack of rivals—London being the only place in England where anatomy and medicine could be learned. The conditions at Edinburgh were also better: the medical education was not an apprenticeship as in London but a properly regulated physician’s training. The London lecturers were cramming whole subjects into forty lectures. They did not have the Edinburgh text-books nor were they engaged in original research.¹ London was not to improve until about 1826 with that major educational development, the foundation of London University. The medical school was, therefore, attracting people because of a succession of distinguished university professors, its adaptation to the needs of the time and its lack of a worthwhile rival.

That the University flourished was in no small measure due to the excellent principaship of William Robertson. His biographer found him assiduous in his devotion “to the minutest duties of his office”.² His concern for the Library, patronage of university societies and his own fame as a historian which attracted attention to the University, all contributed to the foundation which he laid for the years after 1792, when he retired. Both he and the Town Council must take the credit for the assemblage of talented professors at the University.

It is clear, too, that the relative cheapness of going to Edinburgh was another factor in her favour. It would help the humble Scot

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and give expression to the democratic concept of Scottish education, but it would also affect the middle-class in England - those who might wish to become physicians and who could not afford to go to Oxford or Cambridge. George Bell considered that it would cost a poor student £35 for nine months board and lodging in Edinburgh. The average expenses of class fees would be a further £15 and if he was a medical student, £20 would cover the fees for the Infirmary and other classes. The cost for the richer student for board and lodging would be £60. It is true, of course, that some students, such as the future Lord Palmerston who lodged with Dugald Stewart, paid £400 a year for the privilege, but this cost was very much the exception at Edinburgh. Bell continued that the University medical student would expect to pay upwards of £25 for his graduation expenses plus his class fees. On the other hand, the diploma of the Edinburgh College of Surgeons would only cost him 145/-.

The smallest allowance needed at Oxford was £150 but those from the higher social ranks could spend between £600 and £750 a year.

The University of Edinburgh had one final advantage which would serve to encourage attendance. Students were free to select their own courses, even in Medicine, where the custom of taking degrees had not grown into the same disuse as in the Arts faculty. Andrew Duncan junior expressed the established view: "I think it is one of the great advantages, not only in this school but in the best schools in the north of Germany, that the students are left very much to direct their own course of education and I apprehend that they do it better than by having a fixed curriculum laid down".

1. George Bell's figure are given in Evidence, I, 454 and 451-452.
The war with France helped the University to flourish after 1790. The University trained many of the medical men who served in the war. On the other hand, well-to-do English families, who would normally have made the Grand Tour, and those who, while of lower rank, would have gone to a Continental university, could no longer cross the Channel. Edinburgh became a place of resort. Fashionable families came, eager for a change, and found Edinburgh in her Golden Age. Those who came seeking education found the University enjoying a great era. Many of the great nineteenth century Whig aristocrats could have derived much benefit from their time at Edinburgh, along with their student contemporaries. The cult of Edinburgh as a resort for pleasure and education would have added another element to a City which already had much to commend it.

IV

The last point to be examined in this chapter is a comparison between Edinburgh and the English universities. The comparison is not one between a university giving a practical, utilitarian training and others giving a liberal education. Edinburgh's emphasis on philosophy made her education liberal. The geologist Charles Lyell considered that as the majority of Oxford and Cambridge students toiled at Latin, Greek and Mathematics with the purely professional object of becoming clerics, tutors and schoolmasters, a utilitarian spirit prevailed. 1

One way in which Edinburgh differed from her English counterparts was in the impression left on the minds of their alumni. Lord Shelburne, the late eighteenth century Whig politician, for example, thought that Christ Church, Oxford, was very low - "a proof of it is, that no one who was there in my time has made much figure either as a publick man, or a man of letters". He sent his son to Edinburgh where there was to be a proliferation of public men and men of letters. For Edward Gibbon, the historian, "The Schools of Oxford and Cambridge were founded in a dark age of false and barbarous science; and they are still tainted with the vices of their origin". John Bowring wrote that Jeremy Bentham was shocked by the profligacy of Oxford's tutors and professors. He was also alienated by their moroseness and had no taste whatever for their insipidity.

Many years later Francis Jeffrey went to the same College as Bentham, Queen's, and he described his fellow students as "the quintessence of insipidity". He was as disappointed with Oxford as the others. Henry Gunning described the Jacksonian Professor, Isaac Milner, the holder of Newton's Chair, at Cambridge in 1792; "In order to prove that a guinea and a feather would descent in vacuo in the same time, he made use of a glass tube hermetically sealed in which the guinea and the feather were enclosed; it so happened, that in several attempts the guinea had the advantage; he then managed to place the guinea above the feather. At the end he exclaimed, 'How beautifully this experiment has succeeded! for if you observed attentively, you would perceive that the feather was down

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2. Edward Gibbon, Miscellaneous Works, with memories of his life and writings, composed by himself; illustrated from his letters with occasional notes and narrative by John, Lord Sheffield. 2 vols., (London, 1796), I, 35.
soon than the guinea¹. His experiments in Optics were very little more than exhibitions of the Magic Lanthorn on a gigantic scale¹. He compares unfavourably with Robison or Playfair, Milner's opposite numbers at Edinburgh at the same time. Another Scot who had attended both Oxford and Edinburgh was Andrew Dalzel, later Professor of Greek at Edinburgh and historian of the University. In 1775 his impression of Oxford was that there was much dissipation in the form of idleness, drinking and gambling, and very little study. "The English Universities", he noted, "are huge masses of magnificence and form, but ill calculated to promote the cause of science or of liberal enquiry".² There was a slight improvement at Cambridge by 1822 when a former Trinity College student, James Losh, wrote: "I was glad to learn that drinking is nearly given up, by the more genteel part of the young men, tho' I fear that gambling and other kinds of dissipation still retain their ground".³

Conversely, Edinburgh alumni could be ecstatic over their alma mater. Sir James Mackintosh went up to the University in 1784 and subsequently wrote: "I am not ignorant of what Edinburgh then was. I may truly say, that it is not easy to conceive a university where industry was more general, where reading was more fashionable, where ignorance and indolence were more disreputable. Every mind was in a state of fermentation".⁴ Lord Brougham, on the occasion of a dinner in Edinburgh to celebrate his appointment as Lord Rector of Glasgow, stood up and said that the system of education in Edinburgh "cultivated and cherished higher objects than mere learning" and

². Andrew Dalzel, History of the University of Edinburgh from its Foundation, with a memoir of the author by Cosmo Innes, 2 vols. (Edinburgh, 1862), I, 14.
³. Quoted in Robert Robson, "Trinity College in the Age of Peel", Ideas and Institutions of Victorian Britain, 326.
"inculcated a nobler ambition than the mere acquisition of prosody and dead languages".¹

Contemporary comments on the respective merits of the two university systems bore out the impressions of the alumni. Robert Southey, the poet, whose brother graduated in medicine at Edinburgh, considered Oxford to be a school for Divinity and nothing else.² Cambridge also only educated for the one profession and while the ministry was no longer the most important occupation in the community, the Colleges had not adapted themselves. Those destined for other professions found it necessary to study elsewhere. Cambridge had professors of everything, who held their situations and did nothing.³ Thomas Campbell, the originator of the idea to establish London University, found justification for the new foundation in the existing English universities. It was "a vestige of barbarism in our language that learning only means in its common acceptance, a knowledge of the dead languages and mathematics".⁴ Charles Lyell, the geologist, thought the continual decrease of medical graduates from Oxford would not have occurred if physical science, experimental philosophy, chemistry, comparative anatomy, botany and zoology had been ardently pursued - "which we might have expected in the chief literary and scientific seminaries of Great Britain".⁵ Much later, Leslie Stephen characterized the eighteenth century English universities as "embodiments of sloth and prejudice", and found those furthering the progress of science (primarily "energetic Scots") owing little or nothing to them.⁶

² Southey, III, 79. 
³ Ibid., II, 298. 
⁵ Quarterly Review, XXVII, 231. 
Overseas visitors were others who confirmed the impressions of alumni and contemporaries. "The two great universities, Oxford and Cambridge, repose themselves under the shade of their laurels, while Edinburgh cultivates hers" wrote Louis Simond after his tour in 1810-1811.1 Marc-Auguste Pictet, the Professor of Philosophy and Experimental Physics at Geneva, visited Britain in 1801. For him, Oxford was almost exclusively for literary people and Cambridge for mathematicians. On the other hand, in Edinburgh there was a variety of practical sciences - "On peut expliquer ... per cette dernière circonstance et par les moeurs simples des habitans de cette ville ... le supérieurité assez marquée des Ecossais sur les Anglais, dans les arts et dans la haute politique".2 In general, French travellers agreed that the Scots were directing their attention to more useful studies, such as science and philosophy, which were excluded from the curricula at Oxford and Cambridge.3

A fundamental difference between a Scottish and an English university was the composition of their student bodies. While Edinburgh had a democratic entry, the scholarships to the English universities were largely won by public schoolboys.4 In general, the Scot would be from a background that would necessitate much diligence if he was to excel, not only at university but in his career. The affluent Englishman might not have this spur - indeed, at the end of the eighteenth century there was a distinct lack of competition in Oxford between colleges or individuals. Hence, the difference in atmosphere described by Mackintosh (Edinburgh)

4. See, for example, Robson, 322.
and Dalzel (Oxford). In fact "the peculiar and beneficient character" of the Northern Universities was to enable the humble ranks to acquire the highest education in Philosophy and Science, while at the same time be equally fitted to educate and enlighten those in the highest classes.\(^1\) Edinburgh was so doing from 1790-1826.

At worst a university education with a strong philosophical basis is as "liberal" as one with the emphasis on Classics - at best it is superior. Unfortunately, Oxford ignored the content of the Classics and the emphasis was placed on form. The first Earl of Dudley pointed this out to Edward Copleston, Provost of Oriel, Oxford reformer but arch-defender against any external attacks. Dudley remarked "that for several centuries the Logic of Aristotle occupied almost exclusively the attention of all persons that made any pretence to philosophy or literature - that these centuries form a period of deplorable darkness, barbarism and ill-taste, during which the human mind seems to have made little or no progress towards the refutation of error ... still less towards the discovery of truth".\(^2\)

The system of education at Edinburgh was such that the student could become generally acquainted with much philosophy and several departments of knowledge. Having acquired these principles he might then be equipped to go into further study either privately or following a further professional course in medicine or law. Philosophy was preferred to mathematics as a way of teaching a student how to think, because mathematical

\[^{1}\text{Report}, 9.\]
\[^{2}\text{Letters of the Earl of Dudley to the Bishop of Llandaff, (London, 1840), 21-22. The letter is dated March 3rd, 1814. Dudley, when John William Ward, had been at both Edinburgh and Oxford Universities.}\]
reasoning differed from the method of reasoning employed in daily life. In the Scottish view, moral reasoning was more fitted to equip the student. Sir James Mackintosh wrote that at Edinburgh his mental activity was pointed "very much, though not exclusively... towards metaphysical enquiries. Accurate and applicable knowledge was deserted for speculations not susceptible of certainty, nor of any immediate reference to the purposes of life".\(^1\) Edinburgh was not giving a purely practical education, and while the metaphysical training might not have any immediate reference to the purposes of life it certainly inculcated good habits of thought.

One of the major matters with which the 1826 Commission was concerned was the value of Classics to the Edinburgh medical curriculum. The more wealthy classes in society, in 1800, considered the ideal end-product of a physician's education "a cultured and highly educated gentleman, with quite secondarily, an adequate knowledge of medicine".\(^2\) "Cultured and highly educated" meant a Classical education. Edinburgh was well ahead in prevailing habits of thought when it determined to produce from its medical school technically competent physicians, irrespective of their classical attainments - although the University did require Latin theses for the M.D. degree. Edinburgh was at the centre of British medical progress and discoveries. The "cultured" man might have been respected by a certain section of the community but if medical knowledge was to be of benefit, its technology had to be mastered. The concept of the "well-bred" amateur as opposed to the knowledgeable professional practitioner was a hang-over from the days before medical advance.

\(^1\) Mackintosh, I, 29.
If Oxford Classics were undistinguished, Newtonian science at Cambridge was scarcely less so. The Scottish system of fees as a spur to the professor to prosecute research has been mentioned. Adam Smith had drawn the distinct contrast between the Scottish universities where reputation and the favourable report of students was of great importance to the professor, and the English universities where the professor's interest was set "as directly in opposition to his duty as it is possible to set it". As a result, said Smith, "the youth neither are taught nor can always find any proper means of being taught, the sciences, which it is the business of those incorporated bodies to teach". Modern improvements were brought in at the Scottish universities.

Without a spur to research, Cambridge mathematicians had ignored the Continental developments of their subject as the Oxford Classicists had ignored the German philologians. The Edinburgh mathematician and physicist John Playfair, pointed out that Cambridge had not seen the Continent develop from Newtonian synthesis to pure analysis. Mathematics at Cambridge remained in the state in which Newton had left it. Cambridge continued to use the geometrical and fluxional methods while in Edinburgh and on the Continent, algebraic mathematics and mathematical physics were being developed. It was not until 1825 when Cambridge adopted analytical methods that she returned to "the mainstream of European development in serious mathematical studies". Meanwhile in Edinburgh, hitherto undeveloped

2. Ibid., II, 254.
3. Ibid., II, 260.
sciences as chemistry and geology, were being evolved and the relevance of science to industry was being studied by the professors.¹

The indifference of the English universities to intellectual pursuits was not the only reason for their failure to develop the teaching of science. It is clear that their connections with the ruling classes and the democratic spirit of the Scottish universities were expressed in their respective attitudes to science. It was in the Royal Societies of London and Edinburgh and the Lunar Society in Birmingham that research was undertaken - that is, in non-academic institutions. When commenting on the new London University in 1825, the Edinburgh Review remarked, of Oxford and Cambridge: "Their cares were devoted chiefly to educate men, who cared far less about science and letters than those who were excluded would have done".² In an age when the concept of government by experts was unknown, the ruling class could not see the value of scientific education. The fashionable classes, it will be remembered, also preferred that their doctors be amateurs. Whatever the reason, scientific education was only to be found in the Scottish universities and later, in the Mechanics' Institutes. Indeed, Edinburgh alumni were to be instrumental in founding Mechanics' Institutes and the University of London. The Edinburgh Review accurately prophesied that those attending Mechanics' Institutes would "in a very short time become greater proficients in science than ninety-nine in a hundred of the Doctors at our antique universities".³

Dr. Hans has shown that for the eighteenth century Oxford and Cambridge were becoming increasingly irrelevant. Lawyers and doctors were not trained there; they only provided classics' teachers; the leading men in the sciences and the new and developing subjects were to be found coming from Scottish and Dutch universities and the Dissenting Academies. Even Anglicans avoided the English universities because of the lack of scientific facilities.¹ The irrelevance might not matter if one took the resigned view of Archibald Alison, the historian. He saw the Scottish and English systems as designed for different ends: "The Scotch, intended chiefly for the education of the middle class who have their fortunes to make, the English being intended mainly for the training of the great and affluent whose fortune is made, is calculated to give what is desired for them, finish and grace to the mind".² It is even doubtful if the English universities gave "finish and grace"; Edinburgh provided all that the fashionable could want.

People identified with the University of Edinburgh were not content to accept the passivity of the English universities. A positive offensive was launched in the pages of the Edinburgh Review. It is important to record that John Henry Newman identified the journal as "the organ of the University of Edinburgh".³ This was not so, but some Oxonians believed it. Newman also referred to Edinburgh as "the party of the North and of progress"⁴ - a compliment from an Oxford man who influenced ideas on university education so greatly.

4. Ibid., 182.
There were five articles which contained the attack: Playfair's review of Pierre Simon La Place's *Traité de Mécanique Céleste*¹, Richard Payne Knight's "*Oxford Edition of Strabo*"², Sydney Smith on "(Richard Lovell) Edgeworth's Professional Education"³, an article by all three entitled "Calumnies against Oxford" reviewing Copleston's replies to the three previous forays⁴, and Playfair's review of "(Robert) Woodhouse's Trigonometry".⁵ The arguments ranged from Sydney Smith saying that Oxford students were confined "to the safe and elegant imbecility of classical learning" because the ecclesiastical tutors were afraid of their turning sceptical⁶, to Playfair's so shaming Cambridge for its outdated mathematical methods that he was said to have been responsible for the changes that took place.⁷ The attack on the edition of Strabo, (a work which described known parts of the inhabited earth and stressed the geographer's need for mathematical and scientific knowledge) was on the grounds that it was obsolete by fifty years in its knowledge of Greek geography. The edition gave no evidence of being aware of German philology. The Earl of Dudley followed the controversy eagerly and wrote to Mrs Dugald Stewart: "I am all for the Scotch and against the English universities - particularly Oxford. It is a d---d place, and not to be defended".⁸ As the Edinburgh Review was interested, among other matters, in scientific developments, it is not surprising that it rounded on the ancient universities.

2. Ibid., XIV, (July, 1809), 429-441.
3. Ibid., XV, (October, 1809), 40-53.
4. Ibid., XVI, (April, 1810), 158-167.
6. Ibid., XV, 50.
7. "State of the Mathematical and Physical Sciences in the University of Oxford", Quarterly Journal of Education, IV (July-October, 1832), 207; "the sarcasms of the late Professor Playfair which no Cambridge men could venture to deny".
Oxford and Cambridge had two arguments to pit against Edinburgh: first, that she was little more than a secondary school, judging from the age of some of the matriculants; and secondly, that the Scottish universities were "mere societies of learned men incorporated for the purpose of facilitating the progress of science and rearing a succession of professors and philosophers". Against the first argument it can be said that matriculants at Oxford aged sixteen or under were also not uncommon in the eighteenth century. The second argument betrays the philistinism and suspicion of science of the ruling class. As subsequent chapters will show, the University of Edinburgh indeed produced a succession of professors and a few philosophers, and facilitated scientific progress—all of which were needed.

The University of Edinburgh did not escape criticism on the scale that the Edinburgh Review had employed against Oxford and Cambridge. There were three main attacks made in 1815, 1819 and 1825. In 1815, Rev. Michael Russel produced his Remarks and Explanations concerned with the View of the System of Education at present pursued in the Schools and Universities of Scotland. His grounds for complaint were three—that classical education in the universities was deficient, should be taught in

2. Jeremy Bentham went to Queen's aged 13, and Edward Gibbon to Magdalen aged 14. Apart from these exceptions, see Alumni Oxonienses: the Members of the University of Oxford 1715-1886, (later series), Vol. A-D, 2-7. Here are given the names of ten sixteen year olds, one aged fourteen and two aged thirteen. Most of these matriculated before 1800. This is not exhaustive evidence but gives an indication of what might be found.
schools and that examinations were irregular.\(^1\) His criticism of the Philosophy classes could be read as a direct attack on the idea of the impressive professor as exemplified, perhaps, by Dugald Stewart. Russel complains: "It is folly . . . to tell the world in these days, that instruction in what is called logic and morals, is to be valued, according to the lectures which any particular professor or seminary may have happened to get credit for with the public. The character of a school . . . ought to be estimated chiefly from the nature of its discipline, and for animated and constant exertion, on the part of the pupil, - not, in short, from what the teacher achieves, but from what the student is induced to achieve".\(^2\) Russel particularly castigated Edinburgh where, in the philosophy classes "everything is done by the professors, and the students do nothing".\(^3\)

Russel failed to see that at Edinburgh Philosophy played the part that Classics did at Oxford and Cambridge. That perceptive historian, Elie Halévy, noted that "it was precisely because the classics did not occupy a predominant position in the curriculum that the education given at the Scottish universities possessed that philosophic and scientific character which was its distinctive feature".\(^4\) Russel misunderstood both the tradition and the value of a grounding, even at an early age, in Philosophy. He also failed to see the value of a charismatic professor.

In the end, he could only be countered by results and the remaining chapters

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1. Rev. Michael Russel, Remarks and Explanations connected with the View of the System of Education at present pursued in the Schools and Universities of Scotland (Edinburgh, 1815), ix, xii, 43.
2. Ibid., 75-76.
3. Ibid., 77.
will show how successful the professors and the system of education at Edinburgh were. But Russel was also a reactionary: he wrote of "the Universities of England, where the syllogisms of Aristotle have not yet lost their authority".¹ He omitted to diagnose the signs of his times, the need to adapt existing knowledge - not necessarily to reject it - to face new challenges and ideas.

The critic in 1819 was John Gibson Lockhart, the biographer and son-in-law of Sir Walter Scott, in Peter's Letters to His Kinsfolk. He too reiterated the complaint about the standards of Latin and Greek teaching.² His main rebuke ran as follows: "The style of education and exertion to which (the Edinburgh student) submits are admirably fitted for sharpening and quickening the keenness of his understanding, but do not much tend to fill his mind with a store of thoughts, feelings and images, on which it might repose itself, and in which he might possess for ever the means of a quiet and contemplative happiness. He is made a keen doubter and a keen disputers; and in both of these qualities there is no doubt he will at first have pleasure. But in neither is he furnished with the elements of such pleasure as may endure with him, and increase with him throughout a laborious, and, above all, it may be a solitary life".³ Professor Horn has explained the tone of the passage against the background of relaxed tension after the Napoleonic Wars, and the rise of economic and social distress.⁴ Nineteenth century British society needed men of keen intellect who were not inclined to bask in pleasant memories. As will be seen, the University trained such men.

1. Russel, 50.
3. Ibid., I, 200-201.
4. Horn, 119.
Robert Mudie attacked the University with *The Modern Athens*. Mudie had been a schoolmaster in Fife, at the Inverness Academy and at Dundee High School. He became a journalist and was with the *Morning Chronicle* when he wrote this book. Later he became editor of the *Sunday Times*. In 1825 he felt that the standards of the University and of its professoriate were not those of earlier days. "With the exception of Leslie", he wrote, "who has written some very flaming articles in the *Edinburgh Review*, and some books in which the path of geometry is made a little more thorny than ever; of Jamieson, who has been most learned on slate and granite; . . . - I did not hear that any of the Athenian professors have put in a single claim for immortality".  

It is the task of the ensuing study to show the calibre of the Edinburgh professoriate in many departments, in the period of which Mudie was speaking. His argument is not consonant with the evidence: even in the professors he praised he failed to see Leslie's main "claims for immortality" and Jameson was ultimately proved wrong in his geological views.  

The impetus of the Scottish Enlightenment, the needs of the nineteenth century which were becoming evident at the end of the eighteenth, the environment of Edinburgh itself, the prosperity of the University in terms of numbers and the calibre of its professors, and the lack of rivalry were all factors acting on the University of Edinburgh from 1790. Many were to continue until at least 1826.

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2. see Chapters III and IV for discussions of Leslie and Jameson respectively.
Probably half way through the period, John Playfair, Professor of Natural Philosophy, wrote to Lady Douglas of Bothwell: "What a time we have lived in - if it should have all the faults in the world it has at least produced novelty - none of your common place servile ages that is satisfied with copying exactly what has gone before it. Always something new - Bonaparte has conquered Europe, Spain is going to deliver it, Davy has decomposed the Alkalis - all the laws of probability have changed". ¹

In this "novel" age, the University of Edinburgh was staffed by men of science and teachers of youth.

¹ S.R.O. MS. GD 1/479/21. The letter is dated August 30th, n.y. (1808-1809?)
CHAPTER TWO

Dugald Stewart
"As yet I have seen nothing which has made such an impression on my mind as the Eloquence of Mr Pitt". (Dugald Stewart to William Robertson, Advocate, Douay, June 4th, 1783, N.L.S., MS. 3943, f. 150.)

"I have heard Pitt and Fox deliver some of their most admired speeches; but I have never heard anything nearly so eloquent as some of the lectures of Professor Stewart". (James Mill to Macvey Napier, July 10th, 1821, Selections from the Correspondence of the late Macvey Napier, ed. Macvey Napier, (London, 1877), 30.)

I

Eloquence is possibly the only attribute Dugald Stewart would have agreed to share with Pitt. With Fox, there is more common ground. All three men needed eloquence: Pitt and Fox in a political era when oratory could sway the independent M.P., Stewart in his profession as a "teacher of youth". He can be examined as a philosopher-author or as a teacher of philosophy. Cockburn felt that a distinction between these two activities could be made and his line of demarcation will be followed. For Cockburn, Stewart "has two reputations, one as an author, and one as a lecturer". Idolatry and veneration for his philosophy was not universal, "But I am not aware that there has ever been any difference of opinion with respect to his unsurpassed excellence as a moral teacher. He was one of the greatest of didactic orators ... He was the great inspirer of young men".

Stewart the teacher, rather than the philosopher-author, is examined here although it is impossible to omit totally some mention of Stewart's philosophy. The universal approbation of his teaching was not solely because of his style or eloquence. The more perceptive auditor discerned the moral seriousness that Stewart instilled. As

the writer of his memoir pointed out: "Stewart's aim and influence as a teacher of philosophy was doubtless less purely speculative than moral and practical."¹

The first hand appraisals of Stewart fell into two groups - those that merely remark how tastefully and gracefully he lectured, and those who saw that by so lecturing, Stewart was pouring "into the breasts of youth a more fervid and yet reasonable love of liberty, of truth, and of virtue".² There is a third "genre" of literary appreciation, namely the verses, sonnets and odes which various pupils felt inspired to write. Alexander Campbell, the musician and author, in his "Ode to Dugald Stewart", for example, drew a comparison between Plato and "my Scotian Plato" and wished:

"The feeling heart oh could I please
(With such effect, and so much ease,)
As thou my loved Preceptor, Friend,
Canst point out man's chief good and end."³

Two celebrated figures also felt inspired by the Muse. One ode, postmarked 1812 and bearing the seal of the Garter King-of-Arms, could have been by Sir Isaac Heard. Entitled "An Ode on reading the Biographical Memoirs of Drs. Smith, Robertson and Reid, and written by Dugald Stewart Esq.," the last verse reached the climax thus:

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2. James Mackintosh, "Dissertation Second; exhibiting a general view of the Progress of Ethical Philosophy, chiefly during the seventeenth and eighteenth Centuries", Dissertations on the History of Metaphysical and Ethical, and of Mathematical and Physical Science, (Edinburgh, 1835), 386.
"When three illustrious brows around
The amaranthine chaplet’s bound;
Then shall these crowns reflected lustre shed,
And beam around the Umpire’s hallowed head;
Unconscious he of their reflected rays,
His mingled glory, his united praise;
That to these Laureat-Three, impartial fame
Shall add, - at Merit’s call, - applauded Stewart’s name."¹

Lord John Russell might have been concerned to minimise his ode in the
distinction of later life. He went to Kinneil House in the spring to
summer of 1812, where Stewart was in retirement, and addressed him as
follows:²

"To nearer worlds the source of life and light,
To further orbs a guide amid the night
Each sun, effulgent, fills its radiant throne,
Gilds other systems, and preserved its own:
Thus we mark Stewart on his fame reclined,
Enlighten all the Universe of Mind;
To some for wonder, some for joy appear;
Admired when distant, and beloved when near;
- ’Twas he gave laws to fancy, grace to thought,
Taught Virtue’s laws, and practised what he taught."³

Of the two conventional kinds of comment on Stewart, the
first noted his eloquence. For example Andrew Dalzel, Professor of
Greek, wrote to Sir Robert Liston, the diplomat, telling him that
Stewart was "making a wonderful figure" as Adam Ferguson’s substitute
in the Chair of Moral Philosophy, “although he undertook the office at
eight days’ notice. The great fluency and distinctness with which he
speaks, and the extent of his knowledge upon the different subjects of
the course, are amazing. . . . The students even like him better than

1. Isaac Heard (?), "An Ode on reading the Biographical Memoirs of Drs.
2. The dating and circumstances of Russell’s performance are given in
Spencer Walpole, The Life of Lord John Russell, 2 vols. (London,
1891), I, 60.
f. 11.
Robert Heron, the first biographer of Robert Burns, saw Stewart's eloquence as attracting young students to a study of Morals: "Mr Stewart, whose eloquence, dignified, pathetic, winning, soothing, animating, irresistibly interesting, continues to allure our Youth to the study of Morals; - whatever the profession to which they are destined, - or although they be destined to no profession at all." Sir Archibald Alison, the historian, remarked: "Simple in his manners, unostentatious in his habits, but ardent in his enthusiasm, Mr Stewart warmed in the professor's chair into a glow of eloquence which, combined with the beautiful quotations in prose and verse interspersed in his lectures, entranced his hearers and produced an indelible impression on the mind."

Macvey Napier, later editor of the Edinburgh Review, felt that "As a Lecturer, he has been long regarded as the chief ornament of a university, not a little celebrated for the eminence of its professors."

Stewart spoke from notes until 1790. His biographer noted that "This method of address, and the whole circumstances of his position, were favourable to the display of (his) peculiarity powers of developing speculative doctrines with those accessories of appropriate illustration and analogy, and the resources of a graceful, copious, and a flexible diction, of which he was so great a master." After 1790, he sat and read his lectures until his retirement but there was apparently very

2. Robert Heron, Observations made on a Journey through the Western Counties of Scotland, in the autumn of 1792, 2 vols. (Perth, 1792), II, 493.
5. Veitch, xxxi.
little difference in the effect of his manner and he continued to
speak eloquently.1

There is far more to Stewart than his eloquence; his delivery
complemented his philosophic aim, his moral seriousness and his character.
Cockburn found Stewart's character "unimpeachable", - "He exalted his
powers of oratory by devotion to the science he taught, an exquisite
taste, an imagination imbued with poetry and oratory, liberality of
opinion, and the loftiest morality".2 The Minto family thought that
"the influence of his character, manners and taste, gave a tone to the
College which was said to be of even greater advantage to the students
than that they derived from attendance at his lectures, "3 and that "he
had established a considerable influence over the minds of the rising
generation; such as must always belong to a teacher who inculcates high
and general principles with the breadth of view and candour of opinion
belonging to a highly cultivated intellect".4

From the few contemporaries quoted, - and they are typical of
many others - it is clear that Stewart was idolized.5 He apparently
made an indelible impression on people's minds and they had a tendency

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(Edinburgh, 1830), III, 176-177.
3. Lord Minto in India: *Life and Letters of Gilbert Elliot, First Earl
of Minto, from 1807 to 1814, while Governor General of India*, ed.
Nina, Countess of Minto, (London, 1880), 233.
4. *Life and Letters of Sir Gilbert Elliot, First Earl of Minto, from 1751-
5. One of the many who idolized Stewart was John Conolly, later a distin-
guished mental specialist. While in Edinburgh, Conolly was very
anxious "to become privately acquainted with one for whom he felt a
remarkable admiration, and whom his exaggerated reverence invested with
a sort of heroic halo. One of his friends among the students, an
impassive matter-of-fact mortal, who doubtless thought philosophers
very much like other men, had this honour which he coveted so much,
and him he used eagerly to question of the conversation and habits of
the philosopher; but all the reply he could ever get was, 'Ech! he
just talks awa'." (Henry Maudelay, "Memoir of the late John Conolly,
M.D.", *Journal of Mental Science*, XII (1866), 153.)
to write excessive eulogies. Sir James Mackintosh was not exempt. He wrote to Stewart in December 1802 regretting that when he, Mackintosh, had visited Edinburgh, Stewart was absent. "But though I could not see, I felt your influence, in the taste, the knowledge, and the eager and enlightened curiosity, which you had diffused among the ingenious young men with whom I had the pleasure of conversing."¹

With his "unimpeachable" personal character and his oratorical gifts Stewart was equipped to diffuse his moral seriousness. His philosophy lectures were not concerned with metaphysics, polemics or philosophic sectarianism but moral themes such as the duties and ends of man, the connection between virtue and enjoyment and the charms of literature and science.² For Stewart, the first object of philosophical enquiry was human nature.³ Through his philosophy course he wanted to find "results bearing on the work and adornment of human life."⁴ His character exemplified "the ideal perfection he loved to portray. Few men have exhibited a more harmonious development of powers, intellectual, moral and aesthetical, or carried into reflective science a more entire humanity."⁵ John Veitch summarised Stewart's moral seriousness as developing all that is distinctive in man, thus giving "dignity, elevation, and even grandeur, to the commonplace of every day life, by intermingling with it a permanent love of truth, beauty, and virtue, and

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² Cockburn, Memorials, 22.
³ Veitch, xxxiv.
⁴ Ibid., xli.
⁵ Ibid., xlii.
thereby attaching the individual to what alone has worth and is imperishable."¹

Hence, Stewart lectured on such topics as Sensibility and Taste, Education and Political Economy. It is necessary to indulge in "selective Stewartism" in order to illustrate how he saw each of these topics fitting into his grand scheme of ennobling human nature. On the question of sensibility, Stewart's elaboration of the point that man should be moved by distress may be taken. He pointed out that some people are moved by fictitious distress but not that of real life: "In a novel, or a tragedy, the picture is completely finished in all its parts; and we are made acquainted not only with every circumstance on which the distress turns, but with the sentiments and feelings of every character with respect to his situation. In real life we see, in general, only detached scenes of tragedy, and the impression is slight, unless imagination finishes the characters and supplies the incidents that are wanting".² Stewart maintained "the apparent coldness and selfishness of mankind" was due to "a want of attention and a want of imagination."³ Man can always sympathise with his own misfortunes or with the misfortunes of those who can communicate all the facts. If man supplied the deficiencies in attention and imagination he would also comprehend the situation of his neighbour and be aware of all the distress in the world.

Taste might be the means of supplying these deficiencies. Stewart drew a comparison between moral taste and "cultural" taste. "The power of moral taste", he said, "like that which has for its

¹. Ibid., xliv.
². Collected Works, II, 453.
³. Ibid., X, 453-454.
object the beauty of material forms, and the various productions of fine arts, requires much exercise for its development and culture. . . . Considered as a principle of action, a cultivated moral taste, while it provides an effectual security against the grossness necessarily connected with many vices, cherishes a temper of mind friendly to all that is amiable, or generous, or elevated in our nature."¹

In common with earlier eighteenth century figures, Stewart saw that taste and sensibility were worthy of the moral philosopher's attention because they improved the human condition. Education and Political Economy were more practical subjects which could realize the same end and these topics will be discussed at greater length later in the chapter. For the moment, it is important to see how the material of his lectures fitted into his grand scheme of moral seriousness. With the combination of this scheme, his much respected personal qualities and his eloquence, Stewart undertook his task as a teacher of youth.

The views of Henry Home Drummond indicate the combined effect of the three elements in Stewart. A Peelite conservative, Drummond had little in common with Stewart. He was a grandson of Lord Kames and introduced Lockhart to Scott in 1818.² He was also to be a member of the 1826 Commission of inquiry into the Scottish universities. In 1808 he was writing in his Opinions about Stewart's value as a teacher of moral seriousness: "His labors opened to me views of human nature, which but for him I might never have known; . . . Mr Stewart's lectures certainly have a very extensive influence, upon the opinions of those

¹ Ibid., VI, 40-41.
² Gentleman's Magazine, new series, IV (October, 1867), 548.
who are educated at the College of Edinburgh". For Drummond, Stewart's value as a "teacher of youth" was not to be estimated in terms of the amount of knowledge gained - "his great use as an academical teacher was to impart to his students an admiration of the objects of his lectures, a desire to imitate his good taste and dignified style of composition, and a general tone of science in comparison with which it is most vulgar folly to try to sum up as in a ledger an account of knowledge actually gained." Stewart's great value, said Drummond, lay in "exalting the dignity of the subjects to which he directed (his students') attention, and inculcating a high tone of moral and intellectual excellence. His manner in lecturing was singularly impressive and the force and elegance of the language greatly contributed to attract their interest and form the taste of the youthful mind".

Stewart succeeded Adam Ferguson whom Duncan Forbes has seen as typical of the Scottish Enlightenment. Ferguson had emphasized sympathy, humanity, fellow-feeling and social solidarity. These characteristics were the matrix of moral approval and disapproval. "An idea of perfection, of the perfect character," commented Forbes, "is required as a guide to action". Stewart was an admirable successor to Ferguson: his eloquence complemented what he had to say - his example was worthy of imitation. He attracted such notice that he could encourage his students to action. Apart from being an exemplar, he was also a good teacher in that he trained, by his courses, several types of specialist - primarily Whig politicians, economists

1. Drummond, Opinions, II, 9-10.
2. Ibid., V, 88-89.
3. Ibid., VIII, 149.
and educationalists. He was able to train them in their future fields of endeavour not only by his studies and lectures, but also by his acquaintance with politicians and intellectuals. The bulk of this chapter will illustrate that he was no remote teacher but also a practical man of affairs. The plethora of comments about his eloquence, the Stewart legend, must, therefore, be seen as implying that he had a special moral character that befitted him to teach Scottish philosophy in a particular age. His personal appeal, teaching and experience caused action in several arenas.

II

Dugald Stewart was born in 1753 and lived in the Edinburgh College buildings where his father was Professor of Mathematics. He went to Edinburgh High School and studied under John Stevenson (Logic) and Adam Ferguson (Moral Philosophy) at Edinburgh University before going to the University of Glasgow, for the session 1771-1772. The idea behind the move was to make himself eligible for a Snell Exhibition to Oxford where he intended to enter the Church of England, like his old friend Archibald Alison and the later Archbishop of Canterbury, Archibald Campbell Tait. He was deflected from this course by Thomas Reid, the founder of the Scottish school of philosophy which reacted to Hume's scepticism. Stewart became captivated by Reid and became his main disciple. "No pupil", wrote John Veitch, "ever caught the spirit of a master more fully, or more intelligently appreciated his method of philosophical enquiry."1

1. Veitch, xxv.
Stewart showed his diversity of interests early. He had also considered joining the East India Company's Corps of Engineers. On the intellectual plane, he was typical of the eighteenth century: he appreciated not only the mathematical sciences as a means of training the mind in a method of investigation but also a subject like geology, - a science which was bound to develop as man began to investigate his environment and free himself from irrational superstitions concerning the origins of the world. 1 He found his metier in his particular exposition of moral philosophy which had the fulfilment of all that is noblest in man as its aim.

Stewart excelled as a teacher and turned his hand to mathematics and physics as well as moral philosophy in the closing years of the eighteenth century. In the autumn of 1772, during which he was to turn 19, he substituted for his father in the mathematics' classes. This continued until 1775 when he became conjunct Professor of Mathematics. In 1778 Adam Ferguson was appointed Secretary to the Commissioners sent to negotiate with the Americans and so Stewart not only lectured on mathematics but also on philosophy and even astronomy. 2 By 1782, however, he was beginning to dislike the routine of teaching mathematics. He wrote, in that year, to Archibald Alison: "I am somewhat in low spirits at the prospect of winter, particularly at the thought of teaching Euclid for the thirteenth time." 3 In 1785, he transferred to the Chair of Moral Philosophy in which he was to make his reputation.

1. see, for example, his geological and naturalistic observations in his letter to William Robertson, Advocate, September 14th, 1775 in N.L.S. MS., 3942, ff. 208-211.
2. Veitch, xxx.
3. Ibid., xxxiiin.
His forays into other disciplines were not finished, however, for in 1787-1788 with the illness of Professor John Robison, he had to undertake the duties of the Natural as well as the Moral Philosophy Chair. He wrote to Alison: "The Natural Philosophy goes on beyond my expectation. I have already finished the Mechanics and Hydrostatics, two parts of the course to which I looked forward with some apprehension, and I have performed every experiment (even the Hydrostatic ones) with my own hands, and without breaking a single jar. . . . To-morrow I proceed to Pneumatics, and am just now employed in premeditating two Lectures - the one on the Air-Pump, and the other on the Immortality of the Soul." He also supplied for Andrew Dalzel, in the Greek Chair, one winter and wrote a work on Sanskrit. Stewart's versatility is not in doubt.

His Moral Philosophy course was divided into four parts, all of which bore on his central theme of man. There were four enquiries - into the intellectual and moral part of man's constitution, and into the duties and condition of man. Within these inquiries fell several of Stewart's attractive themes such as taste and political economy, although the last subsequently became a separate course. The class attendance showed a sharp rise after 1800 when he began to lecture on Political Economy:

1. Ibid., Ivin.
2. Evidence, I, 117.
3. Ibid., I, 128) - 130).
<table>
<thead>
<tr>
<th>Year</th>
<th>Moral Philosophy</th>
<th>Total (Arts)</th>
<th>Total (Arts, Medicine, Law)</th>
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<td>116</td>
<td>395</td>
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<td>1795</td>
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<td>1800</td>
<td>106</td>
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</table>

Stewart had 1810 students from 1794 until his retirement in 1809. This meant that at two guineas for the class fee and a salary of £30 from the Exchequer and over £72 from the Town Council, Stewart was by no means a poor man. Quite apart from his professorial income, Stewart was making money elsewhere. There was, of course, his writing. Archibald Constable wrote to Joseph Ogle Robertson in the autumn of 1821 giving an account of the origin and progress of the Encyclopedia Britannica and its Supplement. Stewart was paid £1000 for the first part of his Dissertation which was not to be under ten or more than twenty sheets in length. Stewart was then paid £600 for the second part of the Dissertation on September 21st, 1821. Stewart was doing well considering that Playfair was originally to be paid £250 for his

1. for details on professorial salaries, see Evidence, I, 52).
Dissertation, and it was only increased to £500 when Constable reflected on what Stewart had received. Leslie was paid £200.\(^1\) There are no figures available for Stewart's other published works but Constable thought very highly of him and there is no reason to think he received an inconsiderable fee. "I need not tell you" wrote Constable to Robertson, "that Mr Stewart's name stood in the first rank of the philosophers of the day, and it required the high premium of payment, my own intimate connexion and friendship with him," to have Stewart write the Dissertation.\(^2\) Leslie commented to his friend James Brown:

"What think of this trio of stalking horses to Constable. Could you have imagined that Stewart who looks with such contempt on writers for reviews and Encyclopedias, would have lent his name? It was for the benefit of Constable's family he says - but more probably as a douceur to the purchase of the 2d vol. of the Phil. of the H. Mind. Constable talks of very liberal terms."\(^3\) Both sources of income show Stewart as a "man of science" as well as a "teacher of youth".

A third source of income for Stewart came in 1806, upon the brief accession of the Whigs to power. Stewart was an object of endearment to the party and they created the sinecure of the Writership of the Edinburgh Gazette with a salary of £300 a year and emoluments from the sale of the paper.\(^4\) He also took in lodgers, as was traditional among Edinburgh professors and certainly charged the Palmerston £400 a

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2. Ibid., II, 319.
4. Veitch, Ixxix. In the summer of 1806 too, he accompanied his friend Lord Lauderdale to Paris for peace negotiations.
year for each of their sons. With an income from his teaching, his publishing, his lodgers and his sinecure Stewart could well retire to Kinnell House, Bo'ness, where Watt first erected the condensing steam engine and where Stewart proceeded to compose his *Philosophy of the Human Mind.*

Kinnell House was described by the poet, Thomas Campbell, who visited Stewart there in May, 1815. It was an old chateau of the Dukes of Hamilton, by the sea "opposite the classic Benledi, and surrounded by the groves that resound with the songs of birds, the cawing of rooks, and the sweeter cooing of wood-pigeons." Here the profits of teaching and philosophy were displayed and Campbell was mildly surprised - "I found this seat of the Philosopher more splendid perhaps, than seemed to accord with philosophy; but he is easy and prosperous, and lives in a style that somewhat, though very agreeably, surprised me".

Stewart learned early that at the end of the eighteenth century it was dangerous to dabble in politics. Certainly he saw it as important in his scheme of things but he became wary of politics after 1800. He avoided overtly political topics in his economics' lectures and yet his class-room and home more than any other - including those of John Millar of Glasgow - were the nurseries of the early nineteenth century Whiggery. He fought shy of political issues in public because

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3. Ibid., II, 287.
of the smear campaign against him following the French Revolution. The argument put simply is that certain professors, especially Stewart, were suspected of being Jacobins in the Edinburgh of the 1790's. It will be remembered that Edinburgh was the scene of the reform societies' Conventions and the trials of Thomas Muir and Thomas Palmer. Scottish judges were in a particularly savage mood in 1793-1794.

Henry Dundas, all-powerful in Scotland and Pitt's faithful disciple in the policy of repression, resented opposition, particularly influential, intellectual opposition. He showed this clearly when he replied to the Marquis of Wellesley, who had written asking advice about the establishment of a College in India: "But I likewise confess to you that my chief objection to such an establishment arises from a consideration of the danger attending the collection of literary and philosophical men which would naturally be gathered together in consequence of such an institution. I would not be surprised if it should ultimately resolve itself into a school of Jacobinism in place of a seminary for education. I hate Jacobinism everywhere as I know you do, but in India I should consider it as the Devil itself, and to be guarded against with equal assiduity." ¹

Dundas can only have formed this prejudice against intellectuals from his experience with the University of Edinburgh. He did not take his views to the extreme of not aiding the new buildings financially. Nevertheless, the letter quoted is evidence that he thought "literary and philosophical men" tended to be Jacobins. Henry Cockburn saw the problem clearly: "Yet we had wonderfully few proper

¹. Wellesley Papers, British Museum Add. MS. 37275, ff. 169-190. I am grateful to Mr. Tracy Beyer for this reference.
Jacobins; ... There were plenty of people who were called Jacobins; because this soon became the common nickname which was given, not only to those who had admired the dawn of the French liberation, but to those who were known to have any taste for internal reform of our own.1 Dundas might have meant Jacobins in this sense and if so, the University of Edinburgh was certainly Jacobinical for professors as influential as Stewart, Playfair and Dalzel were all good reformist Whigs. Cockburn continued "Stewart, in particular, though too spotless and too retired to be openly denounced, was an object of great secret alarm."2

In the summers of 1788 and 1789 Dugald Stewart was in France - on his second visit he was mostly in Paris. While on these visits it is quite clear he was an apostle of change. He wrote to Archibald Alison on August 27th, 1788 from Paris describing "the wonderful Revolution which has taken place here within these two days".3 In January, 1793, he was again writing to Alison who had asked him to be godfather to Archibald, the Tory historian, who had just been born. "I don't know what duties your Church imposes on a godfather," wrote Stewart, "but I promise to do all I can to make him a Philosopher and an Economist; and I engage, as soon as he begins to snuff . . . to make him the present of a very handsome box which I received lately with the Rights of Man inscribed on the lid."4

The following year, however, Stewart was in trouble with two Lords of Session, Craig and Abercromby. Abercromby had read Section VIII of Stewart's Elements entitled "The Use and Abuse of General Principles

2. Ibid., 76.
3. Printed as an appendix to Veitch, cxxii.
4. Ibid., cxxxv.
in Politics", a piece of writing which attacked established institutions.  
Abercromby complained to Craig who then wrote to Stewart. Part of  
Craig's letter to Stewart read: "That even allowing the principles in  
that chapter, however erroneous, to have been written with the most  
innocent intention at that time, that after the massacres in France, and  
the dreadful acting such principles had produced, and after the con-  
sequences of them had been expressed in such horrible and bloody  
characters, it could not only not be innocent to maintain those opinions  
but that that conduct could not be innocent which did not disavow them."  
Craig then proceeded to quote Abercromby's views which  
agreed well with Dundas' anti-intellectualism - "that the triumphs of  
philosophy and reason, daily exhibited in France, ought to have satisfied  
every thinking and every virtuous man of the danger of unhinging established  
institutions, even though such institutions should appear, when considered  
abstractedly in the closet, to be less perfect than the theories of  
speculative and ingenious men". Stewart was asked to retract his  
views. He replied at length to Craig on February 20th, 1794. He  
denied the perniciousness of his views - "no reference has been made to  
my opinions (so far as I have been able to learn) by any of the inflam-  
matory writers of the times". He denied that he approved of the  
French philosophers in general, with their tendency to corrupt morals -  
indeed, "I opposed them with zeal, at a time when the profession of  
scepticism was not quite so unfashionable as it is at present."  

2. quoted in Veitch, lxxi.  
3. Ibid.  
4. Ibid., lxxiii.  
5. Ibid., lxxiii-lxxiv.
regretted mentioning the name of Condorcet with respect, but while he
might have become an extremist, he was breathing "a spirit of moderation"
when Stewart's book was going to press. Stewart only accepted res-
ponsibility for the passage he quoted and that was a moderate one.¹ In
sum, Stewart maintained that he was not encouraging revolution - he
"was aware of the mischiefs to be apprehended from the spirit of innova-
tion, and from sudden changes in established institutions".² Indeed,
he always concluded his Moral Philosophy course by showing "the peculiar
excellencies" of the English Constitution "of which I have always enlarged
upon in the warmest and most enthusiastic of terms".³ He concluded:
"Of the utility of my labours as an instructor of youth, it does not
become me to judge, but I may be allowed to say, that I have long enjoyed,
and that I continue to enjoy, every testimony of approbation which the
public can give."⁴ Stewart did not retract because, he felt, he had
nothing to retract. His general attitude was not revolutionary. He
was a Whig, however, and that was sufficient in the Scotland of his day
to bring suspicion on him.⁵

If Stewart was courageous in defending himself, he took
great care subsequently almost to the point of timidity. He was
extremely careful in what he said in public. His second wife, Helen
D'Arcy Stewart, wrote to an old friend of her husband's, Dr. William

1. Ibid., lxxiv.
2. Ibid., lxxiii.
3. Ibid., lxxiv.
4. Ibid.
5. By 1819, the University was free from taint. Lord Castlereagh wrote
to the Principal asking that every attention and assistance be given
to the son of the ex-King of Sweden, Count D'Iterburg, whom Castle-
reagh had recommended to come to Edinburgh to study. (See College
Minutes, III, 203, November 20th, 1819.)
Drennan of Belfast: "I believe I may venture to say, you will find him much the same as you left him. His few hairs are indeed gray, and perhaps the sad history of the world for the last twenty years may have made his manner more serious and reserved in company than it was when you knew him, but it is only in company."¹ In his Political Economy lectures he was particularly careful: "I shall also pass over, without examination, another project of taxation, which has been lately carried into effect in Great Britain, - I mean the tax upon income, as I am always unwilling to touch upon any questions which are connected with the political discussions of the times."²

Stewart's views on the French Revolution put him in good company. The Marquis of Lansdowne and his Bowood circle were all for the Revolution in 1789, believing that all the people had one cause while it was the sovereigns who had different interests. Lansdowne reacted to the excesses but remained more or less loyal to his earlier convictions.³ Stewart had contacts with the Bowood circle as will be mentioned later. The relevant point for the moment is that the circle were operating in a more sympathetic environment than Stewart.

A more local controversy with which Stewart became involved was that over John Leslie, which illustrated Stewart's ideas on the University. Stewart saw the attempt of the Moderates in the Edinburgh Presbytery to nominate Rev. Thomas Macknight rather than Leslie to the Chair of Mathematics as an attempt to conjoin university chairs with

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². Collected Works, IX, 253.
Church livings. Stewart had two reasons for championing Leslie, apart from the fact that Leslie was by far the superior mathematician. Stewart saw the conjunction of the two offices as detrimental to the University and he also saw that for the University to be "priest-ridden" would destroy its metropolitan character and turn it into a parochial establishment.

In evidence of the first reason, Stewart wrote to the Lord Provost maintaining that the uniting of chairs and ecclesiastical livings was inexpedient and "a practice which if persisted in for a few years longer, must inevitably terminate in the ruin of an establishment, from which this City has derived for more than two Centuries, much solid emolument as well as literary distinction." Stewart continued: "a variety of circumstances combine to give me an interest in the literary fame of the University, which cannot be supposed to operate in an equal degree with those who either consider their Academical Stations as secondary objects, or who may be disposed to employ them in subservency to particular views of Ecclesiastical Policy.”

In respect of the second ground of Stewart's intervention there was his letter written to Francis Horner, on June 8th, 1805, after Leslie had triumphed. Stewart commented that "circumstanced as we were, it was absolutely necessary for the friends of liberality and of learning, to submit to a contest with the enemy, and I am not without hopes, that after the victory we have gained, we shall be less priest-ridden in our Scotch Universities than we have been during the long

1. Edinburgh Town Council Minutes, February 13th, 1805-May 15th, 1805, 165-166, in the City Chambers.
2. Ibid., 171.
period of Lord M's administration." The fears of the "friends of liberality and learning" were not over in 1809 when Stewart himself was pondering retirement. The Earl of Dudley wrote to Mrs Stewart saying that when Stewart and John Playfair retired "they will be succeeded by a brace of Edinburgh parsons (parson or no parson, I prefer the Oxford brand), and there will be no place of liberal education in the kingdom." Liberalism was an albatross around Stewart's neck when it came to his writings and lectures, but he could share in the triumph of liberalism with the installation of John Leslie in the Chair of Mathematics in 1805.

The exterior Stewart presented to his classes - that of a man of taste - he maintained consistently in his private life. He was a man easily moved by the beauties of the countryside and by personal affection. He made frequent trips around Britain - in 1790 to Wales, in 1797 to the Lake District and York, in 1799 to Bath, Bowood and London, in 1800 to Burntisland, in 1801 to Northern Scotland and in 1803 to Fife and then through the Midlands of England to Hampshire and London. His Diary of some of these tours gives long descriptions of the countryside, towns and sites through which he passed. His description of Fountains Abbey is a case in point: "The Style of the Building seems to be remarkably distinguished from that of most other Gothic Edifices, excluding completely all minutes and trifling ornaments, and exhibiting throughout a noble simplicity in the workmanship."

1. quoted in Veitch, cxxxviii.
whole is said to cover three Acres - Long, narrow vale, with a stream of water and a bank of wood (some rock here and there appearing) on both sides of the vale which terminates in the Abbey - A most delicious scene. There is a similar appreciation of York Minster - "the simple Grandeur and majesty of the whole Fabric, and the beauty and elegance of its parts in detail." York Minster, in fact, gave Stewart the occasion to express his view that Gothic was superior to Grecian architecture. The Minster conveyed an impression of stability and skill. In Grecian architecture, "the means employed are too obvious, neither furnishing any employment to the Spectator's ingenuity, nor conveying any high idea of the skill of the designer. A great edifice accordingly in the Grecian Style only suggests the notion of immense labour and expense, without leading up the Imagination to one comprehensive mind which embraced the whole design and combined the means of carrying it into execution." One wonders what Stewart thought of the classical Edinburgh, the Northern Athens, his memorial on Calton Hill and the references to "the Scotian Plato".

Stewart was desolate by the death of his son George in 1809. His own health was affected and he retired from active prosecution of his duties in 1810. Maria Edgeworth quoted an Edinburgh student as saying the conclusion of his lectures was most pathetic and impressive - "placing before the view of his auditors a series of eight-and-thirty years, in which he had zealously devoted himself to the duties of his

1. Ibid., ff. 4-5.
2. Ibid., f. 5.
3. Ibid., f. 6.
office; and giving the impression that this year would be the period of his public life.\(^1\) He still had eighteen years to live but they were punctuated not only with the composition of the *Philosophy of the Human Mind*, the revision of his existing works and his *Dissertation*, but also by paralytic strokes. The one that struck him in January 1822 meant that from then on his wife, at his dictation, took over his correspondence. His final stroke came on June 11th, 1828.

III

Dugald Stewart had connections with many significant people. They included not only his students and lodgers, but his friends, correspondents and his publisher. Their relations reveal more about Stewart himself, how he could have acquired knowledge of public affairs, as well as possible opportunities for an extension of his influence. Some of the most prominent names of the late eighteenth and nineteenth centuries had a direct contact with him.

William C. Lehmann, in his study of John Millar of Glasgow, collected the quotations of Millar’s students which showed that they were as impressed by their mentor, as the students of Stewart had been.\(^2\) Lehmann pointed out that Stewart was a younger version of Millar as an influential teacher.\(^3\) Lehmann maintains that as many of Millar’s students entered public life, and became authors,

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3. Ibid., 149.
literary critics, writers, advocates, lawyers, MPs, and holders of high office, "In some cases there is clear evidence, in others at least a strong presumption, that they were to no small extent influenced by their former teacher in their writings, in their activities, in their conduct of office, and in their application of legal and political principle to the latter".  

Miller was a Professor of Law and as such could have a major influence on aspiring lawyers. Stewart's course served no such utilitarian purpose. Lehmann claims that Miller influenced much the same people as Stewart - the Edinburgh Reviewers, Lords Lauderdale, Lansdowne and Melbourne. Of these four, the first three has much closer ties either with the City of Edinburgh or with Stewart. The only exceptions are Jeffrey of the Review and Melbourne, both of whom were mainly educated at Glasgow. Lehmann then makes a statement which is also applicable to Stewart: many of Miller's students "lived and worked and carried both the memory of the man and the impact of his thought well toward the middle and in a few cases even beyond the middle of the nineteenth century."  

Elsewhere in his book, Lehmann seeks to support his argument with long lists of Miller's students. It is interesting to compare these with John Veitch's list of Stewart's well-known students and friends. Many are duplicated, such as Lauderdale, Charles Kinnaird and Richard Wingfield, Lord Powerscourt. Almost contemporaries, Miller and Stewart were a prolific pair of teachers. On the whole, Stewart's students played on the British as opposed to the Scottish stage, as was

1. Ibid.
2. Ibid.
3. Lehmann, 36n-37n and Veitch, lxn, lvi-lx, cxviii.
to be expected when Millar was primarily training lawyers. Hence, Stewart and the University of Edinburgh in this respect at least, were serving British society rather than the purely Scottish. Numbers and personalitites justify studying Stewart even though they may only have remembered his eloquence, rather than what was said. There are some strong indications, however, that his influence was appreciable.

Sir James Mackintosh adopted for Stewart the approach Lehmann has used for Millar. In his Dissertation on philosophy, Mackintosh included a section on the Edinburgh professor. "How many are still alive," he wrote, "in different countries, and in every rank to which education reaches, who, if they accurately examined their own minds and lives, would not ascribe much of whatever goodness and happiness they possess to the early impressions of his gentle and persuasive eloquence. He lived to see his disciples distinguished among the lights and ornaments of the council and the senate". For Mackintosh, Stewart’s "disciples were among his best works", and he continued: "The system of conveying scientific instruction to a large audience by lectures, from which the English universities have in great measure departed, renders his qualities as a lecturer a most important part of his merit in a Scottish university which still adheres to the general method of European education". Through the Scottish system Stewart "calms and soothes the feelings, yet exalts the genius, and insensibly inspires a reasonable enthusiasm for whatever is good and fair."

Stewart's students consisted of those who lodged with him - English aristocrats - and those who had to take or chose to take his

2. Ibid., 367
3. Ibid.
Moral Philosophy course during their time in Edinburgh. It was not exclusively a youthful audience: even before he inaugurated his Political Economy course older members of the permanent or temporary Edinburgh community came to hear him. They had greater cause to do so when they realized the potential value of studying economics under Adam Smith's biographer. During the sessions beginning 1808 and 1809 Stewart’s health required that his successor, Thomas Brown, substitute for him. Brown's biographer wrote of the composition of Stewart's classes: "It was not a crowd of youthful students led away in the ignorant enthusiasm of the moment; distinguished members of the bar, and of the pulpit, were daily present to witness the powers of this living philosopher. Some of the most eminent of the professors were to be seen mixing with the students, and Mr Playfair, in particular, was present at almost every lecture".1 The youthful element in the classes included Lord Palmerston, the future politician, Francis Horner, the future economist and George Birkbeck, the future educationist.

Henry Temple, third Viscount Palmerston, was deliberately sent to study and lodge under Stewart at Edinburgh, despite the Pittite Toryism of his parents and remained in Edinburgh from 1800-1803. The second Viscount rejected the senior classes of an English public school with their classical bias as suitable for the period in his son's life between the age of 16 and the age of entrance to an English university. Palmerston wrote to Stewart: "He is now coming to that critical and important period when a young man's mind is most open to receive such impressions as may operate powerfully on his character and his happiness during the remainder of his life. At this time, therefore, I think it

of the greatest consequence that he should be judiciously directed through such a course of studies as may give full exercise to his talents and enlarge his understanding, and that he should converse as much as possible with persons to whose opinions he must look up with deference, and in whose society his manners would be improved and his morals secured."¹

In placing his son with Stewart the character of the philosopher "has very considerable weight in our determination".² Palmerston was suitably impressed by Stewart’s establishment, noting that the Professor took considerable pains with those under his care: "He sometimes, as an evening amusement, encouraged the young men in his house to debate before him upon some subject previously agreed on. Mr Stewart's terms are £400 per annum, for board and for his own instruction. The payment to other professors, which are inconsiderable, and the expenses of masters, are not included".³ The Palme's were sufficiently impressed also to send Henry’s brother William Temple, later Minister Plenipotentiary at the Court of Naples, to lodge with Stewart.

Henry Temple liked the Stewarts "amazingly" to his father's delight.⁴ Palmerston wrote to his son "I feel every day more and more satisfied when I reflect on the situation in which you are at present placed, which I am persuaded will afford you advantages that ..."

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² Ibid., and printed in Connell, 426.
³ Journal of a Tour by the second Viscount Palmerston, of the North of England, Lake District, Edinburgh and the Highlands of Scotland, and notebook for this journey, November 7th, 8th and 9th, 1800; Broadlands MSS, and printed in Connell, 431.
⁴ 13 letters from Henry Temple to his father 1799-1802; Broadlands MSS, and printed in Connell, 432. This letter dated November 28th, 1800.
will tend most essentially both to the comfort and credit of your whole life. I am rejoiced to find that you are so well pleased with Mr Stewart.\(^1\)

Lord Malmesbury, who became the now third Lord Palmerston’s guardian after his father’s death, wrote to his ward: “I only fear when you get to Cambridge you will find yourself with nothing to learn, or rather that your tutors will know nothing with which you will not be previously acquainted”.\(^2\)

Lord Ashburton, son and heir of the lawyer John Dunning, who is remembered for his campaign to diminish the influence of George III, resided with the Stewarts at the same time as Palmerston.\(^3\) Another celebrated lodger was John William Ward, later first Earl of Dudley and Foreign Secretary under Canning. Ward, a tragic figure who died young after a complete mental breakdown, formed a great friendship with Stewart’s wife, the “Ivy” of his most informative letters. Ward was one of Henry Home Drummond’s most intimate acquaintances and Drummond recalled that Ward’s living several winters with the Stewarts “occasioned a certain similarity of ideas”.\(^4\) Brougham praised Ward’s powers of reasoning which “though never cultivated in the walks of the stricter sciences, were admirable; and the tuition of Dugald Stewart had well supplied the defects of an Oxford education in all that concerned

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1. 339 letters from Lord Palmerston 1782-1801; Broadlands MSS, and printed in Connell, 433. This letter n.d.
2. Letters to and from Henry Temple, 3rd Viscount Palmerston - five letters from Lord Malmesbury, 1802-1805; Broadlands MSS, and printed in Connell, 461. This letter dated March 5th, 1803.
3. Palmerston wrote that Ashburton “has a surprising dread of squinting and he thinks the study of optics must bring it on; therefore, as Mr Stewart in his lectures about the sense of seeing described the anatomy of the eye, he would not go to College that day”. (quoted in Connell, 432 from Broadlands MSS) 13 letters from Henry Temple to his father 1799-1802, and the letter is dated November 28th, 1800.
metaphysical lore". Samuel Henry Romilly, the editor of Ward’s letters, considered that "The effect of the influence of the professor was to make him realize the moral responsibility imposed upon him by Nature in return for her gifts of wealth and wisdom, and to overcome his inherent reserve and reluctance to take a lead part in public affairs." Other lodgers included Basil, Lord Daer, eldest son of the fourth Earl of Selkirk, who died in 1794; Henry Richard Greville, later third Earl Brooke of Warwick, Sir Alexander Muir Mackenzie of Dalvigne, Richard Wingfield, Lord Powerscourt and Rt. Hon. Lawrence Sullivan, subsequently Deputy Secretary of State for War and brother-in-law of Palmerston. Other aristocrats to be numbered among his students were Henry Petty, later Marquess of Lansdowne, Lord Anrrom, later Marquess of Lothian, Lord Sampill, Lord Webb Seymour (brother of the Duke of Somerset), the Earl of Dundonald, Lord Forbes (later a representative peer), and Charles, Lord Kinnaird. Stewart was benefiting from the aristocratic influx to Edinburgh in the period of the French Wars and the deficiencies of Oxford and Cambridge. Consider Henry Petty: as Shelburne’s son, he would be subject to Bentham’s views on Oxford, when the reformer was on his visits to Bowood. Bentham considered that he had prevented Petty from being sent there. Shelburne was a progressive thinker and from his Bowood activities would have known that in his day and age Edinburgh, and specifically Stewart, were the institution

1. Henry Brougham, "George the Fourth and Queen Caroline - Abuses of the Press", Edinburgh Review, LXVII (1830), 77.
end professor where the most satisfactory and enlightened education was to be procured. Hence, in 1796 and 1797 Henry Petty was studying Ethics under Stewart.

The Earl of Minto, who was to be Governor-General of India, and his son who was to be Lord Privy Seal, both studied under Stewart. When Gilbert Elliot the younger went to Edinburgh, the Mitsos hired a house in Edinburgh and there made friends not only with Stewart and his family but also the future Lord Palmerston. In January 1802, the Earl, with the avowed aim of seeing how his son and Temple were progressing, spent a week at the University. Minto found his satisfaction entire, and he happily went with the two boys to chemistry and philosophy classes, and the Earl himself also took in Stewart's political economy course.

Before leaving the aristocrats, it is interesting to recall the thesis put forward in G.T. Garratt's Lord Brougham. He suggested that nineteenth century British politics were run by the Amateurs (patricians) and the Professionals (the hard-workers). The importance of Edinburgh in this scheme of things was that it drew both the future amateurs and professionals - the Palmerstones, Lansdowmes, Russells as well as the Horners and Jeffreys. Garratt concluded: "From that inspiring and unconventional teacher (Stewart) they acquired new ideas about their duty as citizens, and also learnt to know each

1. An amusing observation on Palmerston was made by Lady Minto at this time. He occasionally betrayed high spirits "as on the solemn occasion of a party at Professor Dugald Stewart's, where he sprained his leg by jumping over Mr Stewart's Gothic couch in the middle of her drawing room". (Life and Letters of Sir Gilbert Elliot, III, 231-232.) With regard to the Stewart house, Lord Dudley wrote to the Bishop Llandaff: "Your house in Oxford is, I fancy, what Mr Stewart's used to be in Edinburgh - the best by far to which a stranger of any merit could be introduced". (Letter dated February 16th, 1821 and printed in Letters of the Earl of Dudley to the Bishop of Llandaff, (London, 1840), 275.)
other. It was inevitable that the old English governing families, the Amateurs, should look to Edinburgh for talented Professionals to strengthen their party sides, when the nineteenth century called for a new type of politician, capable of understanding economic and industrial questions.\footnote{G.T. Garratt, \textit{Lord Brougham}, (London, 1935), 7-8.} Hence, Lansdowne and Lord John Russell, for example, worked together on educational questions in the Committee of the Privy Council on Education and had as their Secretary and then Assistant Secretary, James Kay-Shuttleworth, a fellow Edinburgh alumnus.

Stewart's students included many of these so-called "Professionals", and others who did not have the advantages of birth to carry them through significant careers in the nineteenth century. George Birkbeck (of whom more is said below) and Richard Bright (of Bright's Disease) were examples of medical students who considered it worth their while to attend Stewart's classes. Sydney Smith, the wit and Canon of St. Paul's, did the same when in Edinburgh as tutor to the Hicks-Beach family. John Murray, later Lord Advocate, James Mill, Sir Walter Scott, the Horner brothers, Professor William Pulteney Alison, Charles Grant (later Lord Glenelg, Irish Secretary, President of the Board of Trade and Colonial Secretary) and Professor John Hoppus are other names that figured in Stewart's class lists. Hoppus, who from 1830 was the first Professor of Logic and Mental Philosophy at University College, London, followed his mentor in taking in lodgers, one of whom was Walter Bagehot. James Mill and Francis Horner are considered more fully below in the fields of Utilitarianism and Economics. Horner was considered by Mackintosh as the most receptive student of Stewart: "Without the aid of birth or fortune, in an assembly where aristocratical
propensities prevail, - by his understanding, industry, pure taste, and useful information, - still more by steadiness and sincerity joined to moderation, - by the stamp of unbending integrity, and by the conscientious considerateness which breathed through his well-chosen language, - he raised himself at the early age of thirty-six, to a moral authority which, without these qualities, no brilliancy of talents or power of reasoning could have acquired. No eminent speaker in Parliament owed so much of his success to his moral character. If Mackintosh's evidence be accepted, here was a perfect model of the public figure which Stewart set out to mould and inspire.

When Francis Horner left for England in 1795 he wrote to John Murray: "I see nothing to prevent us carrying on our Disputationes Academicae, though we are four hundred miles asunder. Metaphysics can war loud enough, and I can get franks every week. Come, I order you in the name of Hume, and Smith, and Dugald Stewart, to select a question immediately, and to begin upon it in your very first letter".

In August 1814, Horner and Murray visited Paris together and Stewart wrote them a letter of recommendation to Baron de Gerando, saying that Horner was a very distinguished M.P. and Murray a Scottish lawyer of the highest rank: "The favourite pursuits, however, of both are Letters and Philosophy; - more particularly those branches of study which are connected with Political Economy. Of their principles you will be sufficiently able to judge, when I tell you, that they are the friends

of Lord Lansdowne, of Sir Samuel Romilly, and of Sir James Mackintosh. Horner's brother, Leonard, was another example of the public servant who had taken Moral Philosophy and Political Economy from Stewart. He became Chief Factory Inspector, founder of the School of Arts in Edinburgh and Warden of London University.

Stewart's reputation as an educator of statesmen invaded the citadel of Cambridge and he was remembered as an exemplar in the later nineteenth century. "Early in life," wrote Oscar Browning, the historian at Cambridge and educationist, "I had adopted the opinion that a statesman could be formed by judicious education, and that the education of the statesman was the highest of all educations, higher than that of the divine, the scholar, or the poet. To educate statesmen, to train myself in such a way that I should be fit to educate statesmen, has been, indeed, the ruling passion of my life, ... I was a liberal, even a radical, ... a great admirer of the Reform Bill of 1832, and I had the notion, ... that the whigs who carried the Reform Bill of 1832 were trained by Dugald Stewart at Edinburgh. A stimulus was given to these ideas by a study of the life of Francis Horner, who is a very good representative of the Academical Whig, and has left in his diaries and correspondence a complete account of Dugald Stewart's method. I desired to be the Dugald Stewart of Cambridge".

1. Dugald Stewart to Baron de Gerando, August 8th, 1814, N.L.S. MS. 5319, f. S1. Baron Joseph-Marie de Gerando (1772-1842) was a French writer and statesman. He held many important administrative posts under Napoleon I, Louis XVIII and Louis-Philippe. A member of several French academic institutes, he was especially noted for his philanthropy.
2. Oscar Browning, Memories of Sixty Years at Eton, Cambridge and elsewhere, 2nd ed. (London, 1910), 52. I am grateful to Mr C.T. Harvie for this reference.
In an article in the *Cambridge Journal* Duncan Forbes has emphasized the importance of the eighteenth-century Scottish philosophical background to the novels of Sir Walter Scott: "If the fact that Scott was a pupil of Dugald Stewart and a friend of Adam Ferguson, and lived and worked in or near the metropolis of rationalist history - Edinburgh - is ignored, the story of the creation of the historical novel by Scott can only be half told".1 Forbes then went on to maintain that Scott was philosophical because like the philosophes his real concern was life in society, the study of social man and the principles of human nature.2 All these were themes which Stewart comprehended in his course - indeed, as has been mentioned, they were the foundation of his moral seriousness. Further research might reveal another debt of Scott to Stewart. Possibly in 1796, the philosopher was writing to Scott thanking him for four copies of his Translations, of which two he would keep and "The other two I shall take the earliest opportunity of transmitting to a friend in England, who I hope may be instrumental in making this merit more generally known, at the time of their first appearance. In a few weeks, I am fully persuaded, they will engage the public attention to the utmost extent of your wishes, without the aid of any recommendations whatever".3 Perhaps on both the practical and intellectual level Stewart was instrumental in furthering the career of the Scottish Romantic.

2. Ibid., VII, 23.
3. Dugald Stewart to Walter Scott, n.d. 1796 (?), N.L.S. MS. 3874, f. 20. No further details on the Translations are given.
The last of Stewart's students to be considered here is William Pulteney Alison, second son of Stewart's old friend. Before studying medicine, Alison studied Philosophy in 1804 and 1806 and was an enthusiastic pupil of Stewart. Indeed, in 1817 he wrote an article in Blackwood's defending his philosophy. Once qualified, Alison rose to be Professor of Medicine at Edinburgh until his retirement in 1855, and he had been Dean of the Medical Faculty at the time of the 1826 Commission.

A man who took generosity to the poor to extremes, Alison was instrumental in working the New Town Dispensary and his great experience of medical work among the poor led him to his views on the Scottish Poor Law and his well-known opposition to Thomas Chalmers. He was a great advocate of changing the situation in Scotland whereby the relief of the poor was entirely dependent on voluntary benevolence.

There is a tendency to be impressed by all Stewart's positive virtues when considering his relations with his students. In his dealings with those where his connection was not that of Professor and student the picture is not so varnished. This is especially clear in his relations with Alexander Constable, his publisher. It is evident from a reading of the correspondence between them, both printed and in the National Library of Scotland, that Stewart was particular and demanding and yet when asked to undertake business for Constable, dilatory.

Stewart was punctilious about errata in his published works and was anxious either to stop the presses or the parcels from being despatched, or else demand the insertion of a printed list. He was demanding in the almost inexhaustible number of requests made to Constable and his staff. They ranged from sending copies of his books to a considerable number of people, having books sent to him for his research
or having novels sent to Mrs Stewart. Letters requesting copies of
his books printed on fine or common paper to be sent to certain people,
give evidence of Stewart's contacts. For example, the Earl of Moira
was sent a copy of the Philosophical Essays on fine paper, and Adam
Ferguson one on common paper.

When Constable asked Stewart, on the other hand, to
produce his various writings for publication Stewart regularly delayed.
On February 16th, 1821, Constable asked Stewart for his Dissertation
indeed, he showed some ingenuity in writing to Mrs Stewart to ask her
to help. Constable had to write to her again on May 28th - time was
pressing for the work should preferably be out before Parliament rose.
Constable was getting very forceful indeed by July 31st. Again the
following November Constable was obliged to write to Mrs Stewart to
hurry her husband's approval and reading of James Playfair's memoir of
his uncle, John Playfair. The collected Works were ready for publica-
tion but the memoir had to be appended. This side of Stewart, one
that is perhaps common to many distinguished writers, was appreciated
by Mrs Stewart and diagnosed by Francis Jeffrey. Mrs Stewart described
her husband's hatred of letter-writing, for example, as "unconquerable" while Jeffrey wrote to Francis Horner saying that Stewart "is an excellent
person; without temper, or a sufficiently steady and undisturbed
estimation of himself. And then he is an idle dog; ... You will call
this blasphemy; but it is very true, and I love him all the better for

1. N.L.S. Ms. 791, 245, 319-320 and 352.
2. Ibid., 430. Stewart also looked through the papers of the mathe-
matician Colin Maclaurin which his son was publishing in 1797.
(N.L.S. Ms. 2524, f. 25.)
3. Helen D'Arcy Stewart to William Drennan, November 22nd, 1813. E.U.L.
Ms. Dc. 1, 100°. f. 1.
believing it."¹ Human failings accompanied his moral seriousness and his financial acuteness.

Constable tolerated these human failings of Stewart because at other times, Stewart was immensely valuable. Thomas Constable noted in his edition of his father's letters that Archibald Constable freely consulted Stewart in literary matters.² In no case was this more so than with respect to the *Encyclopedia Britannica*, the copyright of which Constable acquired in 1812. On November 15th, in response to Constable's request, Stewart wrote from Kinnel his suggestions for the *Dissertations* which were to be published as supplements to the *Encyclopedia*. Stewart's ideas and suggestions as to authors were adopted by Constable to the mutual benefit of authors and publisher.³

Dugald Stewart, as a leading intellectual of his age had contacts with many of his equals. He had copies of his books sent to Richard Lovell Edgworth and Benjamin Vaughan⁴ but there is more ample evidence of personal contact. When Sir Samuel Romilly committed suicide in November, 1818, Stewart was at Bowood, where Maria Edgworth was also staying. She wrote in a letter: "I did not know till now that Mr Dugald Stewart had been so very intimate with Sir Samuel, and so very much attached to him - forty years his friend; he has been dreadfully shocked".⁵ The respect was mutual; Romilly had written

¹ quoted in Cockburn, Jeffrey, II, 133. The letter is dated January 25th, 1811.
² Thomas Constable, I, 34.
³ Stewart's recommendations are to be found in N.L.S. MS. 675, ff. 140-141.
⁴ Ibid., ff. 98 and 116.
⁵ Hare, I, 255. The letter is dated November 4th, 1818.
to Etienne Dumont, the Genevan editor of Bentham's manuscripts, in 1793 after a visit to Edinburgh saying: "the person whom I most saw and lived with at Edinburgh, was our friend Mr Dugald Stewart, whom the more I know, the more I esteem for the qualities of his heart, and the more I admire and respect for his knowledge and his talents". 1 John Wishaw, the solicitor, and Lansdowne were appointed Romilly's executors and Leonard Horner wrote that Wishaw travelled to see Stewart to consult him about the publication of Romilly's papers. "The consultation was, as he told me, in every way satisfactory, and he came away with his mind quite made up as to the parts he should publish, having had the sanction of one on whose judgment and caution in a matter of this sort he placed more reliance than on that of any other person he knew". 2 The long and close connection with Romilly established a firm link between Stewart and the Bowood Circle of which Romilly was an intimate.

Jeremy Bentham was aware of Stewart's distinction. He had occasion to write to him during his enquiries into crime. He wanted Scottish crime statistics from Stewart to see if they would show if the "cheaper" Presbyterianism and education of Scotland had a better effect on public morals than the richer Southern episcopacy. 3 Stewart and Bentham had closer contacts through their mutual friend George Wilson of Edinburgh, who had worked as a lawyer in Lincoln's Inn and who subsequently retired to his home town.

Madame de Staël along with Romilly and Bentham was a visitor to Bowood and an admirer of Stewart. Stewart's daughter, Maria, wrote from Bowood in November 1813 that Madame de Staël "assured me she meant to be in Scotland in spring, but if Mr Dugald Stewart would come to London, all wish for a journey there would be over". Among Stewart's other intellectual contacts were Edmund Burke with whom he visited the then Lord Lauderdale in 1784 and Samuel Parr. Stewart wrote of Parr, to Henry Mackenzie: "I could not help enjoying, as well as you, his vigour both bodily and mental, and still more than either the incessant and uniform flow of his animal spirits. I have long corresponded with him, and once passed a day with him, many years ago at the house of a common friend; but his conversation while here has impressed me with a higher idea than I ever had before, not only of his unrivalled scholarship and inexhaustible fund of literary anecdote, but of his good humoured disposition to view every thing he sees, on the most favourable side. I have certainly nowhere met with an English man of letters so completely free from all national prejudice against Scotland". Parr's reply can be said to have come in his will, in which he bequeathed Stewart a ring. He described Stewart as "a friend who is endeared to my soul from the simplicity of his manners, the candour of his spirit, and the purity of his principles, and who at the same time commands my admiration by his profound and capacious views as a Metaphysician and a Moralist and by the correctness, by the perspicuity, and occasionally by the glowing, and sublime eloquence which adorn his style."  

1. Letters to 'Ivy', 220. The letter is dated November 2nd, 1813.  
2. M.I.L.S. 124, ff. 31-32. The letter is dated August 30th, 1818 (?).  
3. E.U.L. MS. Dc. 5. 111. f. 76.
Stewart's less intellectual friends can be gleaned from the Constable letters which contain instructions for books to be sent to his aristocratic patrons - the Palmerstons, the Lansdownes, the Mintos - and others. They included Lords Moira, Spencer, Grenville, Grey and Holland in 1810, all of whom were sent copies of the Philosophical Essays on fine paper.¹ He also visited Broadlands, the Palmerston home, often and also Bowood.² The respect in which he was held admitted him to the highest intellectual and social circles in Britain and overseas. He met and corresponded with Thomas Jefferson, later President of the United States.³

One person who never had the opportunity of encountering Stewart's personal attractions, was nonetheless impressed with his writings. On March 31st, 1827, a P. Ferrol of Bewdley, Worcestershire, wrote to Stewart saying that he was a young man wanting advice on "the affairs of my Life". His reasons for asking Stewart are explained: "Those acquainted with the works of an Author and not with his person must form their Ideas upon the first, and certainly mine so formed, encourage me, the very last of literary men, for I am not allowed even to try for fame, to apply to you the very first". He was a poet but no one would publish his work. He asked Stewart to read his verse and give him his opinion. "It is the great philosopher to whom I address these Questions, which perhaps Men of much less eminence might answer, but it is because you

1. N.L.S. MS. 675, ff. 87, 92, 93 and 95.
2. see his Diary of Tours, E.U.L. MS. Dc. 8. 178, f. 8 for the visit to Bowood in 1799 and ff. 18-19 for several visits to Broadlands in 1803.
are so high that I think you will bend thus far; it is because you are liberal, candid, most benevolent . . . . I have to thank you for some of my happiest hours and my most valuable knowledge; I have learned from you and admired you and now throw myself into your notice because all this has been.¹ Here was a man who had gained a similar impression of Stewart from his writings, as those who heard and knew him. It is to be hoped that Stewart conquered his hatred of letter writing to reply.

IV

Some aspects of Stewart’s relationship to the Whig party and Whiggery from the end of the eighteenth century until quite late into the nineteenth deserve consideration. His connections are with three important groups—the Bowood Circle², the Edinburgh Reviewers and Holland House. The first place to operate as a centre of Whig, reformist ideas was Bowood, the country house in Wiltshire of William, Earl of Shelburne. Shelburne became infected with Enlightenment ideas and government reform after a visit to France in 1771 and saw that what was needed in Britain was an alliance of government and the forces of change. To implement this alliance, he began to patronise radical thinkers and writers such as Joseph Priestley. By 1782, Shelburne had gathered around him a brains trust at Bowood from whom he could draw

² The consideration of the Bowood Circle owes much to Mr J. Derek Jarrett, of the University of London Goldsmith’s College, who gave permission to read his unpublished B.Litt. thesis at Oxford, 1956, The Bowood Circle 1760-1793: Its Ideas and Its Influence, and helpful suggestions. His section on Shelburne in Britain 1688-1815 (London, 1965) is a brief but useful summary. Future references are made either to Jarrett thesis or Jarrett.
ideas on political and social reform. Many of this Bowood Circle were active members of the Constitutional Information Society and Bentham's *Introduction to the Principles of Morals and Legislation* was presented almost as a seminar paper at Bowood in 1781. When Shelburne became First Lord of the Treasury in July, 1782, he was in a position to extend the reform of the Civil List, overhaul accounting and taxation, reorganize the Treasury, Navy Board and other government departments, with the aim of greater administrative efficiency. All these schemes were originally canvassed at Bowood.¹ Priestley described Bowood as "altogether a political house, where I daily saw and conversed with, the first politicians, not only of England, but from all parts of Europe".²

After his departure from public life early in 1783, and still only 45, Shelburne went on another journey to France and recruited Etienne Dumont into his service. In the 1780s, the Bowood Circle was stimulated by the introduction of radical lawyers such as Samuel Romilly, and there too Bentham was introduced to Dumont. Bowood as a Lansdowne (for so Shelburne had become in 1784) showpiece also revealed the weaknesses of its patron for Mr Derek Jarrett feels that Lansdowne was more at home with measures and ideas than with the management of men,³ essential for the successful politician in the context of the eighteenth century.

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¹ Jarrett, 381.
³ Jarrett, 384.
Bowood had its roots in French ideas, Dissent and Reform - especially legal and constitutional reform. It might have lost one of its purposes as an unimpeded source of ideas for government once Shelburne had fallen, but it was throughout the 1780s an important country house centre where congregated the intellectuals of the day. Mr Jarrett sees two mainsprings of reform in the early nineteenth century - humanitarianism and utilitarianism: "Bowood was the foyer for this intermingling of ideas and the contacts between the various thinkers who met there profoundly affected the growth of Bentham's theories and the development of the Whig 'party line' at this most critical time."¹ He continues "Benthamism was modified and humanized by the humanitarian side of the Bowood Circle"² - "Their approach, one of rationalism and perfectibility tempered by common sense and by morality, may have been abortive in the 1790s; but it provided the basis for the reforming energy of the Victorians".³

There is, of course, a familiar ring in the phrase "rationalism and perfectibility tempered by common sense and morality". Muriel Jaeger has written "The peculiar brand of seriousness which the Edinburgh school contributed to the increasing seriousness of the early nineteenth century was thus one of reforming and progressive principles - social and political rather than personal".⁴ Bowood and the Edinburgh philosophers, especially Stewart, strove for the same Whig reformist ends. They did not, however, act independently. There are several indications that there were strong links between Edinburgh and Bowood. Stewart and

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¹ Jarrett thesis, 44.  
² Ibid., 48.  
³ Ibid., 128.  
⁴ Muriel Jaeger, Before Victoria, (London, 1956), 89.
Romilly’s friendship dated from 1771. Lansdowne sent his son to Edinburgh rather than any other university. Lansdowne was in contact with Stewart for in 1795 Romilly wrote to Stewart saying: “Very soon after I received your last letter, I delivered your book (Adam Smith’s biography) to Lord Lansdowne; he desired me to return you many thanks for it, and to say, that as soon as he is sufficiently recovered from a fit of the gout, which he has had for a considerable time, to be able to hold a pen, he will write himself to thank you for it.”¹ There were many mutual contacts between Edinburgh and Bowood well into the nineteenth century. Stewart himself certainly visited Bowood and his students, family and friends, were constant visitors well into the 1800s. In 1813-1814 Mme. de Staël visited both Bowood and Holland House.² In October 1813 Sir James Mackintosh found her there with Romilly, Dumont and John William Ward.³ In his account of the same meeting, Romilly noted that Macvey Napier was also present.⁴ Stewart was a Whig, Bowood was a Whig foyer, and their theoretical basis for reform was the same. The evidence shows not only a similarity of views but also personal links.

Moral seriousness was to be found too in the Edinburgh Review. John Clive has maintained that as Stewart was a Whig, a supporter of the French Revolution and their lecturer on Political Economy, he had great influence on Francis Jeffrey, Henry Brougham, Francis Horner and Sydney Smith, and hence, the Review.⁵ Veitch wrote in his Memoir that

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Stewart fostered "in the minds of the rising youth ... the love of political freedom" and that his classroom was "the asylum and the nursery of the liberal opinions of the times". ¹

The story of Edinburgh Review need not be repeated here. A Whig, sometimes a virulently Whig journal, a combination of circumstances caused its appearance in 1802. One of these circumstances was doubtless the vision of life given to most of its early contributors by Dugald Stewart. There was bound to be a similarity between the ideas of Stewart and the Reviewers in view of their declared devotion to him and because they were, in 1802, still too young to have undergone a sufficiently variegated set of experiences which would have enabled them to form views unique to themselves. The ensuing section, for example, shows his students' part in making the Review an important vehicle of ideas on economics.

Stewart's Whig students were among the most important liberals of the nineteenth century. While some in their youth channelled their energy into writing for and managing the Review others went up to London to engage in politics at the centre. As liberal Whigs, they tended to gravitate towards Holland House. Their teacher had done likewise; in the winter of 1799 he frequently dined at Holland House as the Dinner Books show. ² The Hollands were also related to the Lansdownes and Holland House, much more than Bowood, became a place of resort for liberal Whigs and Edinburgh alumni. The intellectual threads of Bowood and Stewart's classroom were woven into the tapestry of Holland House's

1. Waitch, liv.
2. Ilchester, 170.
practical politics. In 1802, Stewart was writing to Lord Holland who had just returned from the Continent, asking for information: "I should feel in meeting you again after so long an interval, I have so many questions to ask on subjects which I believe to be equally interesting to us both, and on which I know of none more able to give me the information I wish for. The letters which you were so kind as to write from Paris gave me more light with respect to the principal objects of my curiosity, than I have yet obtained from any other quarter, and add much to my anxiety to learn a little more in detail, from your own mouth".  

Stewart’s students formed their own clique at Holland House. In August 1805 Minto was writing that he had seen "most of the Edinburgh Reviewers" there.  

The Earl of Ilchester has written of Lord Dudley’s friendly relations with Holland and that Mackintosh was one of the most talented members of the Holland House Circle.  

This Edinburgh "old boy network" was in fact, to succeed in obtaining a parliamentary seat for Francis Horner. Charles Kinnaird wrote to him saying that he had made an arrangement with Henry Petty and he was sure Horner would not decline. Horner wrote to Murray telling him of the new: "Certainly do not refuse to say to any one who asks the question, and is entitled to ask, that I am introduced into Parliament by the friendship of Kinnaird".

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1. Dugald Stewart to Lord H(olland), September 1st, 1802, N.L.S. Ms. 2521, ff. 169-170.  
5. F. Horner to John Murray, November 19th, 1806 in Ibid., I, 184.
In matters political Dugald Stewart was not above delighting in his student's success. On February 12th, 1806 he was writing to Francis Horner rejoiceing over Henry Petty's victory over Lord Althorpe in the Election of M.P. for Cambridge University. If he had survived to his 90s he would have been amazed to see the 1846-1852 Whig government with no less than four of his former students in high places - Russell, Palmerston, Lansdowne and Minto.

Stewart's connection with Whiggery lay in his contacts with the intellectual and political centres of Bowood and Holland House. His students followed his example and "party line" and fashioned their own forum in the Edinburgh Review. Behind the Review and Bowood there was a common moral seriousness of purpose. That of Bowood did not derive from Stewart, although he contributed to it. The Review owed much to Stewart. At Holland House, the Edinburgh alumni could gather to concert their plans and ideas for putting liberal, humanitarian reform into practice.

V

Stewart was a link between Adam Smith and Edinburgh students who contributed to economics in the early nineteenth century. Stewart was not an original economic thinker: his part was that of the commentator and expositor of Adam Smith. A.L. MacFie in his "The Scottish Tradition in Economic Thought" posed the thesis of a peculiarly

1. quoted in Veitch, cxxxviii.
Scottish attitude and method which was especially influential from 1730-1770. He called it the philosophical or sociological approach. Philosophy and sociology are virtually synonymous in eighteenth century Scottish thinkers. The approach derived from the interests of thinkers such as Hutcheson, Hume and Smith in a variety of intellectual topics - not just Moral Philosophy but Natural Theology, Physics, Justice and Law. Macfie maintained that "It was under the law of contract and private property, with its social aspects that the broad descriptive and critical comments on political economy arose". In other words, the philosopher-economists gave "a broad well balanced comprehensive picture seen from different points of view". Later economists have abandoned this practice in favour of analysing one particular aspect. Macfie concluded that Smith, "in his use of history and broad sociological facts and comparisons to develop his argument and to demonstrate the need for considering all the influences together as seen in actual institution - ... was not original, he was simply Scottish".

The Scottish approach delineated here was not, of course, limited to economics, but could also be seen in history, law and sociology, in William Robertson, John Millar and Adam Ferguson. Dugald Stewart's concept of economics was also related to the Scottish tradition. He was interested in Political Economy because he thought that the right implementation of its principles would promote human happiness. He wrote: "the connexion between the interests of individuals, and the national prosperity, and the still more unexpected connexion between the prosperity of nations and that of neighbouring communities, becomes

1. Ibid., II, 83.
2. Ibid., II, 84.
3. Ibid., II, 95.
more and more apparent". In his lectures, Stewart explained why he comprehended more in his course than wealth, population and the resources of the state, - topics covered by Sir James Stewart, Smith and Quesnay. Political Economy, he said, "may be extended to all those speculations which have for their object the happiness and improvement of Political Society, or, in other words, which have for their object the great and ultimate ends from which Political regulations derive all their value; and to which Wealth and Population themselves are to be regarded as only subordinate and instrumental." He was also concerned to define the occasions and limits of state interference. Stewart was primarily a teacher and so his third aim in teaching political economy was "to enlighten those who are destined for the functions of government, and to enlighten public opinion in respect of their conduct". In among his reasons, therefore, - all of which concert with his moral seriousness, - can be found a utilitarian function for training students for the nineteenth century.

One of Stewart's successors, John Wilson, the "Christopher North" of Blackwood's Magazine, told the 1826 Commission why Stewart saw Political Economy as falling within the province of the moral philosopher:

2. Ibid., VIII, 10.
3. Ibid., VIII, 17. see also his apology for laissez-faire in "Account of the Life and Writings of Adam Smith", in *Collected Works*, X, 60: "the great and leading object of (Smith's) speculations is to illustrate the provision made by nature in the principles of the human mind, and in the circumstances of man's external situation, for a gradual and progressive augmentation in the means of national wealth; and to demonstrate, that the most effectual plan for advancing a people to greatness, is to maintain that order of things which nature has pointed out, by allowing every man, as long as he observes the rules of justice, to pursue his own interest in his own way, and to bring both his industry and his capital into the freest competition with those of his fellow-citizens".
4. Ibid., VIII, 17.
"I observe Mr Stewart has a quotation from Lord Bacon, in which is pointed out the necessary connection between all inquiries into the principles of human nature, and the circumstances in society which operate upon those principles. And Mr Stewart remarks, that it is that connection alone which can dignify the calculations of the political economist, and make them worthy of the attention of the moral philosopher - Mr Stewart always entertained very high notions of the dignity of his favourite science".¹

Henry Cockburn appreciated the value of Stewart's teaching which "supplied both young and old with philosophical ideas on what they had scarcely been accustomed to think philosophical subjects, unfolded the elements and the ends of that noble science, and recommended it by the graces of his eloquence that even his idler hearers retained a permanent taste for it".² Francis Horner felt that it was "not so much from the details of particulars that I derive improvement from this amiable philosopher's lectures, as from the general manner and spirit with which he unfolds his speculations, and delivers, in chaste and impressive language, the most liberal and benevolent sentiments, the most comprehensive and enlightened views".³ On the same day as this observation was made in his Journal, he wrote: "Stewart insisted this morning, with great elegance and force, on his favourite remark, that the general principles of internal economy and regulation are far more worthy of the interest and attention of the political philosopher, because

1. Evidence, I, 117-118.
more immediately connected with the public happiness, than discussions with regard to the comparative advantages of different constitutions."

Stewart's Political Economy lectures were first delivered in the winter of 1800 and continued for eight sessions with an average attendance of 49. Apart from Glasgow, there was no other place in the country where instruction could be had. The topics Stewart covered were the general principles of populations; the theory of national wealth, which included the doctrine of Free Trade and Circulation of Money; regulations with respect to the poor and plans for the education of the lower classes, including a system of preventive police. John Veitch saw the achievement of the course as giving shape and definition to the new science so that the population might become more generally aware of the doctrines of Smith.

The importance of Stewart's course has been noted by Jacob H. Hollander in an article on Adam Smith in The Journal of Political Economy. Hollander pointed to the French Revolution as checking the popularity of the Wealth of Nations. The doctrines of the French political economists were seen to have led to excess. The French Revolution confronted Stewart with another difficult situation, considering that he read his account of Smith to the Royal Society of Edinburgh in 1793 - the year Craig and Abercromby attacked him. It is clear that he was subject to much pressure. Stewart grappled with the issue of the French Economists, sifting what was significant and important in their economic principles "at a time when their general doctrines were subjected in this

1. Ibid., I, 79.
2. Veitch, xlvi and xlviiin.
3. Ibid., li.
country the indiscriminating obloquy of an alleged revolutionary
tendency; and when the excitement of political convulsions abroad, and
the spirit of political rancour at home, might have intimidated a less
courageous man, and shaken the convictions, of a less calm and far-
seeing thinker". Stewart himself wrote of the atmosphere of the time;
"The doctrine of a Free Trade was itself represented as of a revolution¬
ary tendency; and some who had formerly prided themselves on their
intimacy with Mr Smith, and on their zeal for the propagation of his
liberal system, began to call in question the expediency of subjecting
to the disputations of philosophers, the arcana of State Policy, and
the unfathomable wisdom of feudal ages." Given the suspicions of Smith, it is much to Stewart's
credit that he ignored his own reputation and began to revive the study
of Smithian economics. Secondly, Dr. Hollander questioned whether
Adam Smith could be said to merit the title of founder of the classical
school of economists. Smith's claim "lies in some degree in the forma-
tive quality of his thought. But much more it resides in the stimulus,
often the original impetus given to succeeding thinkers to initiate and
pursue inquiries into economic life, sometimes in supporting continuation
of, more often in divergent opposition to, Smith's principles. This
influence is associated with the commentatorial activity of Dugald
Stewart, the critical discipleship of Francis Horner and the first
Edinburgh Reviewers; and the intellectual enlistment of Thomas Robert
Malthus, Jean-Baptiste Say, and David Ricardo".

1. Veitch, 1.
2. Stewart, Smith, 87n.
3. Hollander, 176-177.
This study is only concerned with Stewart and those to whom he revealed the doctrines of Smith. It was Stewart's students who, fired with enthusiasm, began to undertake new economic inquiries and to develop and modernize Adam Smith. As Hollander put it, "Whatever uncertainty there may be as to the precise content of Dugald Stewart's lectures, there is no doubt whatever as to their remarkable influence in encouraging interest in economic study and in stimulating independence in economic thinking."

Amongst Stewart's students were those who as writers, editors, publicists, reviewers and journalists were going to promote early nineteenth century economic thought. They included James Mill, John Ramsay M'Culloch, Earl of Lauderdale, Brougham, Horner, Francis Jeffrey, Macvey Napier and Sydney Smith. Lord Palmerston's neatly written notes from the course of 1802-1803 are extant. Lord Malmesbury had written to him: "Political economy is a very important and interesting subject. From everything I hear of Mr Stewart I have no doubt he will teach it on its right principles and in the way which can best tend to qualify you to act as becomes in you in the rank you hold in life and in the part you will probably be called upon to act". Francis Jeffrey left five volumes of political economy notes. Francis Horner's belief in the value of Stewart's class was instanced on two occasions - the first in writing to his brother Leonard in 1803: "In

1. Ibid., 180.
2. The notes are on microfilm in E.U.L. M. 136.
recommending Political Economy to you at present, I was influenced by the single circumstance of your having but this opportunity of hearing Stewart. Then again, when rumour had it that Stewart was not to lecture during the 1804-1805 session, he wrote: "I hope the course of Political Economy is not given up for want of students; the number, to be sure, has always been small, but then it was composed only of such as to take to the subject in earnest. If peradventure there shall be twenty found there, for twenty's sake it ought to be saved. The effect which these lectures are already producing, by sending out every year a certain number who have imbibed a small portion of his spirit, is so great that I cannot consent to any suspension of it". George Pryme, Professor of Political Economy at Cambridge in 1819, wrote that "several members of our own University went from the South of England to pass the winter at Edinburgh, for the purpose of attending" Stewart's lectures.

Four by-products of Stewart's revival and exposition of economics were the Edinburgh Review, Francis Horner, J.R. M'Culloch and James Mill. The Wellesley Index's introduction to its attributions for the Edinburgh Review has commented: "A striking feature of the new journal was the introduction of political economy. In a time of tensions brought on by the shift from an agricultural to an industrial society, it kept its readers abreast of the most important thinking in the field".

In 1833, Maurice Cross, an early commentator on the *Edinburgh Review*, wrote: "When the writers in the *Edinburgh Review* began their labours, its (political economy's) fundamental principles were not known to the general mass, and but imperfectly comprehended even by the eminent men who then guided the destinies of the nation. . . . They diffused a taste for its acquisition, and impressed upon their readers the importance, with a view to the public interests, of a right understanding of its principles. . . . it is unquestionable that their sound and enlightened views of many interesting subjects have influenced a large portion of society; been sanctioned by the most important politicians; and adopted, though tardily and partially by the government".¹

Those who assumed the responsibility for diffusing a knowledge of economics in the *Review* were Stewart's students. The *Review* adopted the spirit of Adam Smith - "an impatience with the dead hand of tradition, a belief in the virtues of competition, a conviction that the test of policy should be effectiveness in contributing to the welfare of man".² Francis Horner's review of Thornton's *Paper Credit of Great Britain* was written when he was still attending Stewart's lectures at the age of 24.³ Almost all the writers of economic articles in the *Review* had taken at least a part of their knowledge from the Edinburgh professor's lectures. The causes the *Review* championed were Free Trade, solid rather than paper currency, opposition to the Corn Laws and to the East India Company Monopoly.

³ Ibid., LXI, 235.
Once in Parliament, Francis Horner was clearly the expert on economic matters - his training stood him in good stead. In February 1810, he moved for an inquiry into the depreciation of bank notes and the high price of bullion which caused it. The Bullion Committee was established and Horner was made its Chairman. Lord Holland wrote that Horner required all his strength of character as well as knowledge of economics: His was "a determined enquiry into matters which, little attractive in their nature, led him, as he well knew, to conclusions unpalatable to powerful individuals as well as to the Bank and the Government. . . . The dread of the consequences of fair dealing and honesty, or rather the persuasion of the convenience of paying for everything in fluctuating and depreciating paper, was not confined to the vulgar. All the supporters of the war, and some who, without approving its origin, profited by the spirit of speculation to which its continuance gave occasion, were for preserving a hazardous and dishonest system".¹

In June 1819, with the conversion of the anti-bullionists, Lord Dudley wrote to the Bishop of Llandaff: "To me who am apt to laugh, it appears laughable, and to those of a more serious turn, it must be provoking, to see persons who after being a long time in high office, come down to Parliament gravely to declare, that they have just condescended to learn about as much political economy as was usually known to the junior students in the University of Edinburgh twenty years ago, and to lend the sanction of their authority to the opinions of wiser and better men".²

². Dudley’s Letters of Llandaff, 22-223.
Hollander found it "possible to follow almost week by week in Horner's remarkable journal and correspondence his further development as a political economist, the joint stimulus of Adam Smith's text and Dugald Stewart's comment".\(^1\) He was a frequent contributor to the Review but his effectiveness was not, in his editor's opinion, to be measured by the number of articles - "It was his influence, more than that of any other man, that caused the Edinburgh, from the first issue, to give economic problems a prominent place".\(^2\) Dr. Fetter has said that Horner's real contribution was an attitude. Economic problems were important and to be discussed in the light of factual analysis and against the background of history.\(^3\) Here was all the breadth and depth of the Scottish tradition of which Stewart was the able exponent.

John Ramsay M'Culloch first went to the University of Edinburgh in 1805 and "Though he attended several of the classes in the University he gave his almost undivided attention to that department of science which he has done so much to illustrate and elucidate".\(^4\) The first editor of the Scotsman in 1817, he virtually monopolised the economic articles in the Edinburgh Review from 1818-1838.\(^5\) Like Stewart, M'Culloch is not known so much for his original mind. Rather, he campaigned ceaselessly for Political Economy to be recognized in both Edinburgh and London. In 1824, he was in London giving Political Economy lectures. He wrote to Macvey Napier that the Earl of Clarendon, Mr (Thomas?) Baring and Sir James Mackintosh were attending them.\(^6\)

\(^1\) Hollander, 105.
\(^3\) Ibid., 19.
\(^5\) Fetter, 238.
\(^6\) J.R. M'Culloch to Macvey Napier, April 23rd, 1825, and printed in Correspondence of Macvey Napier, 45. Of the members of the Baring family of financiers mentioned in the O.N.B., it seems most likely that it was Thomas who attended M'Culloch's lectures.
A month later he had secured the attendance of five peers and fifteen M.P.s among his regular auditors and his two classes totalled 335.¹

In 1825, it was proposed that a Chair of Political Economy be established at the University of Edinburgh. M'Culloch feared that the Scottish authorities, especially Lord Melville, would obstruct the plan.² M'Culloch had hopes of preferment to the prospective Chair. Dugald Stewart was much in favour and his wife wrote to Napier, that her husband "says he must be cautious in any direct interference in favour of Mr M'Culloch, lest it should be said, as it most undoubtedly would, that he was influenced by personal hostility to Mr Wilson".³ Wilson claimed that giving political economy lectures was in the province of the Moral Philosophy chair. The plan failed but M'Culloch's efforts for recognition were eventually crowned in 1828 with his appointment to the Chair of Political Economy at the University of London.

A.L. MacFie has seen that James Mill imbibed from his Scottish education under Stewart the sociological idea - "James is the most sociological of the Benthamites and his valuable historical and psychological expansions are in the true synthetic tradition".⁴ MacFie refers to Mill's Elements where "the economic theory is placed in its proper relation to the other social sciences, in the true Scottish manner".⁵ The place of economics in an overall environment and its contribution to the good of men was not all Mill gleaned from Stewart. It is through Mill, in fact, that there was an important link between the Edinburgh professor and yet another contemporary development - Utilitarianism.

¹ M'Culloch to Napier, May 25th, 1825, Ibid., 48.
² Ibid., 45 and 48.
³ Helen D'Arcy Stewart to Macvey Napier, May 21st, 1825, Ibid., 47.
⁴ MacFie, 84.
⁵ Ibid., 93.
Dugald Stewart's connection with Utilitarianism runs in two channels - the direct debt of Utilitarian thought to his philosophy and, as with politics and economics, the contribution of his students to Benthamism. Stewart's direct contribution to Utilitarian philosophy was a negative one. He was considered as the embodiment of a philosophic strain against which the Benthamites reacted. Stewart, for his part, did not accept the principle of utility as a panacea and distinguished between areas of its effectiveness and ineffectiveness.

Leslie Stephen's essays on the Utilitarians saw Stewart's influence in their reaction to his doctrines and in James Mill. Stewart, as Reid's disciple, maintained that intuitions or fundamental laws of belief, should rule the conduct of man. James Mill's main purpose, on the other hand, was to confute intuitionism. 1 Stephen considered that common-sense philosophy was a convenient way of compromising between eighteenth century rationalism and the existence of possibly irrational institutions. 2 Stewart was seen as a Whig in philosophy, as well as politics - someone who was not prepared to accept the logical consequences of rationalism, and checked himself by referring to intuitions. 3 On the other hand, "In philosophy as in politics, the Utilitarians boasted of being thoroughgoing Radicals, and hated compromises which to them appeared to be simply obstructive". 4 Stewart was the personification of all against which they wished to react: he was not only the greatest living philosopher but the representative of the Establishment.

2. Ibid., I, 164.
3. Ibid., I, 167.
4. Ibid., I, 167-168.
school of common-sense philosophy. Mill was a defender of this philosopher until 1808 when he met Bentham, the first of several suggestions of his positive as well as negative debt to Stewart.

Once Utilitarianism began to be formulated by the appearance of works by Dumont, Paley and Bentham, Stewart rejected its relevance to the field of morals, while reserving judgment on its application to government. He wrote to Lord Holland in 1802:

"I think I shall have much to say to (Dumont's) fundamental principle of Utility considered in connection with the Theory of Morals, altho' I go along with him in the most important applications he makes of it to the Councils of Legislation". By 1814, Stewart's views were assailing Bowood, something of a Utilitarian power-house. Dudley wrote to Mrs Stewart: "I was going to call on Mme. de Stael so I had an opportunity of immediately delivering Mr Stewart's message to her. She seemed very much pleased and desired me to say that her principal object in going to Scotland would be to see him... I wish, however, you heard the scream of joy she gave when Mackintosh told her that Mr Stewart is hostile to the 'Principe d'Utilité'. By the bye, what with Paley and what with Bentham, we are all converts to it here, so if he means to set us right he had better lose no time".

The quotation which heads this chapter showed that Mill was among those stirred by the Stewart oratory. Alexander Bain, Mill's

2. Stewart to Holland, September 1st, 1802, N.L.S. Ms. 2521, f. 170.
biographer, Elie Halévy, the historian of Philosophic Radicalism and
Donald Winch, the most recent writer on Mill's economics, have unanimously
agreed on the debt of Mill to Stewart. For Bain, the philosopher's
"fascination, ... no doubt, was the stirring of (Mill's) philosophical
aptitudes".\(^1\) He continued that "Mill's early studies and tastes, the
accidents of his career, and the circumstances of the time, conspired
to make him, above everything else, a political and social philosopher".\(^2\)
The Scottish education with its emphasis on man in society could account
for this and while he left Scotland at a later age than most emigrants
to England he was "possessed of good ballast in the moral part" when he
finally did so.\(^3\) Halévy said that when Mill was interested in psychology
and Morals, he was a faithful disciple of Stewart. This was in 1807,
during his early years in London and when he first met Bentham.\(^4\) For
Donald Winch, Mill's attendance on Stewart's political economy lectures
gave him "some claim to be considered as a link, albeit indirect, between
the founder of classical economics and Ricardo, its next great exponent".\(^5\)
Winch also pointed to the general importance of Mill's time in Edinburgh:
"It is worth stressing the Scottish influence on Mill's work because it
provides a framework into which he fitted ideas acquired later from
Bentham and Ricardo; it not only survived the infusion of these later
doctrines but gave them an extra dimension which was unique to Mill".\(^6\)

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2. Ibid., 421.
3. Ibid., 35.
   (London, 1952), 437.
6. Ibid., 4.
Mill himself spoke of the "delightful exhortations to mental enterprise, and to press forward unceasingly to new attainments", which Stewart infused in his Moral Philosophy class.¹

Even if Mill's interests changed after 1808 he never lost the sociological framework, the distinctive characteristic of eighteenth century Scottish ideas and education which in his case, came from Stewart. Hence, his fame, which rests on his effect on Bentham and on his leadership of the Philosophic Radicals, was achieved by his making Utilitarianism a relevant doctrine, by placing it in an overall social context. As Halevy said, "Bentham gave Mill a doctrine, and Mill gave Bentham a school".² By making Bentham a democrat, Mill acted as a catalyst in the evolution of Bentham's views at a time when he was a neglected social philosopher.³ Similarly, in the 1820s, with the formation of the Philosophic Radicals, Mill stamped his own particular character on the movement. As the historian of the movement has said: "James Mill's initial impact on his disciples was to give a strong sense of moral purpose, but he also encouraged their political ambition and gave it focus and direction. Indeed, it was the intellectual foundation he gave to their moral aspirations which combined with their newly acquired political ambition to give a doctrinaire spirit to their conduct on the political scene."⁴ Two Philosophic Radicals, Charles Buller and William Molesworth, were at the University of Edinburgh in the early 1820's.

1. James Mill to Macvey Napier, May 11th, 1820, Correspondence of Macvey Napier, 27.
2. Halevy, 251.
The Edinburgh-Utilitarian link, however, did not rest on the almost exclusively intellectual level discussed here. There were several co-operative projects where the common ideas of Stewart's students and the Utilitarians combined to benefit society. The co-operation lay especially in the field of further education.

VII

In the educational ventures undertaken by the Edinburgh alumni and the Utilitarians the Edinburgh contribution far outweighs the Utilitarian. This has been recognised by the foremost authorities on the University of London. Professor H. Hale Bellot has written that "the strongest single intellectual influence in the new foundation in London was that of Edinburgh", although he did see other forces at work such as Priestley, the Unitarians and the teaching of Bentham. In the Benthamite element, however, Edinburgh ideas were evident since "the immediate source of Benthamite influence was not the master himself but his disciple James Mill".

Dugald Stewart had great faith in Education - are "the morals of men improved, and their enjoyments increased in proportion as the cultivation of taste and learning advances? ... I am disposed, without the smallest hesitation to answer the question in the affirmative". Stewart was more specific. He committed himself to the development of

2. Ibid., 12.
3. Ibid., 25.
4. This quotation is from Stewart's political economy lectures. Collected Works, IX, 345.
Mechanic's Institutes: "Wherever the lower orders enjoy the benefits of education, they will be found to be comparatively sober and industrious; and in many instances, the establishment of a small library in the neighbourhood of a manufactory, has been known to produce a sensible and rapid improvement in the morals of the work people. The cultivation of mind, too, which books communicate, naturally inspires that desire and hope of advancement, which, in all the classes of society, is the most steady and powerful motive to economy and industry".¹

The need for a modern university in England - modern in terms of what it taught and who it taught - became compelling by the 1820s. Previously, Edinburgh had supplied the English Dissenters' demand for university education and had also trained the required professional men. It had also coped with changing social and economic conditions. The idea of a university in London was not a new one but the pressures were by this time overwhelming. The prime mover, although he soon retracted from the scheme, was Thomas Campbell, the poet so impressed by Kinneil, the friend and student of Dugald Stewart. In an article on the proposed University, Campbell argued that such an institution in the metropolis would engender men like Stewart who would "chase vulgarity from the character, habits, and pursuits, and from the very idioms and utterance of the vulgar wealthy".² Of the twenty-four

1. Ibid., IX, 346.
2. Thomas Campbell, "Suggestions respecting the plan of an University in London", The New Monthly Magazine and Literary Journal, XIII (1825), 416. Campbell devoted much space to a eulogy of Stewart. For example: "I speak only of that influence which D. Stewart exercised as a public character, over the temper and spirit of the place where he taught. Some shame I must take to myself, in confessing that I heard but too few of his lectures; but I heard enough to convince me that his influence in his own country, in supporting what most men, in their cool moments, will acknowledge to be the cause of truth, was greatly beneficent and important". (417)
members of the First Council of London University were six former students of Stewart - George Birkbeck, Lords Brougham and Lansdowne, Sir James Mackintosh, James Mill and Lord John Russell. The Education Committee, which devised the courses and curricula of the new institution included all these with the exception of Russell, and also Campbell, Leonard Horner and Lord Dudley. Dr. F.G. Brook's comment on this Committee is: "It seems likely that the three Scotsmen - Mill, Mackintosh and Horner - were the dominating influences, although Dr. Birkbeck's experience must have been valuable."

The results of the Committee's work were predictable: "The extended range of the subjects of university study, the lecture system, the non-residence of students, their admission to single courses, the absence of religious tests, the dependence of the professors upon fees, and the democratic character of the institution, were all deliberate imitations of Scottish practice". Even when the ground work was completed, the Edinburgh alumni were in full force on the Council of the University in 1828 to see it into the future - Birkbeck, Brougham, Dudley, Lansdowne, Mill and Leonard Horner were joined by James Loch of Highland Clearances' notoriety.

The professoriate was drawn from two sources - Edinburgh and Cambridge. Apart from M'Culloch and Hoppus, the Edinburgh contri-

2. Hale-Bellot, B. The Scottish system was seen by those who had benefited from it as of great value. Dudley wrote to Mrs Stewart on June 6th, 1806 about the London Institution, saying that the only way it could do real good "is by making, in some measure, a place of education, and that with the view they ought to found half a dozen professorships, with houses, and small fixed salaries annexed, depending for their increase upon the honoraire paid by each student. In a word, by doing what has already been done at Edinburgh with so much success". (Letters to 'Ivy', 41)
bution was perhaps inevitably most felt in the medical school, and is discussed in Chapter Five. Dr. Brook feels that the influence of the Cambridge group of professors was more personal than ideological, but that nonetheless, "The Scottish tradition and experience were predominant both among the professoriate and on the Council". He goes so far as to suggest that Lord John Russell's great efforts to secure the London University charter and right to grant degrees were because he had been to Edinburgh in the formative period of his life. Brougham secured the post of Warden for Leonard Horner with duties to watch over building, receipts, expenses, books, apparatus, relations between the professors and the Council, admission and classification of students, and discipline. Another Edinburgh feature was the philosophy of John Hoppus, which followed the model of Stewart. London University was not so much founded on Scottish lines and permeated by Scotsmen, but modelled on the University of Edinburgh and diffused with the students of Dugald Stewart.

The other significant educational work undertaken by Stewart's students was in the foundation of mechanics' institutes. While publicity and support were given by the Edinburgh Reviewers, George Birkbeck and Leonard Horner took conspicuous action. Birkbeck had first gone to Edinburgh in 1794, spent a year away and returned in

1. Brook, 87 and 93.
2. Ibid., 151-152.
5. Hale-Bellot, 109, quoting a manuscript in the Department of Philosophy, University College, London.
1796 to complete his medical studies. He took down Stewart's lectures in short-hand. Birkbeck responded to the four main factors responsible for the mechanics' institutes' movement - the need for skilled workers, growth of interest in science, the general movement for the provision of popular education and the formation of a working-class movement for political and economic reform.

In 1823, Birkbeck founded the London Mechanics' Institution, which in 1866 became the Birkbeck Literary and Scientific Institution and in 1907 Birkbeck College. Later, he was prominent in creating Institutes at Spitalfields, Hackney, Deptford, Rotherhithe, Bermondsey, Hammeamith and Chiswick. Leonard Horner, however, had founded what was probably the first Institute - the School of Arts in Edinburgh which is now Heriot-Watt University. Both men were much inspired by the pilot scheme at Anderson's Institution in Glasgow - now Strathclyde University. As a result of their efforts thirteen were in existence in 1824 and 70 by 1825.

The rapid growth was greatly assisted by Brougham's pamphlet *Practical Observations upon the Education of the People* which appealed to employers to assist the new movement. By this means and his articles in the *Review* Brougham was of inestimable value. The whole movement was a Whig and Nonconformist one, although Birkbeck was happy

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5. Ibid., 123.
to exchange ideas with and canvass support from the Utilitarians at George Grote's breakfasts¹ and Mrs Grote's dinners.² He worked with but was not of the Benthamites.

One Edinburgh alumnus could enthuse over his colleagues' success. In 1824, M'Culloch wrote to Napier about the excitement among the populace over the mechanics' institutes and cheap periodicals - "The Mechanics' Magazine sells about 16,000 copies a week, the Chemist 6,000 and so on. I was the other night at the Mechanics' Institution, and met there with Brougham. There were about 800 persons present, and I never saw a more orderly and attentive audience. There are about 1,500 workmen subscribers, at the rate of a guinea a year each. The applications for admission are necessarily numerous".³

Benefitting as they had from a fine education and appreciating the relevance of new discoveries, the Edinburgh alumni brought their ideas South with notable success. Many of the people Stewart trained brought the benefits of education not only to the commercial classes of London but to the artisans of other areas of Britain. Certainly in the foundation of London University, the virtues of the Edinburgh system were not lost on her alumni.

2. Godard, 32.
3. M'Culloch to Napier, May 2nd, 1824, Correspondence of Macvey Napier, 40.
This discussion of Dugald Stewart has endeavoured to show that an eloquent man, preaching a particular brand of moral seriousness, taught and knew a cross-section of intellectual and public figures; that he had personal links and connections through his students with current intellectual and political affairs and also with developments in such new, promising and vital areas as economics, Utilitarianism and education.

His contribution to British society as a source of inspiration, as a teacher and as a personal influence was immense. It was a contribution that lingered until well into the nineteenth century. For some people it was Stewart rather than the University as a whole, which drew them to Edinburgh. The richness of the University's talent can be appreciated more when the contribution of Stewart's professional colleagues is considered.

There is, however, more to Stewart than becomes apparent from the approach taken. He represents more than just the teacher, the intellectual, the friend. He displays on the one hand certain Enlightenment characteristics - his range of interests; his emphasis on man, specifically social man; his appreciating that all facets of life have a bearing on the human condition. His secularism is also apparent - he abandons his interest in the ministry. He takes up Moral Philosophy in the Age of Reason even though he cannot follow the thoroughgoing logic of this course. He falls back on intuitions and becomes the great spokesman for Reid.

This Enlightenment figure, on the other hand, is faced with a confused situation. He is teaching on the threshold of a new age. There are Industrial and French Revolutions. New discoveries are
opening up a new world and imposing new responsibilities; the creed of progress has to be maintained. Fresh problems require answers and the younger generation looks to their teacher. They are receptive to what he has to say not only because they are young and impressionable, but because they are also uncertain - the Enlightenment has shaken established belief and the Revolutions have undermined the established order. He equips them with the answers - classical economics will ensure progress, moral seriousness is the new religion and human happiness can be achieved by virtue, industry and sensibility.

Dugald Stewart is significant as a figure in intellectual history because he represents the transition from the Age of Enlightenment to the Age of Improvement. He more than trained people for a new age - he foreshadowed it in himself.
CHAPTER THREE

A Noble Triumvirate: John Robison, John Playfair and John Leslie
"These three names form a noble triumvirate, whose united and extraordinary energies have been devoted to the meritorious object of enlarging the empire of Physical Science, to the diffusion of the most important knowledge, and, consequently of happiness over the civilized world". (The Edinburgh University Journal and Critical Review, I (1823), 29.)

John Robison, John Playfair and John Leslie are the first scientific professors of the University of Edinburgh from 1790-1826 to be considered here. By 1790, Robison's greatest contributions to his field of Natural Philosophy might have been made but he had established a particular tradition of familiarity with theory and practice which gathered force under Playfair and culminated in Leslie. Playfair, Professor of Mathematics from 1785 and of Natural Philosophy from 1805 had interests that were wide-ranging and he figured prominently in the geological as well as the mathematical and physical concerns of the time. Leslie followed Playfair in both chairs and while not attaining the high standards of teaching common to his professorial colleagues, brought fame to the University by discoveries such as those which led to mechanical refrigeration.

I

John Robison is an example of a trend to be found among Edinburgh scientific academics who had close contacts with practical scientific and technological developments. As early as 1759 he had suggested to James Watt ideas that culminated in the steam engine. 1

1. "Robison's idea was that the power of steam might be advantageously applied to the driving of wheel-carriages, and he suggested that it would be most convenient for the purpose to place the cylinder with its open end downwards to avoid the necessity of using a working beam". (Samuel Smiles, Lives of the Engineers, 5 vols. new and revised ed. London, 1874; Vol: The Steam Engine: Boulton and Watt, 58.)
five years later, watt, a mathematical instrument maker in Glasgow, was given a model of Newcomen's engine to repair. The course of the repair led him to implement a development of Robison's scheme - namely, condensing steam in a separate vessel. So close, indeed, was Robison to Watt in the development of the steam engine that Robison could give evidence in 1797 in support of Watt's claim to originality.¹

Robison was then no theoretical or pure scientist but eminently practical. In 1759 he had become tutor to the son of Admiral Sir Charles Knowles, the controversial naval officer and Governor of Jamaica. Knowles was interested in shipbuilding and found Robison useful in his experiments.² Through Knowles Robison was recommended as the proper person to take charge of John Harrison's timekeeper on its trial voyage in the summer of 1760.³ He returned to Glasgow in the late 1760s but was again recommended by Knowles in 1770 to the Empress of Russia as well qualified to assist in taking charge of the redesign and refitting of the Russian navy.

1. John Playfair, "Biographical Account of the late John Robison", in The Works of John Playfair, 4 vols. (Edinburgh, 1822), IV, 139. Smiles gives the following account of Robison's triumphal return to Edinburgh after giving his evidence: "When Robison returned to Edinburgh, his Natural Philosophy class received him with three cheers. He proceeded to give them a short account of the trial, which he characterised as 'not more the cause of Watt versus Hornblower, than of science against ignorance'. 'When I had finished', said he, 'I got another plaudit, that Mrs Siddons would have envied'." (Smiles, Ibid., 361) Robison's own words come from a letter to Watt dated February 3rd, 1797.

2. Robison used to help the Admiral in between naval expeditions on which he accompanied Knowles' son. One such expedition was to Lisbon in 1760, "on which the traces of the earthquake were yet deeply imprinted". (Playfair, Works, IV, 130). This is worthy of mention: the Lisbon earthquake was a notable stimulus to Enlightenment thought and Robison was one of those who had actually seen its effect. Robison also witnessed the fall of Quebec in 1759.

3. The trial voyage was to Jamaica and the idea was to discover on landing the difference in time as given by the watch and by astronomical observation. (Playfair, Works, IV, 131). Harrison was the first man to develop a reliable chronometer for which he ultimately received a Government award of £20,000.
Robison's biographer described his employment in Russia as "forming and digesting a plan for improving the methods of building, rigging and navigating the Russian ships of war, and for reforming, of consequence, the whole detail of the operations in the naval arsenals of that empire". ¹ He also became, in 1772, Professor of Mathematics with the Imperial Sea Cadet Corps of Nobles, at Cronstadt, with the rank of Colonel. It was here that his capacity to comprehend theory and practice in a course of lectures was first appreciated - "few had enjoyed the same opportunities of seeing the mathematical rules of artillery and navigation carried into effect on so great a scale". ² With this experience behind him, he came to Edinburgh and took up the post of Professor of Natural Philosophy at the University on September 16th, 1774.

Robison now became one of the "men of science and teachers of youth". Until a severe deterioration in his physical and mental health in the late 1790s he was a notable acquisition in both capacities. In 1787, for example, he read a paper to the Royal Society of Edinburgh, of which he was the first Secretary, on "The Motion of Light" as affected by refracting and reflecting substances also in motion. This paper has been described as a pioneering investigation into matters which in our time have culminated in the theory of relativity. ³

A tradition in teaching and writing which he established and which was adopted by his successors Playfair and Leslie, was a familiarity with and exposition of the discoveries of continental mathematicians. His course embraced Dynamics, Physical Astronomy, Mechanics,

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1. Ibid., IV, 141.
2. Ibid., IV, 143.
Hydrodynamics, Astronomy, Optics, Electricity and Magnetism,¹ and he employed much mathematical demonstration in his lectures. But he was not a popular lecturer: he spoke too quickly, he assumed that the students were as clever as himself, and he demonstrated few experiments. Robison did not believe them to be of great value in establishing the principles of science.²

The 1826 Commission evidence gave his class attendance from 1794 until his death in 1805. It is noticeable that while the total number of students doing Literature and Philosophy remained about the same or even increased, the number of Robison's students declined:

<table>
<thead>
<tr>
<th>Year</th>
<th>Nat. Phil.</th>
<th>Total Lit. and Phil.</th>
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<tr>
<td>1794</td>
<td>93</td>
<td>395</td>
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<td>1795</td>
<td>75</td>
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<td>1803</td>
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<td>384</td>
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<tr>
<td>1804</td>
<td>56</td>
<td>445</td>
</tr>
<tr>
<td>1805</td>
<td>105</td>
<td>412</td>
</tr>
</tbody>
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The 1805 figure is included to show the distinctive rise in interest in Natural Philosophy once Playfair was appointed to the Chair. Another noteworthy fact is that Robison's classes declined most appreciably after 1800, - the very year when Dugald Stewart's began to increase.

1. Playfair, Works, IV, 145.
2. Ibid., IV, 145-146.
3. These figures calculated from Evidence, I, 128) and 130).
His failings as a popular teacher do not detract from the view that he furthered the interests of his subject in the University and laid the groundwork for some important later developments. His familiarity with Continental mathematical developments led him to introduce the Leibnizian calculus into his course of lectures - but only a small number of his students were capable of understanding it. He secured two important grants of £600 each of which served as foundations for the work of Playfair and Leslie. The first was in 1775 for the Observatory on Calton Hill - the building of which began under his direction in 1776. Unfortunately the money only covered the building of the walls. Robison also received £600 for apparatus from the Town Council. It consisted of an air-pump in July 1778, mathematical instruments for the Natural Philosophy class in December 1782, Martinmas 1783 and again in 1789-1790. He also received money in the early 1790s for a heliostat and an instrument for experiments on refracted rays - the subject of his paper to the Royal Society.

With his undoubted ability and with the aid of his apparatus, Robison set out to teach some notable students - Lord Ashburton, Thomas Chalmers, the Earl of Haddington, Francis Horner, Lord Lansdowne, James Mill, Lord Palmerston, Lord Webb Seymour and Henry Reeve. His most important student, however, was John Rennie, who commenced his

1. Professor John Thomson to the 1826 Commission, Evidence, I, 458.
5. Haddington was Lord Binning while at Edinburgh, and became Lord Privy Seal from 1845-1846.
6. Henry Reeve: President of the Edinburgh Medical Society 1802-1803; founder of the Edinburgh Medical and Surgical Journal, 1805; physician to the Norfolk and Norwich Hospital and Lunatic Asylum and an associate in London of Humphry Davy, Sir Joseph Banks, Isaac D'Iseraeli and Samuel Taylor Coleridge.
studies at Edinburgh under Robison in November, 1780. Rennie was to be the architect of the three great London bridges, and the engineer both of the Plymouth breakwater and the Principal London Docks. In Rennie Robison found a student who could grasp what he had to say and even after Rennie had left Edinburgh, Robison used to confer with him "upon mechanical subjects".  

Robison has two more intellectual achievements to his name which testify to his calibre. In 1793 he was asked to contribute to the third edition of the *Encyclopedia Britannica*. This was an important move for as Playfair wrote, "He was the first contributor who was professedly and really a man of science; and from that time the *Encyclopedia Britannica* ceased to be a mere compilation".  

The articles written between 1793 and 1801 which were especially noteworthy were those in which his theoretical and practical knowledge were combined - those under the headings of Seamanship, Telescope, Roof, Water-works, Resistance of Fluids, Running of Rivers. He also wrote on electricity and magnetism. Because he was an informed man the articles were often full of views which were new and original to his contemporaries.  

His second undertaking arose on the death of the great chemist, Joseph Black, in 1799. Robison, who had succeeded Black as lecturer in chemistry at Glasgow in 1766, was asked to edit Black's lectures. Robison began the enterprise in May 1800 and they were ultimately published in 1803, under the title *Lectures on the Elements of Chemistry*.

3. Ibid.  
4. Ibid., IV, 178.
It is now known that these lectures were largely interpolated by Robison. Professor Douglas McKie and Dr. David Kennedy have shown that on the evidence of Robison’s letters to Black’s brother James, the lectures had been left in such a state that blanks had to be filled and emendations made. Black had spoken extemporaneously and so his notes had to be expanded. Secondly, Robison discovered that the lectures would not support nor enhance Black’s reputation since they were “fitted for the most ordinary capacity, and the most uninformed hearer” and that they “were the furthest thing imaginable from a high finished philosophical System of Chemistry”. Thirdly, Robison found that Black had been severely shaken by the new chemistry of Lavoisier, and that this too was made apparent in his notes. In the same letter to James Black, Robison described how Black felt:

Dr. Black was in very poor health and feeble spirits when these discoveries of Lavoisier began to acquire celebrity, and was much provoked by the total neglect of his claims by Lavoisier and La Place, after all his wheedling letters. But he found that he hurt himself by the study and thought which was required for putting things in proper light – he made several beginnings; but prosecuted none, as appears from his papers. I can also easily believe that Dr. Black, now seeing that he was no longer to be looked up to as the first chemist in Europe, which was certainly his situation before, no longer felt himself incited to the same exertion, even had he been in health – it was not worth his while now to break his quiet enjoyment of his remaining days – He therefore contented himself with a general acquiescence in doctrines which he found well supported, and with working them into his Class Lectures, in the easiest manner he could – it is certain that he gave his whole attention to this, rendering his lectures as acceptable and popular as possible.

But during the five years he continued to lecture after this, he had not satisfied himself with the way of introducing all the new doctrines, and he has varied from year to year – and, after all, some of them are brought in very abruptly, and artificially.


2. Robison to James Black, September 16th, 1802. These two quotations are printed in McKie and Kennedy, 162.

3. This part of the letter printed in McKie and Kennedy, 166.
Given the three problems which Robison had to face as Black's editor, it can be seen how he was largely responsible for the final version. He wrote to James Black: "It was here that my own labour and study commenced - I had to fill up all the blanks, describing the substances, and relating the processes and experiments - I had to change the language almost in every page, because it was continually referring to something standing on the table, or on the furnace before his hearers - much referred to processes going on, and to yesterday's lecture &c - All these additions and alterations were written on the blank pages of the first Copy, or inserted in additional Leaves. I added many historical Notes". 1

Robison had sought to vindicate Black's reputation. He had strong prejudices against the French who had disturbed Black at a time of ill-health. Playfair wrote: "Such, indeed, was the force of those prejudices, that he considered the Chemical Nomenclature, the new System of measures, and the new Kalender, as all three equally the contrivances of men, not so much interested for science, as for the superiority of their own nation". 2 Robison's achievement in being able to edit Black's work so thoroughly at a time when he himself was only months away from death, was considerable.

The importance of Robison as a professor lay in his being an eminently practical scientist, his introduction of Continental thought into the Edinburgh curriculum, his concern for apparatus and his capacity

1. printed in McKie and Kennedy, 163.
in another science, albeit in an age when the boundaries between disciplines were not finely drawn. He was also the first scientific expert to be engaged for a work like the *Encyclopædia Britannica*. He set precedents, in these ways, for his successors.

II

John Playfair and Dugald Stewart were not only close friends but shared similar ideas and were highly commended by their friends, students and associates. ¹ Stewart's own impression of Playfair was given in a letter of introduction to Baron de Gerando when Playfair went on a Continental trip in 1816: "Mr Playfair's name is too well known over Europe to render it necessary for me to say anything of his eminence as a Mathematician, as a Geologist, and as an eloquent as philosophical Writer. In the variety, indeed, of his scientific and literary talents, I know of nobody in this country who resembles d'Alembert so nearly. It is equally unnecessary for me to add (what you will immediately discover from his conversation) that he is a most amiable, interesting and worthy man". ²

For Lord John Russell, a lodger of Playfair, he was "one of the best and the noblest, the most upright, the most benevolent, and the most liberal of all philosophers". ³ Thomas Constable quoted one of Playfair's friends as describing the Professor as "one of the most amiable

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1. Thomas Thomson, the chemist, wrote to Lord Minto on July 24th, 1819, after Playfair had died: "I was at Kinnaird yesterday, and found that Mr Stewart was determined to be present (at the funeral) - much against the remonstrances of his family". (Cosmo Innes, *Memoir of Thomas Thomson*, Edinburgh, 1854, 163.)


and estimable of men; delightful in his manners, inflexible in his principles, and generous in his affections, he had all that could charm in society, or attach in private, ... and it was equally impossible that, under any circumstances, he should ever perform a mean, a selfish, or a questionable action, as that his body should cease to gravitate, or his soul to live". 1 Francis Horner did not have an affinity to Dugald Stewart alone among the Edinburgh professoriate. In his memoirs he wrote: "My greatest enjoyment in Scotland has been in the society of Mr. Stewart and Mr. Playfair who have been growing younger all the while that their pupils have been turning gray, and are in such good health, and such ardour of study that the world will probably have the benefit of many years of their labour. It is a gratification which I enjoy more than I can describe, to be admitted to the confidence and unrestrained conversation of two such sages, who first imparted to me a true relish for literature. 2

Playfair was well liked as a person and appreciated as a teacher. There was divided counsel among his contemporaries as to whether he was merely an outstanding teacher and expositor like Stewart, or whether there was a spark of genius and originality about him. It will become clear when his geological accomplishments are considered as well as those in mathematics and natural philosophy, that he was primarily a gifted teacher and expositor. Francis Jeffrey believed

Playfair to be an intelligent judge of the achievements of others. 1

The Edinburgh Magazine believed he was "the most eloquent expounder of that great and magnificent system of knowledge which has been gradually evolved by the successive labours of so many gifted individuals". 2 A very different assessment was made by a fellow scientist and president of the London Royal Society, Sir Joseph Banks. When Playfair died, Banks wrote to Thomas Allan, the mineralogist, on the subject of who would succeed Playfair: "it is not to be Propd or Expected that so original and so superior a character as Playfair had created for himself, could be Found to succeed him. Original, creative merit is always a scarce article if one among your 26 Professors obtains it The University cannot Fail of deriving honor." 3

The Edinburgh Magazine believed Playfair's character as well as scientific accomplishments enabled him to play his part in the late Enlightenment University: "For we are ourselves persuaded that his personal character has almost done as much for the cause of science and philosophy among us as the great talents and attainments with which it was combined, - and has contributed in a very eminent degree to give the

1. Francis Jeffrey, "Biographical Account of the later Professor Playfair", Works of John Playfair, I, lxiv. When Stewart was making his suggestions for the Encyclopaedia Brittanica dissertations in 1812, he wrote to Archibald Constable that Playfair should write the historical sketch of the progress and present state of modern discoveries in Mathematics and Physics: "Mr Playfair is the only person in the country who can do justice to the first of these subjects, and also the best adviser you can consult about the writers to be employed in the other two departments (Chemistry and Natural History)". (Thomas Constable, Archibald Constable and his Literary Correspondents, 3 vols. Edinburgh, 1873, II, 320n.) Constable on at least two occasions gave Playfair gifts in return for his services - "six dozen of very fine old sherry" in 1812 (Constable, II, 323) and "a Large Paper Copy of our Edition of Swift's Works". (Constable to Playfair, August 31st, 1814, N.L.S. MS. 789, 107).

2. "Some Account of the Character and Merits of the late Professor Playfair", The Edinburgh Magazine and Literary Miscellany, V (1819), 163.

better society of this our city that tons of intelligence and liberality by which it is so honourably distinguished. Of all the people since the time of Hume and Robertson no one had so powerfully contributed to the connection between Edinburgh's learned and fashionable world.

Posterity is dependent for biographical details of Playfair on the account appended to his Works by his nephew, James. Playfair's memory is also not helped by the fact that his papers were left in bad condition. Leonard Horner wrote: "Playfair has left no manuscripts in a state fit for publication, and very few of which any use can be made".

John Playfair was born at Benvie, near Dundee, on 10th March 1748 and went to St. Andrews to qualify for the Church. There he showed several signs of progress in the mathematical sciences: he substituted while still a student for the ailing Professor of Natural Philosophy, William Wilkie; when aged 18, he went through an eleven day trial as a candidate for the St. Andrews chair of Mathematics and came third in a field of five. After leaving St. Andrews he spent much time in Edinburgh until he was given his father's livings of Liff and Benvie in 1773. In his spare time he prosecuted his own studies and came to know such eminent figures as Nevil Maskelyne, the Astronomer Royal. In 1782 he resigned his livings to become tutor to Robert Ferguson of Raith and his brother, Sir Ronald. This gave him the opportunity to reside in Edinburgh and visit London where Nevil Maskelyne, the Astronomer Royal, introduced him to the scientific world.

2. Ibid., V, 167.
4. Both brothers played a significant part in Leslie's career and are discussed later.
In 1785 Playfair became Professor of Mathematics at the University of Edinburgh. He was a prolific writer on a wide variety of subjects - biographical memoirs such as that of Dugald Stewart's father, the mathematician; works on barometrical measurements, Indian astronomy and porisms. He also wrote text books for his class. In 1805 he succeeded Robison as Professor of Natural Philosophy; he continued to write, became a fellow of the London Royal Society in 1807 and succeeded Robison as Secretary to the Edinburgh Royal Society. He travelled considerably in Britain and on the Continent undertaking research and died after completing no less than thirty-four years as an Edinburgh professor, in 1819.

A brief mention of his writings gives some clue to Playfair's breadth of interests. They can also be seen by examining both the catalogue of his Library and the Wellesley Index attributions to him for the Edinburgh Review. Apart from the large number of works on mathematics, natural philosophy and geology his Library contained works of poetry, army manuals, treatises on weapons, history, moral philosophy, works on British rule in India, travel, geography, Gaelic proverbs, education and the phenomena of vision. His articles in the Edinburgh Review were mostly concerned with mathematics, natural philosophy and geology but he also wrote on military matters, Mme. de Stael's Corinna, the deficiencies of Oxford and Cambridge and Travel. He wrote no less than sixty articles in fifteen years and many of the articles

1. According to the Oxford English Dictionary, a Porism is "A proposition affirming the possibility of finding such conditions as will render a certain problem indeterminate, or capable of innumerable solutions".
were concerned with disseminating the latest discoveries in the fields. It can, therefore, be said that the Review was almost as important in disseminating scientific information as in purveying Whiggery and economics.

Of some of Playfair's writings, Robert Heron observed:

"None of the valuable papers in the volumes of the Philosophical Transactions of Edinburgh, have been quoted, or with higher applause than that fine specimen of mathematical reasoning applied to Physics, which Mr Playfair has exhibited in his Paper on the Measurement of Heights and Distances by the Barometer, or that skilful mixture of mathematics and Fine Writing which he has displayed in his Essay on the Indian Astronomy; A science, in which his genius can make important discoveries and in which his accuracy enables him to confirm the discoveries, or to explode the fallacious theories of others, seems to be no less indebted to him for his successful efforts as a Teacher, to render it more popular than it has yet been among our Scottish youth".¹

Once a Professor of Mathematics Playfair could indulge one of his hobbies manifested in his Library and reviews, namely interest in military and naval tactics. He instituted a third mathematics class in 1792-1793 and taught therein Astronomy, Gunnery and Fortification, Geography and Navigation.² Perhaps his most important contribution, however, as a Professor of Mathematics was his desire to make known to the British the discoveries of the Continental mathematicians and show how they had developed Newton's ideas. His appeal to the wider world is discussed below but he did incorporate Continental discoveries into

1. Robert Heron, Observations made on a Journey through the Western Counties of Scotland, in the autumn of 1792, 2 vols (Perth, 1792), II, 494.
2. Evidence, I, 109 and College Minutes, III (1812-1824), 376, March 29th, 1823.
his Edinburgh mathematics lectures.¹ This meant that the University of Edinburgh was offering a course, which in its time was consonant with the latest research.

Playfair’s Natural Philosophy curriculum was given in his *Outlines of Natural Philosophy* published in 1814 as a guide for his students. The first volume dealt with Dynamics, Mechanics, Hydrostatics, Hydraulics, Aerostatics and Pneumatics. The second volume was entirely devoted to Astronomy while the third, which was never completed, was to have embraced Optics, Electricity and Magnetism.

Playfair was concerned not only that he should be informed about the latest developments in his subject but that he should have the necessary equipment to teach his students. He once wrote to the Town Council asking for money for his Natural Philosophy class, giving three reasons why it was needed. The first was that Natural Philosophy was an expensive subject to teach; the second that instruments tended to dilapidate and the third that improvements and discoveries were being made all the time and so the cost of the required instruments increased.² Two years previously, he had asked for a working model of the steam engine, a Bramah’s Press and an air glass.³ He received some £170 from the Town Council for instruments and apparatus and help towards their repair.⁴

¹ *Edinburgh Magazine*, V, 163: “We believe, we hazard nothing in saying that he was one of the most learned mathematicians of his age, and among the first, if not the very first, who introduced the beautiful discoveries of the later Continental geometers to the knowledge of his countrymen, and gave their just value and true place, in the scheme of European knowledge, to those important improvements by which the whole aspect of the abstract sciences has been renovated since the days of our illustrious Newton”.

² Dohn Playfair, letter dated September 21st, 1809, in Edinburgh City Chambers.


⁴ This figure calculated from evidence submitted to the 1826 Commission and printed in *Evidence*, I, 1717.
Another venture with which Playfair was concerned, and which furthered the cause of science and the reputation of the University was the establishment of the Astronomical Institution. In February 1812, the University Senatus considered a proposal from the Town Council that such an institution should be set up. The Senatus agreed with the proposal on the specific grounds that it would be useful to the progress of the physical sciences and to the interests of the University.\(^1\) Playfair became President of the Astronomical Institution and the summer of 1816 saw the beginning of the construction. While by 1830 there was a "most elegant Observatory" albeit without instruments, the idea was nevertheless established early, that facilities would be available for students to be given instruction in Practical Astronomy.\(^2\) Under the regulations of the Institution, the Professors of Natural Philosophy, Mathematics and Practical Astronomy could introduce students both to the Observatory and to the Physical Cabinet.\(^3\)

Playfair showed great general concern for the standards of the University as well as for the two chairs he held. For example, in January 1816 he drew the attention of the Senatus to the loss sustained by the University by the discontinuance of lectures on Civil History. As a result of his protest, the Senatus resolved that all classes instituted by the University were for the express purpose of enabling students to acquire information on the most important branches of knowledge. Furthermore it was hurtful to the reputation of the University

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3. *Evidence*, I, 111. The Physical Cabinet was the collection of apparatus used by the Natural Philosophy class.
that classes should cease to be taught or should never have been lectured to by the present holders of the chairs.\(^1\) These resolutions showing intolerance of laxity were in marked contrast to the lack of vigilance at Oxford and Cambridge.

Playfair also supported the appointment of Leslie to be his successor as Professor of Mathematics in 1805. He adopted the same line as Stewart and said that it would be an innovation not only at the College of Edinburgh but at any other College in Scotland for a Professor of Mathematics to be a clergyman. His reason was that the series of Edinburgh mathematics' professors would do honour to any literary institution in Europe. None of them thought to unite his academic office with any other duty, but all devoted their whole minds to Science - "the Professor of Mathematics should be at liberty to devote himself entirely to science, without being perpetually drawn aside from his Academical labours by the demands of a higher and more imperious duty".\(^2\)

Again Playfair's emphasis and interest appears to have been concern for academic standards.

Playfair's popularity as a teacher can be seen in his class attendance figures:

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<table>
<thead>
<tr>
<th>Year</th>
<th>Maths</th>
<th>Total Lit. &amp; Phil.</th>
</tr>
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<tbody>
<tr>
<td>1794</td>
<td>72</td>
<td>395</td>
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<tr>
<td>1795</td>
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<td>1796</td>
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<td>1797</td>
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<td>372</td>
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<td>1798</td>
<td>72</td>
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<td>83</td>
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<td>1803</td>
<td>79</td>
<td>384</td>
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<tr>
<td>1804</td>
<td>108</td>
<td>445</td>
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<td>1805</td>
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<td>1806</td>
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<td>1807</td>
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<td>1808</td>
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<td>207</td>
<td>783</td>
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<tr>
<td>1818</td>
<td>223</td>
<td>852 1</td>
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</tbody>
</table>

As with Stewart, his students ranged from Lord John Russell to lesser mortals. William Pulteney Alison, Lord Ashburton, Richard Bright, Lord Brougham, the Horner brothers, Lord Minto, Macvey Napier, Lord Palmerston and the Earl of Radnor were among those who heard both Stewart and Playfair.

1. These lists culled from Evidence, I, 1287 and 1307-1431. Leslie substituted for Playfair in 1816.
Playfair's reputation invaded the citadels of Oxford and Cambridge in more ways than his attacks on their teaching of mathematics and physics. Francis Horner introduced a Mr Richard Napier, of All Souls', Oxford, to Thomas Thomson, the Edinburgh chemist, in 1811. Horner specifically mentioned that Napier was "going to Edinburgh chiefly to attend Playfair's lectures". 1 In 1802, Horner himself and Palmerston were both attending the mathematics class. Palmerston wrote to his father that he was having to do algebraical exercises 2 while Horner wrote in his Journal that he had specific reasons for doing Playfair's course of fluxions and higher geometry: "It is not with a view, however, to mathematical knowledge merely, or even to a future intimacy with physical science, that I have resolved to place myself under Mr Playfair; but as forming a necessary part of that survey, in which I have occasionally been employed for two or three years past, of the general field of the sciences, and of the logical methods that are suited to various investigations". 3

Playfair had two aristocratic students in particular, who in different ways illustrated a function which the University was playing at this time — Lord Webb John Seymour and Lord John Russell. Seymour was the brother of the eleventh Duke of Somerset who originally came to Edinburgh in 1799 because of the difficulties of Continental travel. In April 1801 the reason was still operative; Horner wrote of Seymour: "He lately came to the resolution of passing another year here in Edinburgh, as the political situation of the Continent is still unfavourable to

1. Innes, Thomson, 125.
travellers, and as in that time he may prosecute pretty far his mathematical studies under Mr Playfair. Less than a month later, Seymour himself was writing to Henry Hallam, the historian, of the reason that was to become the determining factor in keeping Seymour in Edinburgh until his death in 1819: "Playfair has been my guide in Mathematics. I think myself extremely happy in having so good a one. He has a profound knowledge of the subject, and our intimacy has afforded me opportunities of discussing all my difficulties with him under as little restraint as I should have felt with another person of my own age, with whom I might have been pursuing the study." Once in Edinburgh, Seymour, evidently with time and money on his hands, spent both in studying the sciences - mathematics, physics, chemistry, mineralogy, geology, botany. Clearly a spur to much of his interest was his friendship with Playfair: Cockburn wrote that the two men were inseparable and used to be called husband and wife. Their particular joint interest was geology.

Lord John Russell's attendance at Edinburgh was for reasons akin to those of Palmerston. Russell wrote in 1874: "When I returned from Spain in 1810 I asked my father to allow me to go to the University of Cambridge. But he told me that in his opinion there was nothing to be learnt at English Universities, and procured for me admission to the house of Professor Playfair at Edinburgh." Russell

1. Ibid., I, 95. Entry in the Journal dated April 26th, 1801.
3. Ibid., I, 48.
5. John, Earl Russell, Recollections and Suggestions 1813-1873, 2nd ed. (London, 1875), x. This is a quotation from the Preface to the first edition written on October 30th, 1874.
himself had been put under pressure by two men well acquainted with the advantages of Edinburgh, Lord Holland and his physician, John Allen. In 1808-1809 Russell had accompanied them to Spain and Portugal, during which journey Allen tutored him in Classics. Russell wrote to his father, the Duke of Bedford, that he would like to learn Greek on his return: "I do not know what you will think best for me afterwards; but the thing I should most dislike, and, I think, least profit by, would be an endeavour to acquire Scotch knowledge in a Scotch town. Political Economy may surely be studied in England. As for metaphysics, I cannot even understand the word". 1

About three months later Holland's and Allen's influence was perceptible: "They say," wrote Russell to his father, "that I am as yet too young to go to an English university; that I should learn more there in the meantime than I should anywhere else; that Professor Playfair besides being a learned is a very pleasant man, and that I should pass my time very agreeably with him. I own I am convinced by their arguments, though I said before that I should so much dislike it. Mr Allen says that, ... it would be very foolish to take any tutor there from England, and that it would be necessary beforehand to learn the elements of algebra, trigonometry, and conic sections". 2

Spencer Walpole, Russell's biographer, wrote that the Duke knew what was best for Russell since Lord Tavistock had gone to Cambridge and received only a "pretended education". 3 Even after Russell had finished at Edinburgh the Duke was writing, with reference to Cambridge: "I can see no possible benefit likely to result from it, except you call

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2. Ibid.
3. Ibid.
the various excellences attending the sciences of horseracing, fox-hunting, and giving extravagant entertainments, an advantage, as these, I believe, are the chief studies of our youth at Cambridge".¹

Russell, who remained as a lodger with Playfair from 1809-1812, spoke of him as "one of the most delightful men, and at the same time one of the most profound mathematicians of his age and country. The simplicity of his manners and the elevation of his sentiments were very striking. He was a very zealous lover of liberty and I have often heard him say that if we could be governed by angels it would be a misfortune for mankind, as they would thereby be induced to dispense with those exertions of mind and heart which are the causes of the greatest works of science and of letters, and the noblest efforts in behalf of the freedom, improvement, and civilization of the world".²

During the summer of 1811 Playfair and Russell, at the instigation of the Duke of Bedford, toured the English manufacturing towns. In suggesting the plan originally Bedford wrote: "I confess it would be a great satisfaction to me if he [Playfair] could bring it within his arrangements to make a tour with you... You might employ with great advantage a few weeks in visiting the interesting and busy scenes of Birmingham, Manchester, Nottingham, Sheffield, the great commercial mart at Liverpool, &c.,".³

The assessments of Playfair as a teacher from varied viewpoints are uniformly favourable. His colleagues in the Senatus had an occasion to defend him from attack and agreed that no one could be

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¹ Walpole, I, 46. Tavistock was Russell's brother.
² Ibid., I, 60.
³ Ibid., I, 46.
⁴ Ibid., I, 57.
instructed in mathematics to greater advantage than by Playfair. He demonstrated propositions, examined pupils every day and required his students to demonstrate propositions again in the presence of their Professor and fellow students.\textsuperscript{1} The Senatus also commended his visit to the Continent in 1816 believing it of very great benefit to the scientific world.\textsuperscript{2} Francis Jeffrey considered that Playfair helped students to simple and luminous methods of inquiry, imbued their minds with a relish for the truths of the study and saw that they were never perplexed by petty difficulties.\textsuperscript{3} James Playfair's comment on his uncle's mathematics teaching was that he had been inspiring because he set numerous exercises and rewarded the diligent by naming them before the class: "In this way, he encouraged the habits of investigation of the greatest value, even to those who regarded mathematics only as a part of their general education; while for the benefit of those who wished to cultivate the higher branches of the science, he taught at intervals a third class, rendered doubly valuable by his intimate and masterly knowledge of the modern analysis, at that time so little attended to in Britain". Many older people attended Playfair's third class and presented him with an Astronomical circle which was placed in the Astronomical Institution.\textsuperscript{4}

Playfair had a particular part in the dissemination of eighteenth century developments in the mathematical sciences. Towards

\textsuperscript{1} College Minutes, II, 51-53, January 1st, 1793. A pamphlet by a J. Johnson, entitled \textit{A Guide for Gentlemen studying Medicine at the University of Edinburgh}, had attacked Playfair. "J. Johnson", was purported to be Professor Alexander Hamilton, the Professor of Midwifery.

\textsuperscript{2} College Minutes, III, 124-126, July 29th, 1816.

\textsuperscript{3} Jeffrey, "Playfair", Works, I, lxv.

\textsuperscript{4} Works of John Playfair, I, xxii-xxii.
the end of the seventeenth century two refinements in processes for
dealing with quantities having a non-linear variation had been made -
Newton's Methods of Fluxions (1671) and Leibniz's essay on calculus
(1648). While Newton's method was more geometrical, that of Leibniz
was more algebraical. Eighteenth century England clung to Newton, while
the Continent adopted the "simpler and more workmanlike notation of
Leibniz". During the eighteenth century there were five areas of
progress and cultivation on the Continent - the extension and systemat-
ization of the calculus and its application to physical problems; the
establishment of the calculus of variations; the development of the
theory of probability; progress in algebra and related problems; and
progress in geometry and trigonometry.

The significance of Playfair and thence of the University
of Edinburgh to the situation was in his appreciation of the Continental
developments. One of his most celebrated reviews was that of Pierre-
Simon Laplace's Mécanique Céleste. There he traced the principle
improvements to Newton's astronomy - Euler's applications of algebra
to trigonometry which were of special use in physical astronomy, and
D'Alembert's improvement of the integral calculus. This improvement
could be used for everything related to the motion of fluids as well as
for physical astronomy. Playfair also noted Lagrange's Calculus of
Variations and D'Alembert's discovery of the mechanical principle

2. J.F. Scott, "Mathematics through the Eighteenth Century", Natural
Philosophy through the Eighteenth Century and Allied Topics, ed.
Allan Ferguson, (London, 1948), 68.
which bears his name. He delineated Joseph-Louis Lagrange, Jean Le Rond D'Alembert, Alexis-Claude Clairaut, Leonard Euler and Laplace as those whole contributions had enabled Newton's work in physical astronomy to be completed. All their reasoning had been algebraical and indeed algebra had more than assisted geometry, it had replaced it.¹

Having given his account of the completion of Newton's work, Playfair then bemoaned the fact that "In the list of mathematicians and philosophers to whom [physical astronomy] for the last sixty or seventy years has been indebted for its improvements, hardly a name from Great Britain falls to be mentioned".² British mathematicians ignored great problems, such as lunar theory to assist navigation, and those mathematicians who might be mentioned were all noted for their preference for geometrical methods.³

Playfair continued by criticising the English mathematical scene - that until recent years "calculus of the sines", "the method of partial differences", "general methods of integrating differential or fluxionary equations", "the criteria of integrability", "properties of homogeneous equations" and improvements to Newton's doctrine of fluxions - all were unknown.⁴ Playfair maintained that there were not more than a dozen men in Britain who could read Laplace.⁵ He blamed attachment to old methods and the state of Oxford and Cambridge where "invention finds

² Works, IV, 321.
³ Ibid., IV, 321-322. He quoted as an example of geometrically minded mathematicians Matthew Stewart, father of Dugald.
⁴ Ibid., IV, 323.
⁵ Ibid., IV, 324.
no exercise; the student is confined within narrow limits: his curiosity is not roused; the spirit of discovery is not awakened". ¹

In his review of Robert Woodhouse's *Trigonometry*, Playfair also attacked the English neglect of trigonometrical analysis.² He showed how Euler's *Arithmetic of Sines* had applied algebra to trigonometry.³ He quoted other work on trigonometry - Louis Bertrand in Geneva in 1778, Leonard Euler in St. Petersburg in 1779 and Sylvestre-François La Croix in Paris in 1798.⁴ Playfair was aware of the latest research. England lagged behind because she did not adopt the Continental improvements. This was the basis of his criticism of Nevil Maskelyne, the Astronomer Royal, when he saw him in 1782. They had met some years previously on a mountain expedition in Perthshire but even in the 1780s Playfair was voicing criticisms which he published almost thirty years later in the *Edinburgh Review*: "Maskelyne is an excellent observer, and a good mathematician. He is much attached to the study of geometry and I am not sure that he is very deeply versed in the late discoveries of the foreign algebraists. Indeed, this seems to be somewhat the case with all the English mathematicians; they despise their brethren on the Continent, and think that everything great in science must be for ever

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3. *Ibid.*, XVII, 124. Playfair noted that many mathematical questions required reasoning about a quantity while it was still unknown. Such reasoning made it known. The reasoning had to be analytical rather than a process of *numerical computation*. Algebra could be analytical - arithmetic could not. Trigonometry could only be analytical if algebra was applied to it.
confined to the country that produced Sir Isaac Newton. Dr. Maskelyne, however, is more than almost any of them superior to this prejudice.¹

Playfair's contribution to the significance of the University at this time lay in his personality, his breadth of interests and his being well-informed. He was interested in the welfare of the College as was seen in his championing Leslie and seeing that lectures offered by the University were indeed taught. He was a good teacher - he gave his students regular exercises and explained complicated matters carefully. More than that, however, his incorporation of the latest Continental research into his courses would ensure that his students were pursuing knowledge under the guidance of one thoroughly concerned with making the whole of Britain familiar with the most recent mathematical and physical discoveries and methods. Such teaching made mathematics and physics popular because they were not seen as disciplines mummified since Euclid or Newton, but subjects that were developing at the time and that were of practical relevance.

III

Sir John Leslie was a perfect foil to Playfair as a man of science and teacher of youth. While Playfair had excelled as a teacher but contributed little in the way of original research Leslie was a genius in physics, but a poor expositor. Edinburgh students wrote great praise of Leslie in 1823. They admired his great scientific

¹ John Playfair, Extract from his Journal, in Works, I, lxxviii. On the same trip he met Samuel Horsley whom he described as "the head of the English mathematicians". He also met with a prejudice among the English clergy that was to raise its ugly head among the Scottish clergy with the Leslie Case in 1805. "For it is certain that there is at present a prejudice among the English clergy that natural philosophy has a tendency to make men atheists or materialists". (Ibid., I, lxxix).
discoveries and prodigious knowledge; but, they continued: "There are limits, however, to nature's munificence. Her gifts are dispensed in as different proportions as there are objects to receive them; and lavish as she has been in bestowing on Mr Leslie, the highest intellectual endowments of which our nature is susceptible, she has bestowed on him, in a very inferior Degree, some of the most important qualities necessary to the successful discharge of his office as a teacher of science. The truth is, that this gentleman has, unfortunately, a tedious and unequal elocution, which requires the whole attention to be often painfully strained, in order to comprehend and follow his discourse; while the multiplicity and endless variety of his knowledge seem absolutely to encumber and embarrass him, and he becomes the worst communicator of information, from the very circumstance which would seem to qualify him to be the best, by labouring under what the French denominate L'embarras des richesses - all that confusion which originates in the possession of too great a profusion of 'mental wealth'."* 

Macvey Napier who wrote the biographical notice of Leslie in 1836 considered his subject a genius. He judged Leslie in his own terms for Leslie has said: "Discoveries in science, are sometimes individually referred to mere fortuitous incidents. But the mixture of chance in this pursuit should not detract from the real merit of the invention. Such occurrences would pass unheeded by the bulk of men; and it is the eye of genius alone that can seize every casual glimpse, and discern the chain of consequences". On which Napier commented:

1. *The Edinburgh University Journal and Critical Review*, I (1823), 30. Leslie complained to the Commissioners for College Buildings about the acoustics of his classroom: "The echo of the voice ... is a very serious evil, repulsive to the students and highly prejudicial to my pecuniary interests". (College Commissioners' Papers, 1816-1826, Edinburgh City Chambers, letter dated February 12th, 1824.)
"With genius of this sort he was richly gifted. Results overlooked by others were by him perceived with a quickness approaching intuition."¹

Napier listed Leslie's intellectual qualities as "vigor and inventive genius", "extensive and varied knowledge", "active curiosity" and "excursive reading".² Leslie was no narrow minded scientist — his Library reveals the range of his interests. It comprised "a most extensive collection of Valuable Works, in Mathematics, Philosophy, Philology, Classics, History, Antiquities, Agriculture, Voyages and Travels, &c. &c. foreign and English. Also, a collection of fine paintings and engravings, Larkins' models of crystals, Tassie's casts of Gems, &c."³ Among his paintings were twenty-four portraits in Greek style⁴ and he also kept sucking pigs.⁵ He possessed extensive knowledge of Scottish History which prompted Napier to write: "The ingenious mathematician, the original thinker and discoverer, the rich depository of every known fact in the progress of science, would have appeared to anyone ignorant of his name and character, and who happened to hear him talk on this subject, as a mere antiquary; or, at best, as a curious and indefatigable reader of history, whom nature had blessed with at least one strong faculty, that of memory".⁶

While the University had every reason to be proud of Leslie, he was very much aware of the College's importance. At the

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2. Ibid., 47.
4. Ibid., 87.
5. Leslie wrote to Adam Black, the bookseller, on March 30th, 1830: "I send you a sucking pig, of which I beg your acceptance. It is the second line of progeny from my Neapolitan stock". (N.L.S. Ms. 3713, f. 41).
dinner given to Brougham in 1825, Leslie made a speech.\footnote{This dinner was mentioned in Chapter One. Brougham had just become Rector of Glasgow University.} The occasion was, doubtless, one where the wine flowed freely and this might have explained the euphoria of his language were it not that he had written out his speech beforehand: "The University of Edinburgh's influence has extended far beyond the immediate sphere of application; it has elevated the character of our countrymen, improved their skill and stimulated their native energy". He went on to explain how the University had accomplished these achievements: "Instead of repelling from her gates the approach of new opinions she has carefully watched the progress of knowledge, and has led the way in modelling the great reforms in the system of modern education. She was the first to embrace the Newtonian Astronomy - and the first to apply the logic of induction. But her highest merit was to transpose the principles of philosophy into the maxims and conduct of life. The benefits resulting to society from this happy application of science are quite incalculable."\footnote{The MS. notes of Leslie's speech are preserved in N.L.S. MS. 331, f. 189.}

Earlier in his speech he had spoken of his work for the University (which, as will be seen below, was considerable) and how he had benefitted from her fame: "To have my name Sir, associated with the glory of this flourishing University is the limit of my ambition. For many years I have been closely connected with her interests, both as student and professor I have always taken a deep concern in her prosperity and have constantly directed my humble exertions to support her acquired reputation. Nor shall I forget the proud satisfaction which in foreign lands I have repeatedly enjoyed from the reflected lustre of her fame."\footnote{Ibid., f. 188.}
Leslie's words contained sufficient humility for the occasion but in fact he enjoyed a greater reputation on the Continent for his research than he did in England. In the summer of 1814, he visited France and the Netherlands and wrote back two similar letters - one from Paris and another from Lyons. The first, to an unknown correspondent, said: "you know that it was not my intention at present to mix much with the Scavans. But I have been so well received and feasted by them, that I may perhaps depart a little from my previous design. Humboldt has been very kind and attentive to me, and introduces me wherever I want. They are much better acquainted with what we are doing than I should have imagined. My book on Heat is better known than in England. I was even reminded of some passages in it which in England were considered as fanciful, but which the recent discoveries on the Polarity of Light have confirmed. Even Laplace has, in consequence of some observations of mine, silently omitted a passage in the last edition of his *Système du Monde*."

In the second letter to his brother, Alexander, he wrote: "It was not my intention at first to spend much time or to seek the acquaintance of the philosophers of this country; but at Paris I was received with such distinction and feasted by them that I changed my plan. I have made many new and interesting acquaintances. Indeed, I found my writing better known in France than in England and my name alone has everywhere served me as the very best passport. They have even gone so  

1. Letter dated from Paris, August 1st, 1814 and reprinted in Napier, *Leslie*, 32. Frederic-Henri-Alexandre Humboldt (1769-circa 1852) was a geologist, traveller, explorer, geographer, ethnographer and natural historian. He was described by the *Nouvelle Biographie Générale* as "le plus grand savant de notre époque".
far as to announce my arrival in the Gazette de France and to distinguish me from the crowd of my countrymen".  

In 1818, Leslie was writing to James Brown, Professor of Natural Philosophy at St. Andrews, to tell him that his book on Geometrical Analysis had not only been translated into French but adopted in their elementary systems - "This is an honour which I believe they have very seldom bestowed". He was a member of the Edinburgh Royal Society but never of that of London. In 1820 he was made a Corresponding Member of the Institute of France. London accorded him belated recognition in 1831, the year before his death, when he was made a Knight of the Order of the Guelphs, along with several other famous scientists - Sir John Frederick William Herschel, Charles Babbage, James Ivory and David Brewster. Charles Bell, the surgeon, who was knighted at the same time, wrote of these awards: "The intended batch consisted of Herschel, Babbage, Leslie, Ivory, and Brewster, the object being to show respect from Government for men of science, and it was determined that the Guelphic Order should become the mark of distinction for scientific men. We shall soon see what comes of this!"  

Leslie's father was a joiner and cabinet maker who was only enabled to send his son to the University of St. Andrews because the Chancellor, the Earl of Kinnoull offered to defray the expenses.  

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Leslie remained at St. Andrews from 1779-1784 before leaving to study Divinity at Edinburgh - a condition of Kinnoull's offer. Leslie had always preferred science to Divinity and he was able to indulge himself when Kinnoull died. He continued studying till 1787 and maintained himself by tutoring pupils including Adam Smith's nephew. In 1788 he left for two years as tutor to the Randolph family in Virginia and on his return in 1790 took up literary work for the Monthly Review and for William Thomson, who was continuing a History of Philip III. Adam Smith had given him a recommendation for this literary work in London. Subsequently he became tutor to Thomas Wedgwood, son of the potter and at Etruria, the Wedgwood home, he was able to undertake his research. In the 1790s too, he made journeys to Holland, North Germany including Prussia, Switzerland, and Scandinavia and from 1801-1802 he was collecting all the necessary apparatus for his treatise on Heat at his home in Largo, Fife. His research was completed in 1804.

For Napier "it would be difficult to name any work in the whole range of modern science more strongly indicative of a vigorous and inventive genius".¹ For the Royal Society of London it was sufficiently good for a unanimous award of the £60 gold and silver Rumford Medals in 1805. Sir Joseph Banks, then President of the Royal Society, wrote to tell Leslie that he was "the person who has done most towards the improvement of the knowledge of heat and light".² With this boost to his reputation John Leslie became a candidate for the Mathematics Chair at the University of Edinburgh. Robison had died and Playfair had succeeded him in the Chair of Natural Philosophy.

¹. Ibid., 19.
². N.L.S. Ms. 331, f. 201. The letter is dated February 8th, 1805.
The story and significance of the Leslie Case have been recounted frequently. Dr. Ian Clark has shown that the fundamental issue at stake in the controversy were the ancient right of the clergy to supervise education; the right of Edinburgh ministers to advise on academic appointments; the propriety of clergymen holding both livings and academic appointments; the nature and tendency of Hume's philosophy and the relationship of natural and revealed religion. The controversy was one that had repercussions for the Church of Scotland. The impact on the University of Edinburgh was that Leslie won and became a Professor. The result boded nothing but good for the academic welfare at the University and ultimately for the benefit of society.

IV

The important factor in assessing John Leslie as Professor of Mathematics from 1805-1819 is that he was a natural philosopher at heart. Thus his efforts on behalf of the mathematics teaching at the University of Edinburgh are all the more commendable. His text book on geometrical analysis was entitled *Geometrical Analysis, and Geometry of Curve Lines*, being Volume Second of a *Course of Mathematics*, and designed as an *Introduction to the Study of Natural Philosophy*. The Preface of the book also revealed his true interest: "I must devote my

whole attention to the composition of a work of greater urgency and of
higher interest - The Elements of Natural Philosophy". 1

Being practical minded Leslie was more inclined to Geometry
than his predecessor. Playfair emphasized such department as algebra
and differential and integral calculus. Even in his Geometry Leslie
differed from Playfair who had been a Euclidean. Leslie wanted to reform
Euclid and Ellice M. Horsburgh has written: "Leslie wielded his new
broom among the time-honoured propositions of Euclid". 2

Geometry was Leslie's basis for a thorough overhaul of the
University's mathematics' course. His method of reform was to write a
series of text books which would present the student with a complete
outline. Hence, were published not only his Geometrical Analysis, but
his Rudiments of Plane Geometry and Elements of Geometry. His object
in teaching Geometry was "to unite theory with practice, to connect the
ancient with the modern discoveries, and to avoid the prolixity, without
departing from the strictness and beauty, of Greek demonstration". 3 The
English mathematicians had, as Playfair was fond of emphasizing, con-
sidered Newton a finished production. Leslie thought it wrong to
consider the Elements of Euclid as such: "That admirable work was
composed at the period when geometry was making its most rapid advances,
and new projects were opening on every side. No wonder that its structure
should now seem loose and defective. In adapting it to the actual state
of the science, I have therefore endeavoured carefully to retain the

1. John Leslie, Geometrical Analysis, and Geometry of Curve Lines,
(Edinburgh, 1821), ix.
2. Ellice Martin Horsburgh, "The Works of John Leslie 1765-1832",
Mathematical Notes published by the Edinburgh Mathematical Society,
(Edinburgh, September, 1933), ii.
3. John Leslie, Rudiments of Plane Geometry including Geometrical Analysis,
and Plane Trigonometry, (Edinburgh, 1828), iii.
spirit of the original, and have sought to enlarge the basis, and to dispose the accumulated materials into a regular and more compact system".\(^1\)

He criticised Algebra "or the Modern Analysis" because "the mechanical facility of its operations, has contributed, especially on the Continent, to vitiate the taste and destroy the proper relish for the strictness and purity so conspicuous in the ancient method of demonstration". Quite apart from any practical use it might have, Leslie believed that "The study of geometrical analysis appears admirably fitted to improve the intellect, by training it to habits of precision, arrangement, and close application".\(^2\) The object of mathematics in a course of liberal education was the training of the intellect.\(^3\) In holding such views, Leslie showed himself to be very much in the Scottish tradition: mathematics was not simply a mechanical facility but had a philosophical aim.

Given that Leslie devoted much time, trouble and effort into moulding the Edinburgh mathematics course according to his own ideas it is understandable that, when his successor, William Wallace, wished to resume a more traditional approach to the subject, Leslie should have taken umbrage. On September 21st, 1819, just after Wallace had been appointed to the Chair, Leslie wrote to Archibald Constable:

"I have received a long letter from Wallace which gives me a great deal of pain. Indeed, I regret that I ever quitted the Mathematical Chair, where everything was going on in the train I wished. Now it seems we are to relapse to the state it was twenty years ago. Wallace may fancy that I contemplate the diminished sale of my text books - but this scarcely enters my mind. What I shudder to think of is the total demolition of all my schemes of improvement".\(^4\)

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2. Ibid., viii.
3. Ibid., vi.
4. N.L.S. Ms. 331, f. 150.
Once Leslie began to undertake the duties of his Chair, he wrote to James Brown: "I have a very bad classroom and am very uncertain if I can contrive to get another for this session. The Town Council however seems very much disposed to accommodate me. In particular they promise to give me a sum of money for providing instruments".  
Four days later he wrote to the Lord Provost: "The mathematical class is extremely ill provided with instruments of every sort; and in the present highly improved state of the arts, it seems absolutely necessary to keep pace with the progress of the times. This would give a most decided advantage to public education. It would excite the youth, and relieve and heighten their more abstract studies by a constant reference to practice, and it would prepare them for entering with advantage on the active scenes of life. My great object is to render in every way the subject of mathematics more engaging and more generally useful". 

That same day Leslie received £100 for instruments and apparatus. Between 1807 and 1819 he received sundry sums for a drawing board - the purchase, hanging up, repair and staining of it. In September 1815 over £69 were given for apparatus and another £40 in June 1818. In total Leslie was granted nearly £230 for apparatus between 1805 and 1819. He had also given an original cast to the mathematics curriculum - one designed to modernize the geometrical side as Playfair had the algebraical; to be an effective part of a liberal education by training the mind and yet be of practical value. Leslie

3. Evidence, I, 1767-1771.
never completely subdued his practical bent while Professor of Mathematics, and he had no need to make the effort after 1819 when he moved to the Natural Philosophy Chair.

Macvey Napier criticised Leslie's teaching of Natural Philosophy because he lacked "consecution of thought, and that perspicuity of exposition, without which reasoning cannot be made intelligible, nor its conclusions satisfactory."¹ Dr. Thomas Stewart Traill, later Professor of Forensic Medicine at the University of Edinburgh, said:

"The attraction of his numerous experiments (a novelty), the celebrity of his name, and the opinion entertained of his extraordinary powers, joined with great simplicity and affability of manner, concurred to secure him the respectful homage of his students, and to sustain the glory of the University".²

It would appear that Leslie's appeal to the students was due to his scientific eminence rather than his teaching ability. Yet in the thought and care which he put into the Natural Philosophy curriculum and apparatus there is no doubt that he was a conscientious teacher.

In 1820, for example, Leslie wrote to the Commissioners for the College Buildings to complain about the room in which he was obliged to teach Natural Philosophy: "The room ... was quite low, inclosed on all sides, and never visited by the sun; it was therefore extremely dark, cold and damp - absolutely unfit for the exhibition of a numerous range of optical experiments, and indeed for all experiments that depend on the solar rays".³

¹ Napier, Leslie, 39.
³ Leslie to the Commissioners for College Buildings, April 26th, 1820, in College Commissioners' Papers, 1816-1826, Edinburgh City Chambers.
In 1823, he was elaborating to the Senatus why the Natural Philosophy course had to be re-thought. The subject was broadening and advancing while Logic or Ethics were remaining stationary or were consolidating. As a single course could not possibly do justice to Natural Philosophy, he proposed a two part course to be taken in successive years. The first part would consist of Magnetism, Electricity, Pneumatics and atmospheric phenomena and the second would cover Optics, Astronomy and Physical Geography.¹

For the first time it is possible to study a class that was actually being taught at the time of the 1826 Commission. (Stewart had retired in 1810, Robison and Playfair were dead, Leslie was no longer teaching Mathematics.) The Natural Philosophy curriculum in 1826 comprised twelve topics:

I Somatology (Properties of Matter)
II Statics (Conditions of Equilibrium)
III Phoronomics (Dynamics)
IV Physical Astronomy
V Mechanics
VI Hydrostatics
VII Hydrodynamics
VIII Pneumatics
IX Photonomics (Light)
X Pyronomics (Heat)
XI Magnetism
XII Electricity ²

1. College Minutes, III, 380-384. The meeting took place on June 16th, 1823.
It is clear that this was an enormous number of topics to be treated adequately in the short Edinburgh academic year. It was a course that was also similar to his mathematics course in that it had a strong practical bent. In his lectures on hydrostatics he explained the theory before concerning himself with "stowage of cargo, metacentres and their uses, water flow, and its application to water supply".¹

Leslie put his case to the Commission: "I labour under very great restraint at present," he said, "from the vast extension the subject has undergone, being progressively enlarging, insomuch that I conceive Natural Philosophy cannot now be taught with proper effect unless there are two courses, and this has been the practice of the Continental Universities for a considerable time back. Even in Mathematics we have at present three classes; and Natural Philosophy which is still more comprehensive, has unfortunately in our system been confined to one".² He also referred back to the suggestion he had made to the Senatus in 1823.

Leslie faced the problem by the cursory treatment of some subjects - he never omitted anything entirely. The Commission noted that this contrasted with Robison and Playfair who "were accustomed in different years, to leave out certain branches entirely; Optics, for instance, or Electricity, or Magnetism".³ Leslie also encouraged frequent attendance on his course by saving an interesting subject like Electricity for the end.⁴

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2. Evidence, I, 124.
4. Evidence, I, 133.
Dr. Traill was among those who considered Leslie's emphasis on experiments to be one of the virtues of the Natural Philosophy course. Leslie believed their exhibition to be "perhaps the only way to fix the ideas in the mind of the pupil; it gives him clear conceptions, and rivets the leading facts and conclusions in his memory. He associates the experiments with the principles intended to be illustrated by them".¹ He exhibited one thousand experiments a session and at the beginning experienced great difficulty in so doing without interrupting the lecture. However, he employed an Operator, James Lindsay, trained him and directed him by a sign to perform the experiment while the explanation was continuing.²

It was so that he could undertake the experiments on such a vast scale that Leslie stressed the importance of apparatus. To the 1826 Commission he could say that his apparatus was "more complete than any in this island now",³ and he emphasized the importance of a choice of apparatus "in the present state of the science".⁴ While his might be the most complete apparatus in Britain Leslie did not think it sufficient.⁵ He had spent £900 of his own money and £700 from public funds on it.⁶ In March and June of 1820 he received nearly £141 from the Town Council for furnishings for his Natural Philosophy classroom.

¹. Ibid., I, 126.
². Ibid. James Lindsay entered Leslie's service in 1814 and in 1819 became mechanical assistant to the Natural Philosophy chair. He helped Leslie and his successors in their experimental researches and was also in charge of the apparatus. (Edinburgh's Place in Scientific Progress, 17).
³. Evidence, I, 126.
⁴. Ibid.
⁵. Report, 134
⁶. These figures are from Report, 134 and Evidence, I, 158. The £700 is not explicitly stated in the second reference as coming from public funds.
and in April 1825 £100 for apparatus.¹ He told the 1826 Commission that he had had a water barometer (the only one in Europe) and a fountain, which he had acquired from the Commissioners for the College Buildings, fixed in his room. He needed £50 to clean his apparatus and keep it free from the effects of damp. He asked for a Physical Cabinet - a room for holding models and the larger and older instruments - especially as the Natural History collections "which are surely of less importance for the purposes of education, are spreading rapidly over the whole buildings, and deposited in departments fitted up at great expense".²

In July 1826 he wrote to the Lord Provost asking for £516:10:6d. towards the cost of apparatus. His plea for this money reiterated his general concern for his science and for the University: "This sum may, I confess, appear considerable but when the previous state of the apparatus is contemplated and the necessity of bringing to the level of the times in order to do justice to our institution it will not be viewed as extravagant". He continued: "I have devoted a large portion of my time and labour in contriving, ordering and inciting the workmen, and in pushing what I considered a National Object, I have made several pecuniary sacrifices . . .". He urged the Town Council to accept their responsibility: "While so many institutions are springing up in every quarter supported by zeal and the importunity of public subscriptions, it is the more incumbent on the Town Council to give that encouragement which is necessary in sustaining the dignity and supremacy

¹ Evidence, I, 1707.
² Ibid., I, 158-159. Evidence for the water barometer being the only one in Europe is in a letter of Leslie's to the Commissioners for College Buildings, dated February 12th, 1824 and to be found in College Commissioners' Papers 1816-1826, Edinburgh City Chambers.
of their University."¹ He had no doubts about the importance of his course in the Edinburgh curriculum: "It will be admitted, I presume," he wrote to the Commissioners for the College Buildings, "that Natural Philosophy bears the highest rank in the sciences; as it taught only in the University (no private lectures being attempted in that branch) it must be deemed of primary importance in this place,"²

Leslie could be grateful for what he did acquire. When he had moved into his new classroom he wrote to James Brown: "I have now a large splendid classroom with many conveniences - with gas lights, water fountains &c. and I have access through another large adjoining room containing the cases and apparatus by a stair to a platform on the roof".³ By the time of the 1826 Commission he was well provided with facilities and instruments, well-organized for his display of experiments and full of ideas for the reform of his course. He might not have had the eloquence of the other teachers of youth but the care and attention he gave to his class and to the pursuit of knowledge, makes him worthy of being counted with them.

"Scotland's engineers, who did so much in modernising Britain and laying the foundation of Britain's commercial power, raised at the same time their own little country to a proud position in the partnership. Leslie was one of the earliest contributors to this great expansion - national, commercial, and scientific" wrote E.M. Horsburgh in the centenary year of Leslie's death.⁴ Leslie's students indeed

¹ John Leslie to the Lord Provost, July 19th, 1826. This letter is in the City Council Records. Leslie must have been referring, in the last quotation, to the imminent threat of the University of London.
² Leslie to Commissioners for College Buildings, January 8th, 1820 in College Commissioners' Papers 1816-1826, Edinburgh City Chambers
⁴ Horsburgh, "Centenary", 215.
included some outstanding engineers. They were doubtless lured by the exciting prospect of Lindsay performing the experiments, and Leslie may well have been proved right when he spoke of the importance of experiments in driving home the principles of natural philosophy.

His class attendance figures were as follows:

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Nat. Phil.

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1. Figures culled from Evidence, I, 1287 and 1307/131.
An examination of Leslie's mathematics and natural philosophy class lists from 1805-1832 shows some interesting names - Josiah Wedgwood, the son of the potter, studying mathematics in 1811 and lodging with Playfair; Lord Marcus Hill, later third Baron Sandys, diplomat, M.P. and Treasurer of the Royal Household, studying mathematics in 1814 and also lodging with Playfair; and Gavin Milroy, later the medical writer and founder of the Milroy Lectureship at the London Royal College of Physicians, studying Natural Philosophy in 1822.¹

Leslie also taught men who may well have derived some practical benefit from his prelections on natural philosophy - Robert Stephenson, the locomotive engineer; Thomas Graham, the physicist, who did research on the diffusion of liquids and who has a part in the development of molecular physics;² James Nasmyth, the inventor of the steam hammer and the steam carriage that was tested on Edinburgh roads in 1827 and 1828;³ and two of the sons of Robert Stevenson, the engineer to the Northern Lights Commission, architect of the Bell Rock Lighthouse and designer of the eastern road approach to Edinburgh around Calton Hill.⁴

Clearly, engineers like Robert Stevenson as well as aristocrats thought Edinburgh a fit place for the education of their sons.

Robert Stephenson was the son of George Stephenson, the inventor and founder of railways. George was a self-educated man but he decided that his son, who subsequently became the founder of the modern

1. E.U.L. Ms. Da. 3.
2. Graham (1805-1869) spent five years at Edinburgh University under T.C. Hope, the chemist, and Leslie. He was made Master of the Mint in 1855. (Edinburgh's Place in Scientific Progress, 18.)
3. Ibid., 105.
4. Ibid., 109.
British railway system, should undergo practical training, and at Edinburgh University. Robert went to Edinburgh in October 1822 and did Chemistry under Hope, Natural Philosophy under Leslie and Natural History under Robert Jameson. Samuel Smiles explained in his Lives of the Engineers why Robert was sent to Edinburgh - "there being then no college in England accessible to persons of moderate means, for the purpose of scientific culture". T. Hudson Beare, who wrote the article on "Engineering" in Edinburgh's Place in Scientific Progress, thought that many difficulties had to be overcome by Stephenson in the course of laying out his railway systems and building bridges, and that he "had an advantage over other engineers of that time due to the courses in mathematics and science he had followed at Edinburgh University".

Robert Stephenson also benefitted from his time at Edinburgh in that George Parker Bidder, his collaborator on the London and Birmingham Railway from 1833-1838, was a contemporary of his. Bidder showed his gratitude to the benefits of his Edinburgh University education by the establishment in 1846 of the Jardine Bursary.

The two sons of Robert Stevenson who were educated at the University of Edinburgh were Alan and David. Alan graduated M.A. in 1826 and obtained under Leslie the Fellowes Prize as an advanced student in Natural Philosophy. Subsequently, he succeeded his father in 1843 as engineer to the Northern Lights Commission and designed ten lighthouses.

2. Edinburgh's Place in Scientific Progress, 104. Stephenson built the Britannia Tubular Bridge, the Victoria Bridge across the St. Lawrence at Montreal, two bridges across the Nile at Damietta and the high level bridge at Newcastle.
3. Ibid., 104-105.
including Skerryvore. His brother David would have been at the University only towards the end of Leslie’s life. He too was engineer to the Commission and did much civil engineering work in connection with harbours, rivers and docks. Robert Stevenson, the father, certainly knew Leslie and it is conceivable that they consulted each other. In August 1826 Leslie wrote to him asking if he might delay returning a lens he had borrowed as he wished to demonstrate some of his experiments to Sir James M’Cigor, Chief of the Army medical department.¹

Edinburgh University and Leslie did not then pretend to be a school of engineering: nonetheless, given that some self-made fathers were beginning to see the value of a systematic university education for their sons, there is no doubt that Edinburgh was the most suitable institution available. They would have received no purely mechanical education but would have attended at least part of a course which had a philosophical aim. Any technical knowledge would have been acquired simultaneously with intellectual training in "precision, arrangement, and close application". It appears from the evidence of Josiah Wedgwood, George Stephenson and Robert Stevenson that many fathers who had not had that opportunity themselves, wanted their sons to receive such an education. It so happened that their sons went to Edinburgh when a distinguished natural philosopher was a professor.

¹ N.L.S. MS. 785, f. 32.
This consideration of Sir John Leslie has necessitated the artificial isolation of his different functions - that of mathematician, physicist, teacher. It is necessary to turn now to Leslie the research scientist, for in this capacity he was also outstanding. His particular contributions to physical science at this time were in meteorology and artificial congelation, with the invention of instruments connected with these investigations. He has been considered as the founder of the science of meteorology. Long before he held the responsibilities of a university chair he was undertaking his researches.

In June 1795 he was writing to James Brown: "My conjectures and speculations with regard to the increased power of rarefied air to dissolve humidity, are fully verified . . . . I cannot yet see all the extent of the consequences which it involves. - One simple corollary [sic] is, that the air must grow continually damper until a certain height, beyond which it again becomes perpetually drier, and that this line of extreme humidity has a relation to the line of perpetual congealation. Hence, the serenity of the ethereal regions, inexplicable on the ordinary principles - Hence the limits of clouds, and the reason why these are generally lower in the colder climates, a fact ascertained".

In 1814 he published a book on weather prediction for farmers which emphasized his appreciation of the practical applications.

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of his work.\(^1\) The year before had appeared his \textit{A Short Account of Experiments and Instruments, depending on the Relations of Air to Heat and Moisture}.\(^2\) It was here that he described the various meteorological instruments he had invented - the Differential Air Thermometer, Photometer, Hygrometer, Hygrooscope and Atmometer.\(^3\) He invented an instrument other than those described in 1813. He wrote to James Brown in 1817: "I have been much occupied lately with a very interesting set of atmospheric observations - for which I have invented a new instrument - the Ethrioscope. The public will probably hear soon more particularly about this".\(^4\) It was intended to measure impressions of cold transmitted from the higher atmosphere.\(^5\)

There are two items of apparatus described in the illustration which were not to do with meteorology, but with artificial congelation. It was his researches and discoveries in this field that caused him to be described as "a pioneer in that vast branch of modern engineering, mechanical refrigeration".\(^6\) Leslie himself had great faith in the future of his discovery: "Such enormous powers of refrigeration seem to open a wide prospect of future discovery," he wrote in 1813 after describing his researches in detail.\(^7\)

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1. Remarks, for a series of years, on Barometrical Scales, showing they are inadequate to predict the Weather: the results of these observations exhibited and corrected upon a new and enlarged plan; as also, an improvement proposed on the Rain Gage; with a few hints of the effects on the weather, by the different directions of the Wind. Principally intended for the use of the Farmer. (Edinburgh, 1814).
2. Edinburgh, 1813.
3. see Xeroxed plate and description. Figures 1-8 are his meteorological instruments and 9-10 his process of artificial congelation. Until 1840 when it was succeeded by delicate electrical methods, his differential thermometer was the most superior device for measuring temperature. It is also worthy of note that the Atmometer was made, under Leslie's direction, at the Wedgwood factory in Staffordshire. More will be said about Leslie and the Wedgwoods below, but here is an interesting example of industry co-operating with a university scientist.
7. John Leslie, \textit{A Short Account of Experiments and Instruments, depending on the relations of air to heat and moisture}, (Edinburgh, 1813), 157.
DESCRIPTION OF THE PLATE.

Fig. 1. exhibits the Differential Thermometer, consisting of two connected tubes, terminated with nearly equal balls, containing air, and having interposed between them a portion of sulphuric acid tingered with carmine. When both balls are of the same temperature, the liquor remains steady; but if the one on the right hand become warmer than the other, the liquor will sink proportionally in the stem. The degrees marked on the attached scale, correspond to thousandth parts of the interval of heat between freezing and boiling water. If the left hand ball be gilt with silver leaf, the instrument is converted into a Pyroscope, which measures the quantity of heat darter by the medium of air, from a warmer surface.

Fig. 2. and 3. represent the Photometer, the former being portable and protected by an exterior wooden case, and the latter intended to be stationary. In both of them, the ball which receives the calorific impression of light is formed of black enamel, and the irregular influence of wind is entirely precluded, by means of a case of very clear glass.

Fig. 4. shows the thin porous cup, first used to serve the purposes of an hygrometer, and which had accompanying it a mercurial thermometer open at top, with a small reservoir to hold the surplus quicksilver.

Fig. 5. and 6. exhibit the Hygrometer, the former being stationary, and the latter portable, and protected by a case of wood or ivory, as in fig. 2. One of the balls consists of blue glass, and the other, which contains the supply of coloured liquid, is covered with some folds of tissue paper under a coat of azure silk. This covered ball being wetted and exposed to evaporation, the liquor soon marks, by its descent in the opposite stem, the dryness of the air.

Fig. 7. shows the Hygroscope: the thin tapering bulb, turned out of ivory, and having a glass tube inserted, is filled with quicksilver. When the atmosphere grows drier, this shell of ivory, by losing its moisture, contracts and squeezes up the quicksilver in the stem, where it marks on the attached scale the degree of the variation in thousandth parts of its whole volume. The unequal divisions placed on the opposite side of the tube indicate the correspondence of the instrument with the correct hygrometer.

Fig. 8. represents the Atmometer, an instrument designed to measure the quantity of evaporation, by the descent or rise of a column of water. It consists of a ball of thin porous earthen-ware, to which is cemented a wide glass tube, bearing divisions which correspond each to the measure of a film of water that would cover the external surface to the thickness of the thousandth part of an inch. These balls are elegantly formed, by any direction, at the celebrated manufactory of Etruria in Staffordshire: and I have lately received some, only an inch in diameter, and of the most delicate execution.

Fig. 9. exhibits the process of artificial congelation in its most powerful form, the water contained in a porous pan being set above a wide basin holding sulphuric acid.

Fig. 10. is an oblique view of the freezing of water, as effected in a glass cup after its humid surface has been exposed to the action of the rarefied air, by the drawing up of a lid.
Leslie made his discovery in June 1810 when he froze not only water, but also mercury. A year later, as the English scientists were unsuccessful in repeating the experiment, he went to the Royal Society in London to perform it. His fame spread and in the same year Maurice August Pictet and Joseph-Louis Gay-Lussac displayed artificial congelation to the French Institute. In July Leslie was writing to his brother: "I am not without hopes however of being able yet to turn my discovery of congelation to some account." Then, in 1812, his hopes were realized; he received the following letter from Mrs Marie Graham, better known as Lady Maria Callcott, the traveller, authoress and acquaintance of Sir James Mackintosh and Sir Samuel Romilly: "A relation of mine who is very anxious to eat cool butter at his breakfast has begged me to write to you and ask where your apparatus for cooling, or rather ice-making is to be had and at what cost. if you will be so good as to let me know these particulars I will transmit them to him." In 1825 a purchaser from India solicited the "mode of making ice" and so Leslie transcribed long and elaborate "Instructions for the Forming, Keeping, and Transporting Ice in Warm Climates." Leslie had become an integral part of the Edinburgh tourist scene. Louis Simond wrote of Leslie:

1. Napier, Leslie, 27. On October 1st, 1810 he wrote to James Brown: "You have perhaps heard of my experiment for freezing liquids. It is very curious, and I am in expectation, that it will not to me prove a barren speculation". (E.U.L. MS. Dec. 2, 57, Letter 187.)

2. Napier, Leslie, 30. Pictet (1752-1825) was a Professor at Geneva and Gay-Lussac (1789-1850) was a distinguished French chemist.

3. Letter dated July 7th, 1811, E.U.L. MS. Phot. 1144/1, 28. On April 5th, 1812 he wrote to his sister-in-law, Bess, - "I am not altogether without hopes of drawing emolument from my discovery of cooling and freezing". (Ibid., 34.).

4. Ibid., 36.

5. Leslie wrote to his brother on June 21st, 1825: "I have even most unexpectedly found a purchaser for me mode of making ice in India". (E.U.L. MS. Phot. 1144/2, 88.) The instructions, dated July 1st, 1825 are to be found Ibid., 119-136.
"He was so obliging as to repeat several times, in our presence, this brilliant experiment. In seven minutes, a cup of pure water, under the recipient of the pneumatic machine, became a mass of ice. Had it been warm weather, the process would not have taken more than five minutes, by the greater rapidity of evaporation. This circumstance renders his discovery the more valuable in tropical climates; and Mr Leslie has contrived a simple apparatus, for practical use, which costs, I think, twenty guineas."

Leslie also undertook researches on Electricity, Magnetism and the elasticity of water — "the only just solution to the problem of the properties of fluids". In 1822 he was investigating the possibilities of a steam-boat: "But I am more full at present about the scheme of a Steamboat which if it shall realize my theoretical deductions may prove an important speculation. I expect someday to transport you smoothly to Edinr. in one of them". Leslie was, furthermore, consulted on public schemes. For example, in 1825 he and Robert Jameson, the Professor of Natural History, were asked to report on reservoirs which it was proposed, should be constructed on the Water of Leith. Both men favoured the idea and wrote, in their report: "It would create for the use of the State as great a store of labour as could be produced by the annual expenditure of half a million. An object therefore of such vast moment to claim the special patronage of the Patriot and the Legislator".

4. Report by Professors Leslie and Jameson in regard to the Reservoirs proposed to be constructed on the Water of Leith, 4th April, 1825.
Leslie did not contribute many papers to the Royal Society of Edinburgh and wrote only about seven articles for the Edinburgh Review between 1809 and 1818 - on mathematical, physical and travel books.\(^1\) He compiled the Edinburgh Gazetteer in 1814 for 1000 guineas\(^2\), and wrote one of the dissertations as a supplement to the Encyclopedia Britannica between 1815 and 1824. He was prolific in his Encyclopedia Britannica articles and the subjects show that he continued the tradition set by Robison, of being the great expert on each of them. The topics included instruments, meteorology, cold and congelation.\(^3\) Not only his writings but his ingenious and useful researches were contemporaneous with his concern for his profession. Much credit, however, is due to those who supported him prior to his academic appointment in 1805 and those who provided him with research facilities while he was a professor.

There were two families which patronized Leslie - the Wedgwoods of pottery fame and the Fergusons of Raith. The Fergusons provided research facilities at Raith, and the Wedgwoods at Etruria. The Wedgwoods also gave positive financial help. Josiah Wedgwood sent his three sons John, Josiah and Thomas to the University of Edinburgh because some of his family had been there, and because he "put a strong emphasis on scientific training".\(^4\) It has been mentioned before that there was no university comparable in Britain and it will be recalled

1. see Wellesley Index.
2. see correspondence between Leslie and Archibald Constable, the publisher, N.L.S. MS. 331, ff. 125-128.
3. The full list is given in Napier, Leslie, 35 and reads: Achromatic Glasses; Acoustics; Aeronautics; Andes; Angle; Angle, trisection of; Arithmetic, palpable and figurate; Atmometer; Barometer; Barometrical Measurements; Climates; Cold and Congelation; Dew; Interpolation; Meteorology. Napier was editor of the Encyclopedia Britannica.
that forty years later George Stephenson sent his son to Edinburgh for the same reason. John and Josiah junior were at Edinburgh from 1782; Thomas was there from 1786-1788. During these years, Thomas met Leslie who by this time was free of having to study theology. They became close friends and corresponded "in the warmest and most affectionate terms" during the years Leslie was in America.¹

After leaving Edinburgh, Thomas had studied at home and undertook chemical experiments under his father's supervision and that of his father's assistant, Alexander Chisholm. In 1790, Thomas decided to excite his growing interest in matters scientific by inviting Leslie (who was then writing reviews in London) to Etruria to assist him. "An agreement has taken place" wrote Leslie, "— with the concurrence of his father and brothers, he offers me 150£ per ann. ... He is to provide books instruments &c. ... I have every inducement to activity and I am resolved to exert myself with vigour".²

Leslie was at Etruria from 1790-1792. Tom Wedgwood was concerned with the problems of light and heat from 1788-1792.³ It appears more than circumstantial, therefore, that Wedgwood's forays into primitive photography should have coincided with the time that Leslie, who in 1804 was awarded the Rumford medals for work on Heat, should have been his tutor. Indeed, Leslie's treatise on heat was dedicated to Thomas Wedgwood.⁴ Wedgwood's biographer has written: "I call Wedgwood the first photographer ... because he was, so far as we know, the first

² Ibid.
⁴ Ibid., 173.
person who conceived and put in practice the idea of using the agency of light to obtain the representation of an object;". Litchfield also quoted a letter of Leslie to Wedgwood which strongly suggests that the Edinburgh man was helping in experiments: "A few days ago I left at York Street an object-glass and some thin cylinders for the solar microscope, and half a dozen bits of painted glass which will, I think suit you. I have more pieces, which you may have at any time".

Thomas Wedgwood helped Leslie considerably in granting him an annuity in 1797 of £150 a year, to be increased to £250 in the event of his marriage. The annuity was continued after Wedgwood's death in 1805 by the terms of his will, until 1812. It certainly made it possible for Leslie to free himself from literary hack work, collect his equipment at Largo and there study to produce the treatise on Heat. In that way, the Wedgwood grant was a boon both to Leslie and to the advance of science.

The Wedgwood family connections extended far and each branch in its turn had an educational link with the University of Edinburgh. Josiah senior's eldest daughter was to become the mother of Charles Darwin, the naturalist, who was at the University in 1825. Josiah senior's sister was the grandmother of Sir Henry Holland, the distinguished Royal physician in the mid-nineteenth century. When Holland had gone to the University of Edinburgh in 1806 he took with

1. Ibid., 217.
2. Leslie to Tom Wedgwood, London, November 18th, 1800 - printed in Litchfield, 185.
4. It is interesting to note that another beneficiary of the Wedgwood largesse was Samuel Taylor Coleridge. He received an annuity of £150 on February 17th, 1798 so that he would be free for literary activities and would not have to undertake the duties of a minister. (Eliza Meteyard, A Group of Englishmen (1795-1815): Being Records of the Younger Wedgewoods and their Friends, (London, 1871), 96.)
him a letter of introduction to Leslie which his father had requested from Josiah senior.  

Holland himself married Sydney Smith's daughter.

While these distinguished families were linked by ties of education as well as marriage, the Wedgwood sons and indeed, the sons of other members of the Lunar Society of Birmingham, came to know well the intellectual Whigs who had been to the University of Edinburgh and who in the early nineteenth century frequented Holland House and the Lansdowne residences. In 1809, Francis Horner visited Warwickshire and wrote an account of his visit to Webb Seymour: "I made the acquaintance of several persons whom I was curious to see again. The remnant of the Lunar Society and the fresh remembrance in others, of the remarkable men who composed it, are very interesting, the impression which they made is not yet worn out, but shows itself, to the second and third generations, in a spirit of scientific curiosity and free inquiry, which even yet makes some stand against the combined forces of Methodism, Toryism and the love of gain." Horner clearly found political and intellectual sympathy amongst the members of the Lunar Society and their children.

So did other Edinburgh alumni for the historian of the Lunar Society has said that the family records of the Wedgwoods, Watts, Edgworths, Galtons, Witherings and Darwins show repeated contact with Leonard as well as Francis Horner, Sir James Mackintosh, Lord Henry Petty, Sydney Smith, Henry Brougham, Francis Jeffrey and Thomas Campbell. A common factor in this coalescence of the scientific and humanistic intellectual groups is their familiarity with and attendance on the University of Edinburgh.

1. Ibid., 308.
The Fergusons of Raith also patronized John Leslie. Robert, the elder of the two brothers, inaugurated the hosting of distinguished scientists. He died in December 1840 and his brother, General Sir Ronald Crauford Ferguson died four months later. Both had been tutored by Playfair to whom Robert "always gave the credit of inspiring him with all the zeal which he afterwards manifested for scientific pursuits".\(^1\) Robert qualified as an advocate in 1791 and then visited the men of rank and letters on the Continent where he was detained by the French revolutionary government. He spent some years in France and came to know many of her scientists well; he went on geological excursions with Baron Cuvier and became an active member of the Institute of France. He was in Vienna when Dr. Francois-Joseph Gall pronounced his views on phrenology and Ferguson supported him when Gall was proscribed by the Church of Rome. In Britain, few scientific men were not Ferguson's friends: he was a member of the London Royal Society, the Geological and other Societies. He was a Radical Whig M.P. for a number of years and Lord-Lieutenant of Fife.

His Library was vast. It was divided into four classes - Theology, Philosophy, Literature and History - with many subdivisions within each class. Physics, for example, was subsection four under Philosophy. However, the definition of Physics at the time was very broad and was itself divided up into five categories - Physics in general, Mathematics and Natural Philosophy, Natural History, Chemistry and Medicine. The range of the Library was phenomenal and clearly Robert Ferguson was a man of very broad interests and was highly accomplished.\(^2\)

1. The Scotsman, December 12th, 1840.
2. The information for this paragraph is culled from Catalogue of Books in the Library of Robert Ferguson of Raith, Esquire, (Edinburgh, circa 1820).
Several of Leslie's extant letters in the University of Edinburgh Library were written from Raith. There was a tower there where Leslie undertook experiments and watched eclipses. In May 1806, for example, he wrote to James Brown: "I mean to spend two or three weeks at Raith for the purpose of making some experiments in the tower".¹

Again in September 1820 he wrote to his brother: "I hope you will be able to get notice to my servant in time to come to Raith by Wednesday night or at latest Thursday morning, as I mean to observe the eclipse there and some few arrangements will be wanted".²

The Wedgwoods and the Fergusons were a contrasting set of patrons. On the one hand were the family of entrepreneurs and on the other, an accomplished landed family. Both aided Leslie in his work and he certainly was of help to the Wedgwoods. In an age before government scientific grants or support from industrial concerns, they made possible the advance of physical knowledge.

VI

Concurrent with his research and teaching duties, Leslie showed concern for the welfare of the University, its "image" to the wider world, and the maintenance of its reputation. He displayed this concern primarily in three ways - in his offering extra courses,

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1. Letter 181, dated May 10th, 1806, E.U.L. MS. Oc. 2. 57. In 1817 he wrote to Archibald Constable from Raith: "The pen is execrable, my hand is benumbed with cold having just returned from the Tower". (Letter dated October 7th, 1817, N.L.S. MS. 331, f. 131).
in keeping informed about other universities' changes in regulations, his suggestions for the Library and his views on the curricula for courses other than his own. These interests were in addition to his contributions to the mathematics and natural philosophy chairs.

Leslie once said: "The University of Edinburgh owes all its advantages to the unfettered exertions of individuals".1 The occasion was his move in 1823 to remedy the problem of the expansion of the natural philosophy course. He proposed a Special Physics course which would be divided into two parts to be treated in successive years. He maintained that he was not suggesting this for his own financial benefit: he would receive no more money but the existence of the course would promote the interests of the University and attract a greater number of strangers.2

Unfortunately, Leslie advertised this course without the permission of the Senatus which protested and ultimately did not approve of its implementation on the grounds that it would encroach on the subject matter of other chairs. The controversy called forth a brilliant letter from Leslie.3 In it he made the point that many chairs in the University already overlapped - for example, Heat was comprehended both by Chemistry and Physics. This was beneficial because it gave the students the opportunity to hear a subject being expounded in different ways. Andrew Duncan junior, Professor of Materia Medica, and Robert Jameson, Professor of Natural History, secured the passing of a motion

1. College Minutes, III, 397.
2. Ibid., III, 380-384. He spoke at a Senatus meeting of June 16th, 1823.
3. The letter, dated October 28th, 1823 is to be found Ibid., III, 395-397.
which banned Leslie from offering his Special Physics course.\(^1\) Three years later, however, Leslie did manage to offer a non-graduating course on Experimental Philosophy to which ladies were admitted. His avowed reason for instituting the course was that exciting a taste for the cultivation of physical science would contribute to the interests and prosperity of the University.\(^2\)

The early 1820s saw a debate within the University on the regulations pertaining to the medical degree. Leslie believed that medical students would benefit from taking Natural Philosophy. "I shall not think my labours requited", he wrote to James Brown in 1821, "unless I can oblige the medical students to attend the Natural Philosophy as in the English and all foreign Universities".\(^3\) His concern for the curricula, however, was not limited to faculties other than his own. In 1818 he had written to Dr. John Lee, then Professor of Church History at St. Andrews, to enquire if that University had made any changes in its regulations for conferring degrees in Arts. He also enquired about other reforms which might have been undertaken. He concluded: "You can give me correct information on all these points and it will be of great consequence to us, where the supineness of one party and the restless jobbing of another have led our body (or rather the part which

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1. Ibid., III, 399, November 22nd, 1823. Andrew Duncan junior, when Secretary to the University and Librarian had evidently antagonized Leslie in another way. Leslie wrote to Constable from Reigate: "I have looked over at Souters a few American books which I wish we had in Edinr. both for the college and the Review. But as Dr. Duncan seems to thwart my views of enriching the library you had better speak to him first". Leslie then went on to give a list of recommended books. (Letter undated in N.L.S. MS. 131, f. 121.)


Perhaps the trouble over his appointment to the Mathematics Chair in 1805 enabled Leslie to appreciate the harm that politicking could do to the University. He had definite views on the qualifications required by an Edinburgh professor as was shown by a letter written about the Medical School in 1832: "I should be glad," he wrote to Dr. James Browne, the advocate, "if you could draw the attention of the Town Council to the necessity of renovating the Medical School by the election of professors of high eminence in their profession, extensive learning and science, and capable of taking enlarged and philosophical views". There could be no better description of Leslie himself.

VII

A study of these three professors of Mathematics and Natural Philosophy elicits several significant facts: there was a gradual appreciation from Robison to Leslie of the increasingly practical aspects of science. Robison (despite his experience before becoming a professor) and Playfair, while they might purchase apparatus or foster the building of the Observatory, were not as enthusiastic about equipment and experiments as Leslie. He saw the way in which science was to develop and yet remained true to the Scottish didactic purpose - Mathematics not only had a purely mechanical value but was part of a liberal education. This

1. Leslie to Dr. John Lee, November 16th, 1818. N.L.S. MS. 3434, f. 166.
2. Leslie to James Browne, May 24th, 1832, N.L.S. MS. 3700, f. 75.
philosophic aim lay behind much of Leslie's reform of curricula. All three men - in their familiarity with or contribution to the latest research - would have communicated their evident concern for knowledge: Playfair continued where Robison left off. Robison had introduced the discoveries of Continental mathematicians and was the first scientific expert to write for the *Encyclopedia Britannica*. Playfair maintained the impetus by his teaching, his writing and his complaints against the English ignorance of Continental developments. Leslie, by his own research successfully contributed to knowledge and it clear from the *Edinburgh University Journal and Critical Review* that the students were much impressed by his scientific eminence. The physical scientists at Edinburgh in the period were setting high standards to ensure the progress of knowledge in their fields and the promotion of education. Beneficiaries of their example were a generation of students, several of whom in nineteenth century Britain were to enter public life, or become scientists or technologists themselves.
APPENDIX I

John Robison, John Playfair and the French Revolution

Dugald Stewart and the French Revolution were considered in Chapter Two. There were very different but interesting reactions to the same event by Stewart’s professorial colleagues in Mathematics and Natural Philosophy. Robison had exhibited a certain anti-French prejudice in his edition of Black’s lectures, but it was scarcely as virulent as that evident in his *Proofs of a Conspiracy against all the Religions and Governments of Europe, carried on in the secret meetings of Freemasons, Illuminati and Reading Societies*. Robison suggested that there was an international underground plot by secret societies to achieve world domination and that these societies were behind the French Revolution.

Two men almost simultaneously proposed this theory - Robison and the Abbe Barruel in his *Mémoire pour servir à l’histoire du Jacobinisme*. It was also taken up in the United States by Jedidiah Morse, a Congregational clergyman. It may not be a matter of particular credit to the University of Edinburgh but Robison was the originator of the Masonic conspiracy theory. Barruel appeared in print first, but he heard the theory from Robison and his initiative secured him English, Polish, Italian, Spanish and Russian translations. Robison himself

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1. Augustin de Barruel (1741-1820) was a Jesuit. His book was banned in France and he himself took refuge in England until Napoleon came to power. He ingratiated himself with the First Consul and was rewarded with a canonry of the Paris Cathedral.

saw his book through four editions; William Cobbett brought out an American edition of Robison's book in 1798, and Jedidiah Morse obtained a prepublication copy in Philadelphia.¹

Charles August Bottiger, the philologist and Professor at Weimar wrote to his close friend, Andrew Dalzel: "I am sorry to find that Mr Robson [sic]... has fallen into great error by his last publication of a Conspiracy against Religion and Government. There are now no such humbugs and hobgoblins as his visionary look detects all over Germany, the order of the Illuminati having been finally abolished by the members themselves, who dissolved in the year 1791, and the German Union of Mr Berth has been only a mock society, blown up in the very moment when brought to public knowledge. It is a great pity Mr Robson derived his information from such books, who are now antiquated and laughed at by every knowing man. But I am afraid his book will do great mischief, and spread new alarms in a time when public adspersions and the ringing of the alarum-bell is countenanced by ministerial men themselves".²

The following year Dalzel sent back an explanation to Bottiger saying that for the previous ten years Robson had been in bad health, although before that he had had a very good professional reputation. Dalzel continued - "the book, coming from a man of science and hitherto esteemed for his integrity, excited great interest, was much read, and by some much extolled. I own that I was not one of those who set a

value upon it, but, knowing the state of the author's health, and, that
he has been accustomed for many years to take great quantities of laudanum,
I viewed it as the production of a disordered imagination, and mourned
over it in secret as the sickly offspring of a mind which I had once
admired for its extreme acuteness and for the facility with which it
could produce brilliant thoughts in conversation, superior almost to that
of any man I had met with". 1

Irrespective of the health or otherwise of Robison's mind
the episode shows not only another reaction to the French Revolution
within the University but gives some idea of the upheaval the Revolution
caused. It emphasizes the point made in the chapter on Stewart that
people in the age of the Revolution were looking for re-orientation.
Playfair wrote of the Proofs: "It is a strong proof of the effect on
the minds of men produced by the French Revolution; and of the degree in
which it engrossed their thoughts, that the history of a few obscure
enthusiasts in Bavaria and Württemberg, when it became associated with
that Revolution, was read in Britain with so much avidity and attention". 2
The tragedy was that Robison's name was by this book carried "into places
where his high attainments in science had never gained admission for it". 3

John Playfair, on the other hand, approached the Revolution
as a scientist. His views appeared in two places - first, in his bio-
ographical account of Robison and secondly, in an Edinburgh Review article.

1. Dalzel, I, 155. Laudanum is an alcoholic tincture of opium.
2. Playfair, Works, IV, 165. Playfair also said of the Revolution:
"no man was so abstracted from the pursuits of the world, or so insul-
ated by peculiarities of habit and situation, as not to feel the
effects of this very powerful concussion". (Ibid., IV, 157.)
3. Ibid., IV, 165.
He believed that the French Revolution occurred because there was no correlation between "the degree of knowledge diffused through a nation" and "the degree of Political Liberty enjoyed by it". He explained himself thus: "there seems to be among political institutions, as among mechanical contrivances, two kinds of equilibrium, which, though they appear very much alike in times of quiet, yet, in the moment of agitation and difficulty, are discovered to be very different from one another. The one is tottering and insecure, in so much that the smallest departure from the exact balance leads to its total subversion. The other is stable, so that even a violent concussion only excites some vibrations backward and forward, after which every thing settles in its own place. Those governments in which there is no political liberty, and where the people have no influence, are all unavoidably in the first of these predicaments: those in which there is a broad basis of liberty, naturally belong to that in which the balance re-establishes itself. The same weight, that of the people, which in the first case tends to overset the balance, tends in the second to restore it: and hence, probably, the great difference between the result of the French Revolution, and of the revolutions which formerly took place in this country.

1. Playfair on Robison, in Ibid., IV, 167.
2. Ibid., IV, 167-168. Playfair also believed that Robison's theory of conspiracy was wrong because the ideas of a small group of fanatics could only have an effect on the masses if accompanied by a similar spirit in those masses. e.g. "A hermit or a saint might have preached a crusade to the Holy Land with all the eloquence which enthusiasm could inspire; but if a spirit of fanaticism and of chivalry had not pervaded every individual in that age, they would never have led out the armies of Europe to combat before the walls of Jerusalem. Neither could the influence of a small number of religious or philosophic fanatics, sensibly accelerate or retard the powerful causes which prepared for the destruction of the French monarchy. When opposed to these causes, such influence was annihilated; when co-operating with them, its effects were imperceptible." (Ibid., IV, 166).
In January 1807 appeared his review of Machin and Delambre's *Mesure d'un Arc de Méridien*. It gave him the opportunity to say that not all the changes wrought by the French Revolution were bad. For example, until the turmoil, there was confusion and perplexity over weights and measures throughout Europe. With the spirit of reform the old system was abolished - "and it would have been happy for France and for Europe, if everything which was then destroyed had been replaced by as solid and useful a structure...".

The main burden of the article was concerned with the work entrusted to Pierre-François-André Machin and Jean-Baptiste-Joseph Delambre, both French astronomers, to measure an arc of the meridian between Dunkirk and Barcelona in 1792. Playfair said that the time for such a pursuit of science was unpropitious: "The people, in the heat of the revolutionary proceedings, jealous of whatever they did not understand, saw, in the astronomers and their apparatus, nothing but cause of alarm. When they observed men professing to be employed in a service which they could not comprehend, and accompanied with instruments of so mysterious a form, they thought the whole was a pretence under which the enemies of the people concealed their machinations".

Playfair commended the scientific work undertaken in post revolutionary France and breathed the spirit of moderation when he wrote: "The calamities which the power and ambition of the French government have brought on Europe, induce us to look with jealousy and suspicion on

1. *Edinburgh Review*, IX (January, 1807), 373-391. The article was reprinted in Playfair's *Works*, IV, to which references are made.
their most innocent and laudable exertions. We ought not, however, to yield to such prejudices, where good sense and argument are so obviously against them. In a matter that concerns the arts and sciences only, the maxim may be safely admitted, *fas est et ab hoste doceri.*" By the time the review was written, Playfair had held Robison's chair for nearly two years. The successive Professors of Natural Philosophy had taken very different views of the Revolution.

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CHAPTER FOUR

Professors of Pre-Medical Subjects: Theses, Charles Hope, Robert Eshleman, and Robert Jameson
"No one can trace the history of the natural sciences in this country without feeling that the University of Edinburgh has exercised a very powerful influence on their advancement and diffusion". (The Lancet, August 7th, 1858, 154.)

"Institutions as well as geniuses are requisite for the progress of science". (John C. Greene, "The Founding of Peale's Museum", Bibliography and Natural History, Lawrence, Kansas, 1966, 66.)

I

Joseph Black's last years had been marred not only by ill-health but also by having his own earlier and great contributions to chemistry questioned and revised by Antoine Lavoisier, as was seen in Robison's extensive interpolations. Black's successor, Thomas Charles Hope also made his contributions to science before assuming the Edinburgh Chair. Nonetheless, he was a famous and popular teacher. He was the first in Britain to give a public course of lectures on the reformed chemistry. In 1800 he was mentioning nitrous oxide in his lectures, understanding that it gave an ecstatic sensation. Chemical developments of the gas were at an early stage and its anaesthetic properties were not yet recognized. Professor John Griscom of the Chemistry and Natural Philosophy chair at the New York Institution, thought Hope's class was larger than any he had seen at a continental university and was certainly the most numerous in Edinburgh. For Francis Horner

1. John Griscom, A Year in Europe: comprising a journal of observations in England, Scotland, Ireland, France, Switzerland, the North of Italy and Holland, in 1818 and 1819, 2 vols. (New York, 1823), II, 354. The reformed chemistry: hitherto, Chemistry had been bound down by George Ernest Stahl's phlogiston theory. Stahl (1660-1734) had maintained that inflammable bodies were compounds of which phlogiston was one of the constituents. When the combustion took place phlogiston escaped while the other constituents remained. Lavoisier showed that combustion, far from being a decomposition was a combination, and that commonly the inflammable material united with oxygen. (see Thomas Thomson, "History and the Present State of Chemical Science", Edinburgh Review, L (October, 1829), 284-285.)
"There are in London more than a dozen courses of lectures on chemistry, though none certainly so valuable as those at Edinburgh".\(^1\) The Clows, as the historians of the chemical revolution, consider Hope to be as important as Black because more industrialists were in a position to benefit by contact with the universities and because of his numerous students.\(^2\)

An indication of his popularity is given by his class attendance figures which are quoted at five yearly intervals:

<table>
<thead>
<tr>
<th>Year</th>
<th>Chemistry</th>
<th>Total No. Medical Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1795</td>
<td>221</td>
<td>361</td>
</tr>
<tr>
<td>1800</td>
<td>337</td>
<td>420</td>
</tr>
<tr>
<td>1805</td>
<td>342</td>
<td>446</td>
</tr>
<tr>
<td>1810</td>
<td>422</td>
<td>565</td>
</tr>
<tr>
<td>1815</td>
<td>508</td>
<td>929</td>
</tr>
<tr>
<td>1820</td>
<td>479</td>
<td>754</td>
</tr>
<tr>
<td>1825</td>
<td>505</td>
<td>892</td>
</tr>
</tbody>
</table>

According to the biographical memoir of Hope, he gave some thought to his duty. He once said: "Those who devote themselves to the science of chemistry, may be divided into two classes - 1st, those whose labours are employed in original researches, to extend our knowledge of the facts and principles of the science. 2ndly, Of those whose business it is, from university or other appointments, to collect

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3. These figures culled from *Evidence*, I, 128/7, 130/7 and 1731. It is only fair to mention that between 1822 and 1824 Hope had over 550 students. In 1815, for example, while he had 508 students, Playfair had 161 and Leslie 144. The total number of medical students is given to indicate the proportion that was attending Hope, but not only medical students attended his course.
the knowledge of all that has been discovered, or is going forward in
the science, to digest and arrange that knowledge into lectures, to
contrive appropriate and illustrative experiments, and devise suitable
apparatus for the purpose of communicating a knowledge of chemistry to
the rising generation, or others who may desire to obtain it. From
my professional situation, I consider myself, as Dr. Black had done
before me, as belonging to the second class of chemists. I consider
my vocation to be the teaching of science".¹

Hope was a proficient member of the second class he
delineated. According to Professor Traill, "Dr. Hope had become,
from the variety and excellence of his illustrations, and dexterity in
chemical manipulations, the most popular teacher of the science that had
ever appeared in Great Britain".² Traill went on to say that Hope's
reputation as a lecturer induced some members of the Faculty of Advocates
to ask him to give a summer course in chemistry in 1800 which was not
only attended by lawyers.³ However, there is a temptation to credit
Hope with too much; it is true that he was the beneficiary of a
current rage - the pursuit of chemistry - that went on for several years.
John Leslie wrote to James Brown in 1813: "As you are always very curious
to know about our classes - we may have this year about 2000 in all ... My
first class is large - above 80. But the second unusually small,
and the encouragement for the third one was so small that I did not go

¹. Thomas Stewart Traill, "Memoir of Dr. Thomas Charles Hope, late
Professor of Chemistry in the University of Edinburgh", Transactions
of the Royal Society of Edinburgh, XVI (1849), 431.
². Ibid., XVI, 423. Traill judged the extent of Hope's popularity on
the basis of his large class attendance figures.
³. Ibid.
on with it. All this is very mortifying - the taste of hard study being evidently on the decline - the glare of chemistry obscures everything else.\textsuperscript{1} Hope took advantage of the rage by providing what his students wanted - exciting experiments.

Sir Robert Christison testified to Hope's attraction:

"To be visible to a class of 500 students . . ., his experiments required to be performed on a very large scale - which every one conversant with experimental lectures knows much increase greatly the difficulty of exact manipulation. Nevertheless, when I first attended Hope in 1814, there was not a single failure to attain exactly what he announced; and on repeating my attendance in 1815, he failed once only".\textsuperscript{2} Christison continued that Hope "seems to have abruptly and unaccountably deserted the tempting field of chemical research and devoted his whole professorial life to perfecting his admirable class experiments".\textsuperscript{3} Christison and some of his colleagues also exemplify the penchant for chemistry in that they formed a chemical society so that they could repeat Hope's experiments, there being no facilities in the University at that time for students to undertake practical chemistry.\textsuperscript{4} The deficiency was remedied in 1823: on May 1st of that year, Hope announced to the Senatus Academiciue that a new chemistry laboratory was to be opened so that students could become familiar with experiments.\textsuperscript{5}

\begin{footnotesize}
\begin{enumerate}
\item Letter dated December 25th, 1813. E.U.L. MS, Do. 2. 57.
\item The Life of Sir Robert Christison, Bart., ed. by his sons, 2 vols. (Edinburgh and London, 1885), I, 57.
\item Ibid., I, 58.
\item Ibid., I, 59. More is said about this society in the Appendix on societies.
\item College Minutes, III, 378-379.
\end{enumerate}
\end{footnotesize}
The pleas of the professors of mathematics and natural philosophy for funds to provide apparatus have already been seen. A different situation existed with the chemistry chair: Hope was asked by the 1826 Commissioners if he thought it desirable that apparatus should be attached to his class, to be maintained by the holder of the chair, or whether it should be the personal property of the professor. Hope replied: "I think it desirable that there should be an Apparatus attached to the Class; but the emoluments of late years have been so ample that the Chair is able to bear the expense of that Apparatus, unless the funds of the University become so abundant as to be able to assist the wealthy Chairs as well as the poorer ones". Hope charged each of his students 4/6d. dues, over and above the class fee. The money went to furnishing fuel, chemical substances used in experiments, servants, assistants and apparatus. While this money, gathered annually, would have more than covered any of Hope's expenses, he did expend his own funds for the good of his subject. One year, he gave a course of popular lectures which were numerously attended. He collected £700 in class fees and presented this sum to the Senatus as a Prize Fund for "the encouragement of the cultivation of Chemistry". At the time of the Commission, however, no arrangement had been made for the management and distribution of the fund.

Unlike the Natural Philosophy curriculum, the course in Chemistry and Chemical Pharmacy was not explained in detail to the 1826

1. Evidence, I, 283.
2. Ibid., I, 284.
Commission. Hope merely gave evidence that "The Course embraces a wide field, of which a great part bears no relation to Medicine; but in the science of Chemistry all the parts are so linked together that that portion so essential to the medical profession could not be duly understood without a knowledge of the whole". Chemistry, at this stage in its development was a limited subject: Sir Robert Christison wrote that it was neither extensive nor recondite - an amateur could master it in a six months' course and private study.

Alexander Bower's The Edinburgh Student's Guide, however, was more forthcoming: the course was more multifarious than any other in the University. Hope began his course by giving an account of the advantages to be derived from chemistry, and gave a short sketch of the history of the science. He spoke of its influence on arts and manufactures. He undertook a great number of experiments to explain the phenomena of nature, and to illustrate light, heat and pneumatic chemistry. He also introduced experiments which displayed the different gases. Other parts of his course described the nature, properties, constituent parts and processes whereby different acids and alkalis were obtained, and the different properties and combinations of the thirty known metals were given attention. Finally, Hope showed how chemical doctrines were applied to the animal, vegetable and mineral kingdoms.

Despite the paucity of material on Hope's course, several distinctive features are apparent: first, he was the first to teach the

1. Evidence, I, 284.
2. Christison, I, 57.
3. Alexander Bower, The Edinburgh Student's Guide: or an account of the classes of the University, arranged under the four faculties; with a detail of what is taught in each, (Edinburgh, 1822), 42-44.
reformed chemistry in Britain. Second, he did respond to the interest of contemporaries in practical demonstrations by his large scale experiments, and is, in this way, indicative of a trend among several Edinburgh professors, to introduce a practical element into their courses. A contrast can be made between the generation of John Robison and that of Leslie and Hope. Thirdly, Hope's lectures on the influence of chemistry on arts and manufactures indicated his appreciation of the relevance of co-operation between the research scientist and the burgeoning industries. Fourthly, Edinburgh was the most profitable place at that time to hear lectures and see experiments on light and heat. It was in Edinburgh, after all, that the pioneer research work in the field had been undertaken - by Joseph Black, Hope's predecessor and erstwhile mentor, and John Leslie, a colleague. Fifthly, Hope performed an important function in his lectures on the relevance of chemistry to the animal, vegetable and mineral kingdoms: as will be explained at greater length below, Professor Jameson was the apostle of Wernerianism - a prevalent school of contemporary geological thought - within the university. Once John Playfair had died Hope was the only university professor who could counter Jameson and represent the school of Hutton - a school which had its origins in Edinburgh. Even before Playfair died Hope was in a more advantageous position because geological matters could more easily be discussed by the chemistry professor than the holder of the natural philosophy chair.

Hope provided conspicuous opposition to Jameson for the 1826 Commissioners asked Hope: "Would not a Professor, for his own sake, and for the sake of doing justice to the other branches which more particularly belong to his course of lecturing, rather avoid encroaching upon the province of another professor?" To which Hope replied that
indeed he would, were it not for the debateable land being a very favourite field with the Professor in question. The Commissioners then became less vague: "Do you consider yourself restrained from supporting theories which are probably opposed by other Professors in the University? - Certainly not" responded Hope. "I hold it my duty to give my sentiments faithfully and honestly whatever those sentiments are, upon the subject which I am discussing". As will be seen later, one of the reasons why Wernerianism had to capitulate finally to the school of Hutton was because the chemical researches of Sir James Hall proved Werner wrong. Hope was, therefore, perfectly entitled on academic grounds, quite apart from personal preference, to deal with geological matters.

These five features of Hope's course illustrate yet another professor who was anxious to promote his subject by teaching, who saw the lines on which chemistry was developing, who was appreciative of its practical applications and who concerned himself with the cause of scientific truth.

II

More difficulties than usual present themselves if an attempt is made to isolate Botany as a self-contained academic discipline in the early nineteenth century. In many ways it bore marked similarity both to the Natural History course which came under the aegis of the Faculty of Arts and to the Materia Medica course in the Faculty of Medicine, to which Botany also belonged. Many Edinburgh alumni appear in the

1. Evidence, I, 264.
pages of *A Biographical Index of Deceased British and Irish Botanists*, who could have benefitted from any of these three courses.¹ The University's contribution to botanical studies is further complicated by the fact that of the two professors of Botany from 1790-1826, Daniel Rutherford is best known as the discoverer of the gas nitrogen, and as having done nothing to further botanical studies.²

Sir Robert Christison spoke harshly of Rutherford: he "always seemed to lecture with a grudge, and never contributed a single investigation to the science which he taught."³ Furthermore, "it was a great blot in his teaching that he gave no encouragement in any way to practical training in the field, which has been steadily and successfully pursued by his successors."⁴ Hence, the ensuing discussion is concerned with Rutherford's immediate successor, Robert Graham, who through his curriculum and concern for the Botanical Garden did much to boost Edinburgh's reputation not only as a medical school, but also as a botanical centre and training ground for botanists.

Dr. Douglas Guthrie has written of the importance of Botany as an ancillary discipline to medicine. Wherever universities established the teaching of medicine, provision had to be made for the teaching of Botany. Hence, Physick Gardens were attached to the Universities of Padua, Montpellier, Leyden and finally, Edinburgh - all the great medical schools.⁵ Botany was more important to medicine than

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2. With the aforementioned difficulties in mind, see the Appendix to this chapter which is a list of 26 Edinburgh alumni, between 1790 and 1826, who distinguished themselves as botanists and appear in the Index.
3. Ibid., I, 56.
4. Ibid., I, 56.
chemistry; the practice of eighteenth century medicine was remedial rather than preventive. It was only with the rise of preventive medicine that chemical drugs rather than herbs were used.¹

Robert Graham told the 1826 Commission that Botany was indispensable to any medical course.² All the schools of medicine demanded a definite course of study and Botany was especially demanded to those who entered the Medical Department of the Army. Graham read out a letter from Sir James M'Grigor, the head of that department, saying that a six months' course was requisite. Furthermore, as M'Grigor's letter continued: "in an examination, not only of those who enter the service, but of those who come from half to full pay and of everyone who obtains a step of promotion, Botany forms one of the subjects of examination".³ The Army Medical Board only demanded a three months' course of Materia Medica.

Given the importance of Botany to the Edinburgh Medical School, the University, through Robert Graham, more than adequately provided the requisite teaching and facilities. Graham averaged over 200 students in the early 1820s out of a total of approximately 875 medical students. Rutherford, on the other hand, had been drawing classes of 120-130 when the total number of medical students had been nearly 800.⁴ Furthermore, Graham by virtue of his title "Professor of Medicine and Botany" was not allowed to forget the relationship of his subject to the medical arts. He was one of the four professors who for three months, every second year, was responsible for giving clinical lectures.⁵

¹ I. ibid., XXXIX, 195.
² Evidence, I, 261.
³ Ibid., I, 330.
⁴ These figures estimated from Ibid., I, 1287 and 1307-131.
⁵ Ibid., I, 200.
The curriculum for the Botany course was given in the Commission's report: "The Course of Study in the Lectures on Botany examines Vegetables in general, as one of the great kingdoms of nature, arranges and classes them, and specifies marks for distinguishing individuals: it investigates their formation, structure and constitutions, with the functions of particular parts; their respiration, digestion, irritability, generation &c: it examines their relation to soil, climate and altitude, moisture, light and air: it inquires into the peculiar properties of vegetables, with the purposes, medical, economical, and in the arts, to which they are applied, and into the analogies in regard to properties and functions which subsist between individuals or tribes: it intimately connects Botany with Animal Physiology, and makes known a large part of the Materia Medica, giving a description of the medical qualities of plants". Dr. Charles Ransford, Graham's biographer, noted of the Edinburgh Botany course that "Vegetable Physiology was taught there more assiduously than in almost any other university in Europe".

Graham was, at first, a follower of Charles Linnaeus, the Swede, who had evolved the system that bears his name for classifying plants. The Edinburgh medical student, on the other hand, would also be taught the Natural System from Andrew Duncan, junior, the Professor of Materia Medica. Here was another example where the overlapping of

1. Report, 151.
2. Charles Ransford, Biographical Sketch of the late Robert Graham, (Edinburgh, 1846), 12.
3. Evidence, I, 223. Linnaeus invented, among other forms of classification in the animal and vegetable kingdoms, the sexual system of classifying plants. Until he did so, botanists had been hindered from reducing the multifarious forms of the plant world to order. Linnaeus' system was, however, artificial and was subsequently abandoned for the Natural System. This showed evolutionary relationships; it reflected the approximate order in which the main groups of plants evolved, from the simplest to the most complex.
subject matter by chairs could be of benefit to the intelligent student. Graham only dealt with the more important medicinal plants in the natural order.  

The Botany course could not function properly without a botanical garden. In Graham Edinburgh appointed a man who had, in 1818-1819 already founded a botanical garden in Glasgow for the University of that city. Once elected to the Edinburgh chair in 1820, Graham had to exert himself again - this time to secure for the University of Edinburgh the present site of the Botanical Garden in Inverleith Row. It was Graham too, who organized the move of the old Physick Garden from Leith Walk to Inverleith. For the Commissioners, "much of the efficiency of a Botanical Course must depend on the State of the Botanical Garden. A new one was recently instituted for the use of the Professor".  

Much of Graham's evidence to the Royal Commission was concerned with ensuring that better financial provision was made for the Garden. Its value was at stake: it would fall into a disreputable condition unless more funds were available. In the course of presenting his case, Graham gave useful information about the Garden: "It was long the great depository of objects of Botanical Science in this country, and, in fact, the only one in Scotland until the Subscription Botanical Garden at Glasgow was established. In consequence of this circumstance, and its connexion with by far the most crowded Medical  

3. All the trees, shrubs and plants were moved without a single loss and a Yew tree, which had been growing from 1690-1690 survived not only the first move to Leith Walk but the second to Inverleith. (Ransford, 15.)  
School in the Empire, donations were sent to it from every quarter of the world, particularly from those who had been educated at Edinburgh, and also by others; till at length so many plants accumulated in it, that it became necessary to increase the Garden nearly to three times its former extent . . .". The new garden was "eleven Scotch acres and a half".

Graham also compared the Edinburgh garden with others in Britain: Liverpool Botanic Garden, for example, was one-third the extent and had a comparatively small range of hothouses. Edinburgh and Kew were the only Gardens which were the property of the Crown and in any way under Government control. "The Garden at Edinburgh", continued the Professor, "is connected with the capital, and with by far the greatest medical school in Britain, but which has no funds, and cannot therefore contribute in any degree whatever to the support of the Botanic Garden attached to it. At other Universities, the Botanic Garden is either endowed by individuals, or the University itself is largely endowed; and there is not in every case a Medical School, when Botany can only be regarded as an accomplishment to an individual, not as a necessary part of a professional education in which the public are concerned; and therefore a very limited establishment answers the purpose".

An analysis of the statement indicates that Graham was emphasising still further the connection between Botany and medicine. Indeed, in other evidence he gave to the Commission he said that Edinburgh's expenses exceeded those of other Botanical Gardens because a large supply

1. Evidence, I, 331.
2. Ibid., I, 263. This size is the equivalent of 14½ English acres.
3. Ibid., I, 331.
4. Ibid., I, 331-332.
of plants had to be provided for teaching purposes. Existing botanical gardens were small because their purpose was to foster social or cultural accomplishments. Graham implied that at Edinburgh, more serious matters were at stake - the public health was involved and so the Government should consider increasing their grant.

Graham as Regius Keeper of the Garden enhanced its worth by many importations from overseas and by exchanges with such places as St. Petersburg and Rio de Janeiro. His interest in all aspects of the Garden's prosperity is another example of an Edinburgh professor seeking the best facilities for the communication of knowledge and the fostering of his science. Furthermore, in Graham's summer course, he used to take his students on Saturday botanizing expeditions, over 15 miles. Practical field work was increasingly being used; it was a distinct change from the days of Rutherford. Dr. Ransford quoted a Southampton doctor and former student of Graham, Joseph Buller, who described the pleasant environment in the lecture-room of the Botanical Garden: "the large light conservatory-looking lecture-room, surrounded by fine shrubs and beautiful flowering plants, the abundance of newly gathered flowers, with which the lectures were illustrated".

Graham emphasized as a teacher, the structure and functions of the organs of plants so that he could lay a solid foundation for physiology. He divided his hourly lecture in such a way as to devote

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1. Ibid., I, 263.
2. Ibid., I, 262. In 1826, Graham received £419 from the Crown and £25 from the Town, and had to make up the deficit himself.
3. Ibid., I, 263. For a list of items imported, see Ibid., I, 1827-1847.
5. Ibid., 19.
half his time to the physiological details and the other half to illustrating his observations by handing specimens to the students—thus neatly fulfilling his functions as a Botany professor in a Faculty of Medicine. He employed class tests—such as fixing numbers on plants in the Garden and asking the students next day to identify them. He instituted, and paid for, two gold medals for presentation to the student in the class with the best herbarium and essay. He was a conscientious teacher and two of his students immortalized him: John Gillies named a genus of Chilian plant Grahamia, and Francis Boott named a species of Alpine carex, Carex Grahamia.

III

The University of Edinburgh's contribution to Natural History and allied matters was a highly important one from 1790-1826. In many ways, Edinburgh was the world's great centre of study. The University's significance is discussed under three heads: first, the course itself, its professors and facilities together with some of the students who may have benefitted from them; second, a consideration of the great geological debate of the late eighteenth and early nineteenth centuries and how the University and its institutions became involved; and thirdly, a closer examination of the University and nineteenth century concepts of evolution as seen through two students, Charles Darwin and James Cowles Prichard, and also Charles Lyell.

1. Ibid., 19-20.
2. Ibid., 40n. Gillies, who undertook much botanical work in South America, was a generous donor of boxes of collections and seeds to the Edinburgh and Glasgow Gardens. See F.W. Gibbs, "John Gillies, M.D., Traveller and Botanist 1792-1834", Notes and Records of the Royal Society of London, IX (October, 1951), 115-136.
Until recently, John Walker, Professor of Natural History, has been ignored. He was the first to teach Geology at the University of Edinburgh. ¹ When appointed to the Chair of Natural History in 1779, he had had long experience of field research, was familiar with existing scientific literature and had corresponded with some of the leading investigators of his day. ² In 1764 he had been commissioned by Lord Kames to make a survey of the Hebrides and the Highlands. When a minister at Moffat, he had taken particular interests in the flora of Scotland and the plants responsible for the production of peat. He corresponded with Linnaeus. Hence, he told his students in 1781: "The objects of nature themselves much be sedulously examined in their native state, the fields and mountains must be traversed, the woods and waters must be explored, the ocean must be fathomed and its shores scrutinized by everyone that would become proficient in natural knowledge". ³ Despite this strong recommendation and his own frequent journeys, Walker never included the field excursion in his curriculum. ⁴

Walker was succeeded in both his Chair and in the Keepership of the Natural History Museum by Robert Jameson. Prior to 1800, Jameson was a student of Walker's and not only had made trips with his mentor and collected and prepared material for him but had taken on much of the Museum work in 1792. ⁵ In 1800, however, Jameson went to Freiburg,

2. Ibid., xxii.
3. Ibid., xvii.
4. Walker's editor, Professor Harold Scott, of the Department of Geology, University of Illinois, has kindly written to me as follows: "Walker had spent much of his time in the field. . . . Walker did not take his classes to the field. He told his students to keep mineralogical journals of their individual excursions, but there is no evidence that he conducted trips for classes into the field for any purpose. He showed them specimens in the laboratory and told them what to look for in the field, but he did not take his classes outside". (Letter dated November 13th, 1967.)
5. Walker, xxiv.
in Saxony, to study under Abraham Gottlob Werner, of whom more is said below. Walker seems to have become disillusioned with Jameson after this move, and in turn, Jameson became a blind advocate of Wernerian geological theories. Walker, for example, was highly concerned with the Museum: he had written to the Lord Provost and Town Council of Edinburgh about the state of the collection upon his succession to Robert Ramsay. "The greater part of it", he wrote, "is mere Rubbish, that never can be of any Use. Some parts of it, particularly many birds and Fishes ought to be immediately thrown out, being so over run with moths and other Insects, that no animal Preparations, can be placed with Safety in the Room, till they are removed". Five years later he was making representations in the same quarter for subscriptions to be raised to buy Museums, and for people in Scotland to be urged to present objects.

Despite his pride in the Museum and his concern for the University, Walker's trustees removed his collection upon his death. The trustees were the Principal of the University, George Husband Baird, Dr. William Wright, a physician in Edinburgh, Dugald Stewart, Patrick Walker, an advocate and Charles Stewart, a printer. Jameson was not included in their number although he had cared for the Museum after 1792. This meant that Jameson had to build up the Collection anew.

Jameson was a worthy successor in that by the time he became a professor he had had many years of training and was aware of

1. McLeod's Bundle 16, Shelf 36, Bay C, Edinburgh City Chambers. The letter is dated March 21st, 1780.
2. Ibid., letter n.d. 1785.
3. Evidence, I, 143.
the importance of an museum. He had also studied medicine at Edinburgh. As he had already been seen in other subjects, Jameson began to employ more practical methods of teaching than his predecessor. Where Walker had been content to demonstrate by means of specimens, Jameson made great use of the museum and field excursions. Where Walker's curriculum had been devoted to the "History of the Terrestrial Globe", and to the history of the three "Kingdoms of Nature" (fossil, vegetable and animal), Jameson gave more time to Geology and Mineralogy. Both differences illustrate that Jameson moved with the times in using practical techniques for teaching purposes and covering subjects consonant with an industrial age and with a period that became absorbed with the origins of the world.

Jameson's own successor, Edward Forbes, summarized his achievement: "The value of professional worth should chiefly be estimated by the number and excellence of disciples. A large share of the best naturalists of the day received their first instruction in the science, that was afterwards to prove their fountain of honour from Professor Jameson. Not even his own famous master, the eloquent and illustrious Werner, could equal him in this genesis of investigators. . . . Valuable as were his writings, each, when estimated with regard to the position of science at the time of its issue, an effective advance - his pupils were even more valuable. The greatest praise of a great professor is that which proclaims he has founded a school. And where else in the British Empire, except here, has there been for the last half century a school

2. Ibid., XV, 305-306.
of Natural History?" Laurence Jameson, the Professor’s nephew, wrote in his biography: "Young men at this period were in great demand in all the departments of life, and more especially those well versed in Natural Science. Jameson took good care ... to drill them well in Practical and Theoretical Knowledge". For Sir Robert Christison, the causes of Jameson’s success were the popularity of his subject, his earnestness as a lecturer, his enthusiasm as an investigator and his museum.

Whatever else is said later about the harmful effects of Werner’s doctrines, which Jameson so much espoused, the great benefit of Jameson’s years at the School of Mines in Freiburg was in training him as an observer of mineralogical appearances. All at the school were required to go down the mines whereas Jameson’s observations under Walker had been voluntary and not part of the systematic course. Hence, Jameson’s practical knowledge was unrivalled and in his own teaching, it was the emphasis on practice that was so marked. His poor style of lecturing did not matter as much as if he had been Professor of Moral Philosophy. Griscom wrote: "His manner is tame and feeble, and, having spent much time at the school of Freiburg, under the great founder of scientific mineralogy, Professor Werner, he has acquired a German accent, which, to say the least, adds no grace to his delivery."

3. Christison, I, 90.
4. Griscom, II, 349. Jameson imitated German practice in more ways than his accent: S.H. Spiker, the Librarian to the King of Prussia, visited Edinburgh in 1816 and wrote of Jameson’s lectures that "the students sat in the German manner, on benches rising amphitheatrically above each other, diligently busied in taking notes. Professor Jameson [was] (drest in a black gown, similar to that worn by our clergy in the exercise of their functions)." (S.H. Spiker, Travels through England, Wales, and Scotland in the Year 1816, 2 vols. (London, 1830), I, 169.)
A feature of Jameson's syllabus was its extensiveness.\(^1\) The course covered "General and Particular Details and Views on Meteorology, Hydrography, Mineralogy, Geology, Botany and Zoology". In his consideration of Water, he discussed its importance both to man and nature; in Geology, he treated of the earth's composition, structure and mode of formation; and he dealt with botanical matters that impinged on other departments of natural history. In Zoology, he began with Man before going on to Vertebrate and Invertebrate Animals and lectures on the Philosophy of Zoology. The first lecture under this heading was "Origin of the Species of Animals". He concluded the course with lectures on such matters as the collecting, preserving, transporting and arranging objects of Natural History. No less than 273 different lecture topics were listed in the syllabus. When asked by the 1826 Commissioners if he completed the entire course of lectures in one session, Jameson replied: "Some seasons I have gone over the whole in a particular way; in other seasons I have taken a more extended view, and I have been obliged to divide it one half in the winter, and the remaining portion in the summer".\(^2\)

Jameson had five "modes" of teaching Natural History.

He lectured and demonstrated objects of Natural History. He conversed with students one hour before the lecture and also after it. He met those attending his course three times a week, often six days a week, in the Museum. At these meetings he inquired as to his students' progress and proposed exercises. The exercises included writing

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1. The ensuing details are based on *Syllabus of Lectures in Natural History*, (Edinburgh, 1821). The pamphlet is in E.U.L. MSS. Gen. 615.
descriptions of objects of Natural History with which they were previously unacquainted. Jameson considered that a full description taught the correct way of doing it - descriptions were "a principal object in the study". Lastly, Jameson undertook field excursions: on these he would show students the way to carry out investigations in Natural History - the excursions were to the country roundabout or to the Western Isles. He showed them how to examine appearances in the mineral kingdom, pointed out interesting animals and any atmospheric phenomena which might occur. He also explained the nature of springs, lakes and similar features which occurred on the walks.¹

The excursions, considered Jameson, corrected any mistaken ideas which might have been formed in the classroom. Furthermore, they "also prepare for travelling and for the active and accurate pursuit of Natural History".² In their Report, the Commissioners noted: "Although the Professor is generally attended in his expeditions by the greater number of his pupils, no confusion arises. On the contrary, the information is equally shared by all, and an universal feeling of satisfaction and delight is the constant result of these peripatetic exercises".³

Professor F.H. Stewart, the present Professor of Geology, spoke in his inaugural lecture of the value today of the Edinburgh environs for Natural History, and of which Jameson made full use over 150 years ago: "We have one of the finest positions in the world for teaching and research. On

¹. Ibid., I, 141. Jameson's commitment to practice as shown in the field excursions even caught the attention of a German, the Librarian to the King of Prussia: "The practice introduced by Jameson of accompanying his scholars on mineralogical and geognostical excursions in the neighbouring country, to give them an idea of the subjects of his lectures on a great scale, is extremely praiseworthy". (Spiker, I, 169-170).
². Evidence, I, 142.
our doorstep is a considerable variety of sedimentary rocks, with their attendant fossils, formed in deserts, lakes, swamps, estuaries, and the sea, together with the eroded wrecks of ancient volcanoes of many different ages and types. Only a little farther away are the deeply eroded roots of an ancient mountain chain, bristling with problems of structure, igneous activity and metamorphism. Still not very much farther, in north-western Scotland, are the most recent volcanoes, and also the oldest rocks of our country. Although these rocks have provided many of the fundamental concepts of geology, they will yield more and more of their secrets to modern methods of attack".¹

Jameson himself provided more than the environment; an anonymous obituary wrote of the expeditions: they "did more towards the making of geologists than any instruction that has been given within the century".² The author continued with a lengthy but detailed account of the value of the exercise, which may have been first-hand: "During these Saturday expeditions he made the personal acquaintance of every student and amateur member of his class who displayed a knowledge of, or love for, natural history. Friendships between Professor and pupil then arose, which eventually extended over years, and led to a voluminous correspondence. His advice was eagerly applied for and regularly given, and many of the best scientific writings of his time owe some part of their excellence to his suggestions and revision. The men who became thus attached to him never forgot the college in which they had studied,

and from time to time sent valuable and interesting specimens and collections to be applied by their old master to the development of the University Museum. One beneficiary of Jameson's excursions was the future railway engineer, Robert Stephenson. He, like many others, was infected with enthusiasm for geology while a student at Edinburgh and went with the Professor "along the Great Glen of the Highlands, in the line of the Caledonian Canal, of which trip Robert Stephenson spoke glowingly in after life."

Jameson's practical schemes for didactic purposes were even more elaborate than those of Hope or Graham. He particularly emphasized these practical aspects "when the class appears to be composed of younger men", so that he could appeal to their interest. Several items in his curriculum were treated by other classes - Botany, for example, or meteorology. Jameson was asked about this by the Commission and he considered the situation advantageous: the Chemistry professor dealt with meteorology "with the view of illustrating certain chemical doctrines. The professor of Natural Philosophy also treats in his lectures on Meteorology, with the view of illustrating doctrines in Natural Philosophy, whereas I, as Professor of Natural History, in the extensive view I give of Meteorology, describe the different meteoric phenomena, as objects of Natural History, and according to the methods and principles of Natural History, and in explaining the phenomena adopt it as it may fit the views of the chemist and natural philosopher. By

1. Ibid.
3. Evidence, I, 146.
these interferences, if such they can be called, the same subject is brought before the student in different forms, and thus his knowledge of it is extended and improved". ¹

The Natural History Museum was, thanks to Jameson, the University of Edinburgh's outstanding facility. Its importance to the teaching of the subject has already been indicated. It was considered of great value nationally and internationally. Jameson made two statements to this effect to the Royal Commission: "I now take the opportunity", he said, "of saying that it is understood in the public offices, that, of those articles of Natural History brought home by expeditions fitted out at the public expense, part is to be sent to the Royal Museum in the University. . . . One part of each collection is deposited in the British Museum, another part is sent down to the King's Museum in the University. We have hitherto got a fair proportion of the articles collected by our travellers and voyagers; so that now we possess a most interesting series of objects of Natural History, illustrative of many of the discoveries and observations made during the different expeditions set on foot under the sanction and protection of Government".² Later he was asked if the Museum had acquired a name on the Continent: "I think it has;" he replied, "from the journals and books of travellers I have met with, it stands very high, and by those who have attended to these things it is considered now as probably the fourth or fifth collection in Europe".³

¹. Ibid., I, 145.
². Ibid., I, 144.
³. Ibid., I, 145. The following "great works on Natural History" were produced after their authors had used the Edinburgh collection: John James Audubon's Birds of America; Prideaux John Selby's Illustrations of British Ornithology; Thomas Brown on the same subject and his Illustrations of the Conchology of Great Britain and Ireland; Alexander Wilson's Illustrations of Zoology and William Jardine's and Selby's Illustrations of General Ornithology. (Ibid., I, 494).
Robert Jameson was entirely responsible for rebuilding the Natural History Museum to these heights of respectability. Of the articles remaining after Walker's trustees had removed his Collection, the birds were so decayed that they had to be thrown out. Jameson then placed his own collection in the Museum and assiduously collected more between 1804 and 1819. Throughout the years, the University and the Town Council co-operated by increasing the space available in the College Buildings. In 1804, Jameson was provided with "a very spacious and handsome museum". Collections of minerals and books were accumulated, including those of James Hutton, the Edinburgh mineralogist, and William Thomson of Palermo. In 1807, Jameson like Walker, suggested that public offices should circulate printed instructions for collecting objects for the Museum. The Lord Provost, Donald Smith, and Principal George Husband Baird wrote to Lord Castlereagh on April 20th, 1807 about the welfare of the institution. They suggested that Castlereagh "should convey from time to time, such communications to the servants of Government, or to others in our foreign settlements and dependencies, as may be laid before him by the Professor of Natural History, and as may lead them to collect and transmit such objects as will be fit for the purpose of the Museum". Castlereagh agreed: "it will give me the truest satisfaction, if I shall be enabled to further the views of the University.

1. Ibid., I, 467. Jameson's comments on what remained of Walker's Museum are very similar to those made by Walker about Ramsay's collection. This might suggest that the Professors of Natural History wished to make their own impression on the Museum without the encumbrance of a previous professor's preferences.

2. Ibid.


4. Evidence, I, 182.
over which you worthily preside, and to promote those particular objects to which you point my attention." 1

The result of this appeal necessitated the fitting up of a second museum. The collections were increasing so much that they had to be stored, thus risking damage, and the Commissioners for the College Buildings were convinced of the urgent need. 2 It was in 1819 that the Senatus approved Jameson's purchase of the Dufresne Collection. Dufresne was an assistant at the Jardins des Plantes in Paris and he preferred his collection to go the University of Edinburgh rather than to the Emperors of Austria and Russia, both of whom offered more. 3 Funds were raised from the University's Reid Bequest and from City bankers; a successful application was lodged with the Lords of the Treasury for Customs exemption. There was even money left over to buy some valuable items in William Bullock's collection. 4 The Admiralty ordered Rear-Admiral Otway of Leith to send a vessel from Leith to Le Havre to bring over the Dufresne Collection. 5 The extent of Government co-operation both in securing objects and exempting them from import duty can be gauged from the list submitted to the Royal Commission. 6 Donors included the son of Sir John Marjoribanks, Lord Provost of Edinburgh 1813-1815, who was a London merchant; the Marquis of Hastings, Lord Dalhousie and Joseph Planta, Castlereagh's Secretary, who addressed his package to his employer.

1. Ibid.
2. Ibid., I, 167.
3. Ibid., I, 146.
4. College Minutes, III, 183 and 187. See Ibid., III, 190 for further purchases. The dates were March 9th, April 24th and June 3rd 1819. William Bullock was a traveller, naturalist and antiquarian of some repute.
5. Evidence, I, 1827.
6. Ibid., I, 1827 - 1847.
In May 1820, the Senatus expressed its gratitude to Castlereagh, for securing objects of interest for the Museum from foreign dependencies. Thanks were also given for arranging special passage through the Customs. The collections in the first and second museums were finally housed in one museum in the new College in 1820. However, Jameson owned to the Commission in 1826, the increase had been such since then that the Collection had doubled. He asked and received yet more consideration from the Buildings' Commissioners. He "ordered a suite of rooms, five in number, to be immediately fitted up. This beautiful series of rooms, . . . is nearly filled up with beautiful and interesting objects of natural history. The museum is rapidly increasing, and will, ere many years pass, equal in extent the splendour, some of the most distinguished museums in other parts of the world. In order, however, to enable me to realize these hopes, another series of rooms must be provided. The Commissioners for College Buildings, . . . are now considering of the propriety of erecting another gallery of natural history, on the ground to the westward of the present museum." ²

By the time of his death, "The vast collections of natural history, not only in the East and West Museums, but stored up in the store-rooms, are enormous. We understand that there are nearly 40,000 specimens of rocks and minerals, geographically arranged; 10,000 specimens of fossils; 800 specimens of crania and skeletons; 8,000 birds; 900 fishes and reptiles; 900 invertebrate animals; the collection of insects very large consisting of many thousand specimens; 300 specimens

2. Evidence, I, 167-169/.
of recent shells. The collection of drawings, casts, models, geological and geographical maps, and of instruments used in the survey of countries, is very valuable".¹ The Museum has been discussed at length because along with the excursions it was a vital part in Jameson's scheme of things - "the need of first-hand contact with the materials of science".²

The University of Edinburgh was also distinctive in its training facilities because Jameson ensured that thanks to Government co-operation, one of the finest collections in Europe would act as a stimulant to his students. In considering his students it will be seen that his prognosis was not misplaced. The Natural History Museum's nearest rival was the British Museum which was not an arm of an academic institution.

Certain observations need to be made when considering the explorers and naturalists who were educated at the University of Edinburgh. As with the students of Stewart or Playfair or Leslie it is, of course, impossible to say that it was their University education that dictated their life's work. All that can be said is, that given they went to the University of Edinburgh, they would have benefitted from an enthusiastic professor, a detailed course and unparalleled facilities for the time. They would have received a systematic training whereas those who acquired their knowledge of natural history elsewhere or by private study would not have had that benefit. It does not necessarily mean that the Edinburgh trained naturalists were better but when a

discipline is in its infancy, it is clear that those receiving a systematic education in the known body of knowledge will have some advantage.

Secondly, Natural History was in vogue at the time. Jameson alone was not responsible for the output of early nineteenth century naturalists. It is true that he appealed to the instincts of young men by offering them a Museum rather than a lecture room in which to work, and outdoor excursions on which to go. But this is not a sufficient explanation. It is necessary to remember the Enlightenment with its interest in nature, and the Industrial Revolution with its increased use of minerals. Furthermore, there was the lure of overseas trade, expansion and discovery, which led to the Government sponsorship of expeditions to all parts of the world - South America, Africa, India, the Arctic. A vital part in these and private expeditions was played by the naturalist who could determine the advantages and disadvantages of the climate, soil, rocks and flora of the various territories. To the three challenges of the Enlightenment, the Industrial Revolution and overseas expansion the University of Edinburgh responded.

The figures of Jameson's class attendance as given to the 1826 Commission are unsatisfactory in that the only years accounted for are 1807-1808 (50 students) and 1825-1830 (all 200). Nevertheless, Jameson told the Commissioners that when he first took over the Chair he was drawing 35 students whereas now he could count on 200. There was a great variety of people attending - surveyors, civil engineers, Army engineers, silversmiths, jewellers and farmers. Jameson said, of the Army engineers - "They consider that the Geological department of the

2. Ibid., I, 144.
course is intimately connected with part of their operations as engineers.¹

Of Jameson's students from 1804-1826 no less than seven ultimately held university chairs: James David Forbes, who became Professor of Natural Philosophy at Edinburgh; Edward Forbes who succeeded Jameson as Regius Professor here; Robert Grant, Professor of Comparative Anatomy in the Zoology Department of University College, London; James Nicol, Regius Professor of Natural History, Aberdeen, who in his time was also Professor of Geology at Queen's College, Cork, Assistant Secretary of the London Geological Society and wrote much on the relations of the Highland rock-masses; Louis-Albert Necker de Saussure, the Professor of Mineralogy and Geology at Geneva; Edward Turner, Professor of Chemistry, University College, London; and William MacGillivray, Jameson's assistant and secretary in the years under study, and late Regius Professor of Natural History at Aberdeen. MacGillivray's writings comprehended ornithology, botany and geology.

Among Jameson's students who became officials of the London Geological Society were William Henry Fitton, a President who wrote prolifically on his stratigraphical work, and Leonard Horner, a Secretary for whom "the progress of Geology, and the prosperity of the Society, claimed his most zealous attention, and became the chief occupation of his leisure hours".² In 1846 Horner wrote to his son-in-law, the eminent Geologist Charles Lyell: "You will think that Geology excludes all other subjects from my mind. It is pretty nearly true that every hour unoccupied by factory work, is given to Geology".³

¹. Ibid., I, 142.
³. Ibid., II, 95. The letter is dated March 1st, 1846.
Among the geologists who had the advantage of an Edinburgh training were Ami Boué, later President of the Geological Society of France, who undertook research in Scotland, France and Germany resulting in his books on comparative geology. He and de Saussure exemplify a trend of continental students coming to Edinburgh as Jameson had earlier gone to Freiburg. Other students included Sir William Jardine, the ornithologist; the second Earl of Cathcart, who became not only a mineralogist but also the Governor and Commander-in-Chief of Canada; Charles McLaren, the founder of The Scotsman and editor of the sixth edition of the Encyclopedia Britannica who wrote books on the topography of the Plain of Troy and on the geology of Fife and the Lothians; Sir George Steuart Mackenzie, the mineralogist and co-author of a book on research travels in Iceland; John Fleming whose naturalistic and geological work in Scotland included showing that Old Red Sandstone was a fresh water formation, a mineralogical survey of Shetland and a book on British animals; and William Baird, an Assistant in the Zoology Department of the British Museum who wrote an important book on British insects.

Another outstanding Jameson student was Samuel Hibbert, later Hibbert-Hare. He undertook geological work in France, Italy and northern Germany but his great discovery was chromate of iron in the Shetlands. The discovery was an important one as it was found in considerable quantities. Hitherto, the ore, used extensively in various manufactures, had been imported from America at considerable expense.1 Hibbert asked Jameson to test the quality of his discovery on which Jameson commented: "The ore is excellent, fully as good as that from

1. Mrs Hibbert-Hare, The Life and Correspondence of Samuel Hibbert-Hare, (Manchester, 1882), 249.
North America, which supplies the European market. I shall see that your important discovery is made known to the world.¹ The announcement was made in several scientific and lay journals and the discovery was a positive help to Britain in the age of the Industrial Revolution.

Four of Jameson's students became significant explorers - Sir John Richardson, William Scoresby, Walter Oudney and Alexander Gordon Laing. Richardson was a companion of Sir John Franklin, being his surgeon and naturalist on the expeditions of 1819-1822, 1825-1827 and the expedition sent to search for Franklin from 1847-1849. Scoresby was a naturalist on many voyages to the Arctic while Oudney went to other extremes of heat when accompanying the Bornu Mission of 1822-1825, which discovered Lake Chad. Oudney was specifically invited by John Bynon, Chief Clerk in the Secretary's Department of the Victualling Board to be the natural history expert on the mission.² Finally, Laing discovered the source of the Niger in 1822. Indeed, together with the work of Mungo Park, who was at Edinburgh many years before Jameson was a professor, and who discovered the greater part of the Niger's course, Laing and Oudney took a leading part in putting that river on the map.³

¹. Ibid., 256.
While the University was an impressive training ground, it also had a major part to play in the struggle for survival between two opposing geological theories. In order to explain the University's singular contribution to the debate it is necessary to refer back to the work of two men, James Hutton of Edinburgh and Abraham Gottlob Werner of Freiburg, for it was over their rival contributions to geology that the battle was fought.

James Hutton (1726-1797) is the great neglected figure of the Scottish Enlightenment. Although contributing to very different fields, his contribution to Scottish and indeed, European intellectual life was as great as that of David Hume, Adam Smith, Joseph Black or William Robertson. Yet, little of substance has been written about him; the geologist Sir Edward Battersby Bailey's James Hutton: The Founder of Modern Geology was more a comment on Hutton's writings and a slight appreciation of his contribution, than an attempt to estimate his full significance and the depth of his ideas. A very speculative assessment was made by Sergei Ivanovich Tomkeieff - "James Hutton and the Philosophy of Geology" in the Proceedings of the Royal Society of Edinburgh.

However much of a challenge may be posed by the dearth of research into James Hutton the limits of this study only allow a brief summary of his life and work. He was an M.D. of Leyden and made his

money from the manufacture of ammonium chloride. His interest in mineralogy and geology began when he studied agriculture in Norfolk, so that he could run his farm in Berwickshire more efficiently. In the 1760s he spent his time on mineralogical journeys, mixing in Edinburgh literary society and conducting chemical experiments. He was among the founder members of the Royal Society of Edinburgh to which he first delivered his ideas on the Theory of the Earth in 1783. His writings included a metaphysical work, Investigation of the Principles of Knowledge.

It was his Theory of the Earth that had most repercussions. One writer went so far as to say that it opened new worlds to research and speculation, and established principles which, in the course of time revolutionized the whole trend of scientific thought.¹ For W.H. Fitton, writing in 1839 "it was Hutton's fate to be too far in advance of his contemporaries. At a time when geological information was rare in every part of Europe, and in England almost unknown, he was, we firmly believe, a geologist of the highest order; and he combined such sagacity with great original views as to the scope and object of geological enquiry, in connection with other departments of physical science, and such a just anticipation of what it was likely to become in after years, that we know no other name in Geological Theory which can be placed beside his own."² The work, which was first published in the Transactions of the Royal Society of Edinburgh in 1788 and revised by 1795, was divided into four parts. The first two discussed the origin of rocks, the third showed that present land areas of the world were composed of rock strata

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which had consolidated over the ages, under the sea, while the fourth
demonstrated that older continents and islands, now disintegrated,
provided the materials which composed the more recent land areas. 1

Hutton thought that the events of past geological ages
could best be interpreted by a careful examination of present conditions
and processes. There were primary and secondary materials on the
earth's crust - the secondary being composed of sandstone, pebbles and
limestone which came from the ocean bed. The primary was such material
as granite which was usually underwater. In past ages, said Hutton,
the earth was a vast ocean with the occasional appearance of islands
and continents. A powerful agency transformed the situation to make
new islands and continents by converting the loose secondary material
into solid rock and raising the new consolidations and primary rocks
above sea level. That agency was heat. Heat was also responsible
for pushing up the rock-strata which had amassed under the ocean, and
with which Hutton dealt in Part III. He spoke of the part played by
volcanoes in raising continents to the surface.2

In dealing in Part IV with pre-existing Continents and
islands, Hutton discussed what happened to land surfaces once they had
emerged. To quote von Zittel: "He describes the effects of atmospheric

1. See Karl Alfred von Zittel, History of Geology and Palaeontology to
the End of the Nineteenth Century, trans. Maria M. Ogilvie-Gordon,
(London, 1901), 69-70. Von Zittel is used for the subsequent
summary of Hutton's Theory.
2. The role of volcanoes in geology had been mentioned by the Greek, Strabo,
1800 years before. (Bailey, Hutton, 45) It should be mentioned that
John Walker also noted unconformities as early as 1770 - eighteen years
before Hutton's paper was delivered. Walker observed of the Pentland
Hills that secondary strata overlapped the Primitive at the foot of
mountains. He also proposed that fossils could be used to determine
chronology and in this, was also far ahead of his time. (Walker, xxxix
and xlvii). Walker's contributions were not generally known until
Professor Scott edited the lectures.
weathering, of chemical decomposition of the rocks, of their demolition by various causes, and the constant attrition of the soil by the chemical and mechanical action of water. . . . Hutton impresses upon his readers the vastness of the geological aeons necessary for the completion of any such cycle of destruction and construction". 1 Hence, the Theory can be summarised as follows: existing continents are worn away by water, the particles sink to the bottom of the sea where they consolidate. Internal heat causes the new rock masses to rise and form new continents. It is a cyclical, continuous and never-ending process. As John Playfair, Hutton's disciple said: "in the economy of the world, we see no mark, either of a beginning or an end". 2

It is clear that Hutton's residence in Edinburgh enabled him to ascribe a certain importance to the agency of internal heat. As Professor Stewart said, all around Edinburgh was evidence of heat in the form of Arthur's Seat, Salisbury Crags and Castle Rock. 3 Furthermore, the laws of heat were first generalized in Scotland and by Hutton's close friend Joseph Black. But Hutton has relevance to a wider intellectual environment than that of Edinburgh: he had a contribution to make to the Aristotelian idea of the Great Chain of Being, with its concept of there being continuity in Natural History. Leibniz had suggested that the essential characteristics of the universe were plenitude, continuity and linear gradation. 4 The degree of consciousness determined the place in the Chain of all created things. An eighteenth century

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1. von Zittel, 71.
belief was that the principle of continuity implied that man only differed infinitesimally from the nearest "so-called non-human species". 1 This belief gave an impetus to that research which concerned itself with finding the missing links in the Chain. One effect was the illustration of "the prodigious fecundity of Nature and at the same time . . . her admirable thrift. Life, it seemed, was ubiquitous. No bit of matter was so small that it could not afford lodging and nutriment for living beings still smaller; animate matter itself was everywhere turned to use to sustain yet more animate matter and this in turn yet more, and so on without ascertainable limit". 2

While Hutton, as will be seen, wrote at least one passage on biological evolution, he also applied the principles of plenitude and continuity to the evolution of the earth. The materials that went to the making of the earth were continually being used in Hutton's cycle of destruction and construction. He appreciated that a great length of time was necessary for the creation of each stratum. As others had seen in the biosphere that "no bit of matter was so small that it could not afford lodging and nutriment for living beings still smaller" so Hutton saw the same process at work in the geosphere. As Newton had given impetus to astronomical research, so Hutton stimulated research in Geology.

Playfair used a physical metaphor, concerned with astronomy, to describe Hutton's system: "The geological system of Dr. Hutton,

1. Ibid., 195.
2. Ibid., 238.
resembles, in many respects, that which appears to preside over the heavenly motions. In both, we perceive continual vicissitude and change, but confined within certain limits, and never departing far from a certain mean condition, which is such that, in the lapse of time, the deviations from it, on the one side, must become just equal to the deviations from it on the other. In both, a provision is made for duration of unlimited extent, and the lapse of time has no effect to wear out or destroy a machine, constructed with so much wisdom. Where the movements are all so perfect, their beginning and end must be alike invisible."¹

Hutton was no mere theorist but undertook journeys to show the validity of his ideas. Of his mineral history of the Isle of Arran, for example, Sir Archibald Geikie, albeit a great admirer of Hutton, wrote "This striking essay is a masterpiece of acute observation and luminous generalization. Had it been published in his lifetime, it would have placed him at once as high in the ranks of field-geologists as he admittedly stood among those of the speculative writers of his time".² It is important to emphasize that Hutton did not simply concoct a theory, nor did he leave it entirely to his disciples to prove him right. Hutton, like Werner, was a practical geologist.³

Abraham Gottlob Werner was the other European geologist whose work overshadowed the University of Edinburgh in the period.

¹. Playfair, "Illustrations", Works, I, 431-432.
². James Hutton, Theory of the Earth, with Proofs and Illustrations, Vol. III, ed. Sir Archibald Geikie, (London, 1899), xiv. The essay is to be found on pages 191-267. The manuscript of this volume was not published at Hutton's death. It passed to Playfair, and thence to Webb Seymour who left it to Leonard Horner.
³. Hutton's 1783 paper to the Royal Society of Edinburgh was entitled "Theory of the Earth, an Investigation of the Laws observable in the Composition, Dissolution, and Restoration of Land upon the Globe". On which title Murray Macgregor remarked: "The use of the word "observable" ... provides a key to the whole body of doctrine he expounded". (M. Macgregor in Proc. Roy. Soc. Edin. LXIII, 353-354.)
Werner's ideas were well established by the time Hutton delivered his paper to the Edinburgh Royal Society. He was the Inspector of Collections and professor in the School of Mines for prospective mining captains and engineers at Freiburg from 1775. All his research and that of his students, including Robert Jameson, was restricted to Saxony and the adjacent country. 1 Werner, having studied the rock-structure of the area assumed it was the same over the entire world: "He affirmed that it consisted of a certain number of layers or coats, lying everywhere in the same order with respect to each other; so that, whenever we meet with one of these layers, we may be certain of finding the next in the series immediately above and the one preceding it in the series immediately below." 2 To confirm this, geologists at Freiburg began to examine rock structure and rock strata and they were urged on to do this by the enthusiasm with which Werner inspired his students. 3 The result of all these researches was an increase in information on the appearance of rocks and the rise of ideas on how rocks were formed. It is this last matter that is of concern here. One more feature, however, of Werner and his school was the belief that minerals were highly important to the history of man: Werner even traced national languages to mineralogy on the grounds that dialects became more distinct as natural obstacles to communication became more insurmountable. 4 Sir Edward Bailey commented: "Werner saw the whole world through mineral spectacles. Scenery, industry, population, civilization, architecture, sculpture, agriculture,

3. Werner's influence on Jameson, for example, is elaborated below.
commerce and war are all regulated by mineral distribution; and Werner delighted to proclaim the fact with an eloquence which proved irresistible. 1

The Wernerian idea about the origin of rocks started from the premise that originally the whole world was covered by sea. The first stage saw the crystallization of primitive rocks out of the salt water. The same chemical solution caused the second stage of "transition strata" (slates, shale) while the third stage saw the recession of the waters. The rocks now produced winds in the fourth stage, which in their turn led to such new strata as clay, sand and pebbles. Finally, after the waters had totally receded from the present continental areas, volcanic activity produced new deposits. For the Wernerians, the volcanic activity could only take place after the disappearance of the water. 2

There were two main differences between the Wernerian and Huttonian theories: first, that Hutton considered heat and water to work together in the formation of the earth while Werner only allowed for heat after the action of water. Secondly, Werner saw the process as taking place in particular stages while Hutton saw it as a continuous and continuing one. The advantages of Wernerianism, which research ultimately proved erroneous, were that it was simple and that Werner himself trained and inspired a great many men to undertake stratigraphical observations. 3

2. This is a summary of Charles Coulston Gillispie, Genesis and Geology: A Study in the Relations of Scientific Thought, Natural Theology, and Social Opinion in Great Britain 1790-1850, (Cambridge, Massachusetts, 1951), 44. In the literature on the geological debate, of which Dr. Gillispie's is one item, the terms Neptunist (Wernerian) and Vulcanist (Huttonian) are used. The terms Wernerian and Huttonian are used here not only to avoid confusion but because the other terms are meaningless. Werner did not believe water to be the sole agent in creating rocks - volcanoes had a place in his scheme which the term Neptunist does not wholly convey. Similarly, the terms Vulcanist and Plutonist do not do justice to Hutton since he did not only emphasize volcanoes or heat. Water had a definite place in his Theory. Hence, having given a detailed account of what each man believed, it is preferred to make adjectives of their names when describing their ideas or the ideas of their disciples.
The major disadvantage of Wernerianism apart from being wrong, was that of generalizing about the formation of rocks on the basis of the Hartz mountains. On the other hand, the advantages of Huttonianism included the ability to explain matters which were inexplicable to the Wernerians—such as why land vegetables were found in sea deposits—and being strictly scientific. Huttonians were prepared to discard or modify hypotheses which did not concur with the evidence.

Before moving the discussion to the Edinburgh battlefield it is necessary to indicate some of the reasons why Huttonianism did not make much headway until certainly 1802—fourteen years after Hutton’s paper was published. First, Wernerian ideas were firmly entrenched; secondly, and connected with the first point, Werner’s ideas fitted in neatly with Biblical chronology which only allowed a few thousand years for changes on the earth. There are other reasons—Hutton’s style of writing was tortuous, and his ideas appeared to have no relation to traditional geological ideas. He also never held a professorship which might have helped to spread his views.

Because Hutton proposed "no beginning" and "no end", he was seen as an atheist and free thinker—especially as his Theory was current at the time of the French Revolution. While Hutton appealed to Nature herself for evidence of his Theory, Werner co-operated with "a world given over to dogmatism and preconceived theories, to fantastic explanations invoked to account for natural phenomena, to barren speculations that sought to bring the facts of nature into conformity with the

1. Ibid., 48.
2. 1802 was the year Playfair’s Illustrations of the Huttonian Theory, the explanation of Hutton’s tome, was published.
traditional Mosaic chronology”. To the attacks on Hutton Playfair replied in his biographical memoir and in his Illustrations of the Huttonian Theory. Hutton was misunderstood: his Theory was not concerned with the origin of the world but with the changes that had taken place since. Furthermore, the Scriptures were not scientific treatises: "The theory of Dr. Hutton stands here precisely on the same footing with the system of Copernicus. for there is no reason to suppose, that it was the purpose of revelation to furnish a standard of geological any more than of astronomical science. It is admitted, on all hands, that the Scriptures are not intended to resolve physical questions, or to explain matters in no way related to the morality of human actions; and if, in consequence of this principle, a considerable latitude of interpretation were not allowed, we should continue at this moment to believe, that the earth is flat; that the sun moves round the earth; and the circumference of a circle is no more than three times its diameter. It is but reasonable, therefore, that we should extend to the geologist the same liberty of speculation, which the astronomer and mathematician are already in possession of; and this may be done, by supposing that the chronology of Moses relates only to the human race. This liberty is not more necessary to Dr. Hutton than to other theorists”. Hutton was not concerned whether there was a God who originally created the world. Rather, he assumed the world’s existence and indicated changes which had taken place and which were continuing to take place.

Geology is a science that is highly dependent on other sciences, such as physics and chemistry and this Hutton fully realized.

3. Playfair, "Illustrations", Works, I, 137.
He was experienced in other sciences and was able to use that knowledge to explain his Theory. Werner, on the other hand, increased his already great chance of error by ignoring developments in other branches of science. Playfair wrote that this rejection of help was "a puerile affectation" and rendered his theory inconsistent with established knowledge.¹ Playfair also thought that as Werner communicated his theory by oral instruction rather than by writing books, he escaped the ordeal of public criticism.² For the great historian of science, George Sarton, the contrast between Hutton and Werner was between "un esprit encyclopédique mais essentiellement pratique" and Werner who "qui était en somme un esprit assez médiocre et cela explique en partie sa grande popularité". Werner's great merit lay in training good observers.³ But his geological theory, disseminated either by himself or his pupils and followers "was disastrous to the higher interests of geology".⁴ By ignoring other sciences, other geological research and in seeing the Bible as scientifically accurate, Werner impeded the progress of geological research. A concrete example of how research was hindered will be seen when the activities of Robert Jameson as Keeper of the University of Edinburgh Natural History Museum, are considered.

2. Ibid., XVIII, 60.
4. Archibald Geikie, The Founders of Geology, (London, 1905), 203. Concerning a passage from Werner's Theory of Veins Geikie wrote: "It would be difficult to cite from any other modern scientific treatise a series of consecutive sentences containing a larger number of dogmatic assertions, of which almost every one is contradicted by the most elementary facts of observation". (page 216)
Hutton and Werner have been discussed at such length because an understanding of their theories and influence is vitally important if the contribution of the University to Natural History at this time is to be comprehended. For Edinburgh became the centre of the struggle between the Huttonians and the Wernerians. By 1804 the ablest of Werner's pupils, Robert Jameson, had joined the University staff, there to do battle with John Playfair and Thomas Charles Hope, as well as others in the City of Edinburgh. In its obituary of Jameson, the Monthly Journal of Medical Science commented: "Edinburgh was the great centre of geological controversy. The supporters of Hutton and the followers of Werner were ably represented in the Scottish metropolis, and each party appealed confidently to the phenomena exhibited in profusion by rock formations of the vicinity... Jameson fought on the losing side, but did much good service to science by his opposition to the winning theory, for facts became in consequence far more carefully studied than they would otherwise have been".  

The responses in Edinburgh to Hutton took the forms of John Playfair's writings and geological travels, Sir James Hall's experiments and the adoption by the Edinburgh Review of a Huttonian standpoint. The responses to Werner all stemmed from Jameson - his students, writings, the societies he sponsored and above all his use of the University Museum. Playfair was Hutton's first champion but as his chair could not, without contortions, encompass anti-Wernerian propaganda he was unable to train students on the scale of Jameson. Playfair set out to make the Huttonian theory more popular and perspicuous so that it

2. Playfair used the Edinburgh Review for Huttonian ends in his frequent contributions. According to Gillispie in Genesis and Geology: "The reviews, during the 1820's devoted more space to keeping the educated reading public abreast of the progress of natural history than they did to all the other sciences put together". (page 115)
would become better known. In fact he did more: apart from employing his known literary skill to great advantage, he incorporated into his book his own original research which either proved the Huttonian theory or elaborated on subordinate aspects of it. One of the reasons why Hutton's ideas had not made much headway by 1802 when Playfair's Illustrations appeared, was the tortuous style in which the Theory was written. The ideas benefitted not only by Playfair's elegant writing but also by his research. He used for Hutton a similar technique to the one he used to popularise the continental mathematicians. Only in this case, he added the dimension of original research which had been lacking in his contribution to mathematics and natural philosophy.

Playfair was a much respected authority as a geologist: Sir Charles Lyell wrote some years after his death that only Playfair could have resolved the question of how valleys were formed: "The interior of France is so peculiarly adapted for the decision of this question, that we have great reason to regret the death of Professor Playfair so soon after his visit to Auvergne, and before he had published his observations on the subject". Sir Edward Bailey exclaimed: "Again and again we are amazed at the originality of one who modestly claimed the title of Illustrator". If the specialists are to be believed Playfair was more distinguished as a geologist than as a mathematician. W.H. Fitton wrote: "One effect of the popularity of Playfair's 'Illustrations' has been an almost complete oblivion of the original work, which is now scarcely ever referred to, even by those who have adopted Dr. Hutton's views. We

1. Playfair, "Illustrations", Works, I, 17.
2. von Zittel, 74-75.
think it probable, that very few geologists of the present day have read the book — and that many who have ventured upon criticising its doctrines, have derived their knowledge of them solely from the 'Illustrations'".  

Sir James Hall was unconnected with the University but he had a particular part to play in both chemistry and geology. He wrote to a London physician, Alexander John Gaspar Marret: "I battled myself during three years with old Hutton before I began to see his system in any favourable light and it required a good deal of time and much observation of my own before I could bring myself to swallow all his paradoxes". As Playfair had demonstrated the validity of the Huttonian theory by field research in Scotland and on the Continent, so Hall undertook laboratory experiments to test and prove it chemically. Between them Hall and Playfair not only bolstered the Huttonian case but interested others in it. Hall was not only a convert to Huttonianism but also to Lavoisier's new chemistry. His particular part was to work on the Theory and also to convert T.C. Hope to Lavoisier — hence leading to Hope's delivery of the first public anti-phlogiston lectures. In his use of chemistry to solve geological problems, Hall exemplified the interdisciplinary relationship of the sciences at this time.

2. N.L.S MS. 3813, f. 46. Letter dated May 14th, 1805.
3. Hall's day to day accounts of his experiments from 1798-1806 are in the National Library of Scotland and are entitled Chemical Experiments made with a view to obviate some of the difficulties in Dr. Hutton's Theory of the Earth, MSS. 5019 and 5020. They contain details of what he sets out to do, what he does, his equipment, results, the names of his helpers as well as sketches of the processes. In the S.R.O. are to be found seventeen volumes of Hall's diaries 1783-1831. They are similar to the material in the N.L.S. containing descriptions, accounts and observations of his experiments and his other interests. (see Dunglass Manuscripts, S.R.O. Section II, 315.)
4. V.A. Eyles, "The Evolution of a Chemist: Sir James Hall Bt., F.R.S., P.R.S.E., of Dunglass, Haddingtonshire (1781-1832), and his relations with Joseph Black, Antoine Lavoisier, and other scientists of the period", Annals of Science, XIX (September, 1963), 174.
One of Hope's students in 1816-1817 was Sir William Edmond Logan, founder and first director of the Geological Survey of Canada. Logan had made the first detailed map of the geology of the South Wales coal basin and a recent author has concluded that his interest in geology could have stemmed from his attendance at the University of Edinburgh during the years of the intense Huttonian-Wernerian debate. \(^1\) After all, Necker de Saussure had written in 1807: "Dr. Hope is not less zealous in the \(\text{Huttonian}\) cause ... he inveighs always with insolence in his lectures against the heretics who follow the maxims of a false prophet". \(^2\)

On the Wernerian side Jameson, rather than inveighing against Hutton merely ignored him. Sir George Mackenzie told the 1826 Commission: "I have attended Professor Jameson's lectures myself, and never heard him allude to Dr. Hutton's Theory or Collection". \(^3\) In 1808 Jameson had founded a natural history society in the University which he named after Werner. Of this society Geikie wrote: "I know no more melancholy contrast in geological literature than is presented when we pass from the glowing pages of Playfair, or the suggestive papers of Hall, to the dreary geognostical communications in the first published Memoirs of this Wernerian Society. On the one side, we breathe the spirit of the most enlightened geological philosophy, on the other we grope in the darkness of a Saxon mine, and listen to the repetition of the familiar shibboleths, which even the more illustrious of Werner's disciples were elsewhere beginning to discard". \(^4\) James Keir, an

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Edinburgh alumnus, Stourbridge glass manufacturer and member of the Birmingham Lunar Society wrote to James Watt: "I am little disposed to pay much respect to the Edinburgh Wernerians, as I consider they are occupied more with the pedantry of systems and names, than with the substance of science." For Professor James Ritchie, "Jameson was formal, a man of practical mind, limited in his interests and outlook, immersed in detail, not given to flights of the imagination" who so absorbed Werner's methods that he failed to retain his own critical acumen.  

One of the fruits of the debate was that both sides intensified their examination of rock structures and the like, in order to prove their respective theories correct. Playfair and Hall were not the only ones to undertake research. Both sides went to nature in the raw and the science of geology could not but benefit from all the activity. However, the Wernerians suffered some severe casualties from close examination of material: at least three of Jameson's distinguished students, W.H. Fitton, Ami Boué and Sir George Mackenzie became converts to Huttonianism.  

Touching the University itself more closely yet was the dispute over the use to which Jameson was accused of putting the Natural History Museum. The 1826 Commission was flooded with complaints about Jameson's attitude to the Regius Keepership. Those who complained included the Royal Society of Edinburgh, Sir George Mackenzie, Samuel

1. quoted in the Clough, Chemical Revolution, 99. The letter is dated October 21st, 1809.  
3. see Bailey, Hutton, 155 and Geikie, 263-264.
Hibbert and Sir David Brewster. The tenor of the complaints was that Jameson restricted entry to the Museum and only exhibited in it materials and collections which supported the Wernerian hypothesis. Jameson told the Commission that he only admitted applicants for entry to the Museum if they would do credit to the academic establishment, - the University of Edinburgh. He ascertained their worth and then decided. Prospective research students were allowed in unless they intended to publish: "But if they intended to publish, I would not allow them upon any account as the reputation of the Establishment might be affected by the publication of disreputable works". When asked how the University's reputation would be involved, he said that unscientific drawings and descriptions emanating from the Museum would hazard the scientific character of the Keeper. He had prevented the publication of scientific works: "I did it on the same principle, that the publications would have been disreputable to the University, from the author's want of skill in drawing and ignorance of language". Jameson, therefore, at the time of the Commission had the power to decide what was of credit to science and at his own discretion exclude scientists from one of the finest collections in Europe. As he was heavily committed to the Wernerian thesis, the power was abused.

Jameson excluded men who by any standards were scientific worthies. In their petition to the Commission, signed by the President,

1. Evidence, I, 491.
3. Ibid. The point about the University being harmed if the Keeper's reputation was damaged shows that the University's value was dependent on the work of her professors.
Sir Walter Scott, the Royal Society of Edinburgh claimed admission to the Museum where was housed Hutton's collection of minerals. In 1797 Joseph Black had donated the collection to the Society. As the Society's charter forbade it making any collection or Museum, the minerals were housed in the Natural History Museum. The new charter of 1808 was sought because of the inconvenience of having to refer to Jameson every time a visit to the minerals was intended. Under the terms of the 1808 charter, the old collections became University property but members were to be admitted. However, "of late years, when a new arrangement was made in the lately erected buildings appropriated for that purpose ... the keeper of the museum, actuated by what motive your petitioners are unable to say, as he has not himself expressed it, thought proper to refuse to the members of the Royal Society admission to their own collection; and after a fruitless and unsatisfactory correspondence upon the subject, that refusal has been persisted in." Sir David Brewster spoke, as a curator of the Huttonian collection, of its value "as illustrative of his curious speculations respecting the Theory of the Earth". Other valuable articles belonging to the Society and housed in the Museum included a collection presented by Captain Cook, from the South Sea Islands. It is clear that the Commissioners themselves dropped a bombshell when they announced that they had asked to see Hutton's minerals and had discovered that the collection had never been opened by Jameson — "It was shown to the Commissioners in boxes".

1. Evidence, I, 178. The Huttonian collection of fossils was for explaining the principles of geology and for illustrating the changes that mineral substances went through. (Playfair, "Hutton", Works, IV, 104.)
2. Evidence, I, 620.
3. Ibid., I, 178.
4. Ibid., I, 559.
5. Ibid., I, 619.
Sir George Mackenzie told the Commission that he had brought back from his travels in Iceland a very large collection of interesting and valuable specimens. He divided them in two - giving one part to the Royal Society and the other to the College Museum. He had not had a chance to label them at the time of the donation and Jameson had never since let him do so. ¹ The collection "certainly did exhibit facts directly opposed to the theoretical views that Professor Jameson then held; and did illustrate the Huttonian Theory. And it was with the view to ascertain the origin of the trap-formation of rocks, and which was disputed between the Huttonians and the Wernerians, that I went to explore Iceland". ² When asked "whether the Specimens in favour of the Huttonian system were generally or at all exhibited to the Public", Mackenzie replied: "I never heard that they were". ³ The only people who could benefit from material exhibited in the Museum were Jameson's students and the Wernerian Society. ⁴

Brewster voiced more complaints. The William Thomson of Palermo bequest was not exhibited. Brewster himself had been concerned with studying mineralogy as it was connected with optics. He required specimens from the Museum to aid his research but had difficulty - "There was no direct refusal to furnish me with specimens; but the difficulties were always so great, that I gave up making such requests". ⁵ Instead Brewster borrowed samples from mineralogists in Scotland, from the British and Cambridge Museums and from Scandinavian, American and

¹. Ibid., I, 610.
². Ibid.
³. Ibid., I, 621.
⁴. Ibid.
⁵. Ibid., I, 558.
Continental mineralogists.* The horticulturalist, Robert Kay Greville elaborated on Brewster's difficulties with Jameson. The two men were not on good terms as they edited rival journals. Admission to the Museum was vital for Brewster if he was to illustrate his discoveries in crystallography in a book on the history of Mineralogy. This was an example of Jameson refusing whom he wished and his personal feelings were inhibiting scholarship. The judgment of the Royal Commission was that "The whole arrangement is brought too much under the control of one individual, who acts according to his own opinion and discretion. In the present case, his private interests interfere with the management of a great public institution."4

Although Jameson abused his position as Keeper in a partisan Wernarian fashion that a distinction has to be drawn between his activities as Keeper and as Professor. Despite the "exercise of his discretion", there is no doubt that his course and Museum were intensely valuable both in prosecuting research in natural history and in the training of naturalists. Despite the Wernarian curriculum, fine

1. Ibid.
2. Ibid., I, 626.
3. There were many other examples of complaints: Samuel Hibbert (Evidence, I, 622-623) who was personally indebted to Jameson; John Willies (Ibid., I, 627-629) who was similarly indebted; and Henry Hulme Cheek (Ibid., I, 179-180) for whom it was imperative to see a skeleton in the Museum for a work on comparative anatomy. Cheek, President of the Royal Medical Society, and William Ainsworth, President of the Royal Physical Society (both societies of Edinburgh), were joint editors of the Edinburgh Journal of Natural and Geographical Science in which they attacked Jameson in 1830 for, among other things, the poor scholarship of the Wernarian Society and "the constant habit of appropriating to his own use the papers which ought to have formed part of the Transactions". (Edinburgh Journal of Natural and Geographical Science, I (1830), 352-355 and II (1830), 269-274. The quotation is from page 269.) Only Daniel Ellis, the horticulturalist, defended the Professor on the grounds that it was one of the Keeper's perquisites to have the first claim to use Museum materials for his own researches and writings. (Evidence, I, 571.)
mineralogists and natural scientist emerged. This is all one aspect of the University's contribution to Natural History. On the other hand in the realm of geological theory, Edinburgh had another part to play. The University was the battleground for the Huttonians and Wernerians and as such, was important not only to British science and society. If the Natural History Museum had a place as a teaching instrument, a visual aid, it was also a weapon in the intellectual dispute. The significance of Hutton and his ideas in nineteenth century British intellectual history, were even more far-reaching. The University's function in disseminating Huttonian concepts and passing them on to the middle and late Victorian world can best be seen through three intellectual giants of the time Charles Lyell, James Cowles Prichard and Charles Darwin.

The context in which the discussion is placed is that used by Charles Coulston Gillispie in *Genesis and Geology*. The book is constructed around five stages of theoretical advance in geology - Huttonianism, Catastrophism, Uniformitarianism, Robert Chambers' *Vestiges* and Darwinism. Huttonian ideas, as will be seen, ultimately culminated in Darwin. Furthermore, each stage of Gillispie's framework showed the gradual decline of the idea of a providential God. Neither Hutton nor Darwin were particularly original in their ideas on evolution. Nevertheless, evolutionary ideas were becoming more current and more familiar from the end of the eighteenth century. There is no doubt that one reason for this was the increase in skilled scientific research in many areas. (It is interesting to note that of Gillispie's five stages four were either directly or circumstantially related to Edinburgh.) It
is necessary to move from Huttonianism to some aspects of Uniformitarianism and Darwinism and see their relation to ideas current at the University of Edinburgh from 1790-1826. The relation of the University to these two ideas is more than circumstantial.

Charles Lyell's connections with the University were both personal and intellectual. On the personal level, he worked with Leonard Horner in the Geological Society of London and ultimately married Horner's daughter. One of Horner's personal connections with Huttonian ideas was his being bequeathed the third, unpublished volume of the Theory which concentrated on proofs taken from the Isle of Arran.

However, it is known that Lyell never read Hutton carefully. Writing to W.H. Fitton after the latter's review of his Elements of Geology, Lyell confessed that "I found it difficult to read and remember Hutton, and though I tried, I doubt whether I ever fairly read more than half his writings and skimmed the rest". Yet, Fitton had noted of Lyell's books that the principles adopted as the basis of the system of the earth were "no more than the leading propositions of Hutton's theory confirmed and extended by modern observations". Fitton's view to the effect that no one read Hutton any more and derived their ideas from the Illustrations was quoted above. And indeed, Lyell admitted his debt to Playfair in the letter to Fitton already mentioned: "The motto of my first two volumes were especially selected from Playfair's Huttonian

Theory, because although I was brought round slowly, against some of my early prejudices, to adopt Playfair's doctrines to the full extent. I was desirous to acknowledge his and Hutton's priority. For Tomkeieff, Playfair's greatest contribution to the development of geology was acting as Hutton's interpreter to that "man of genius", Charles Lyell.

Lyell was one of the protagonists in the geological debate which succeeded that between the Huttonians and Wernerians, - that between the Uniformitarians and the Catastrophists. The debate was similar with Lyell proposing a Huttonian theory brought up-to-date which suggested that nature worked gradually to produce gigantic transformations and William Buckland, Professor of Mineralogy at Oxford, suggesting that the great changes took place by a series of "catastrophes". Much as Playfair's book had set the scene for the Huttonian triumph earlier so, according to Sir Edward Bailey, Lyell's Principles of Geology won the later debate for the Uniformitarians. The work was a direct descendant of Playfair's Illustrations.

Lyell's importance is greater than the merely transient victory over Buckland. As Lyell was dependent on Playfair and Hutton, so was Darwin dependent on Lyell. Lyell's idea which Darwin used, that "the inorganic world existed in a continual state of slow modification" was a Huttonian one. One commentator on Lyell's Principles spoke thus of the book preparing for Darwin: "A long history of life on the earth, undisturbed by repeated worldwide catastrophes, no longer required

1. Lyell, Life, II, 49.
2. Tomkeieff, 388.
4. Tomkeieff, 400.
successive creations of all living organisms. A uniform series of changes in the inorganic world might well be accompanied by changes in the organic world producing the distinct floras and faunas found in the successive series of rocks. The possibility of the progressive development of life on the earth could no longer be dismissed.¹

Playfair is the important figure in the Hutton-Lyell connection. The University can claim a part in expediting Huttonian ideas not only because Playfair was a Professor but because the University itself was humming with Huttonianism at the beginning of the nineteenth century. All concerned with Natural History became infected with the current ideas. Hence, there was a rash of literary productions and annually alumni well versed in geological theory, dispersed taking with them at least a germ of Huttonianism. It was from the University of Edinburgh that Huttonian ideas had come, wherever they might be found in Britain. It was at the University in the years under study, that research, teaching and writing, designed to expand on Hutton’s Theory commenced. In these years, the University of Edinburgh had been the scene of the Huttonian triumph.

Darwin owed more to the University of Edinburgh than the simple transmission through Playfair and Lyell, of the Huttonian intellectual heritage. He had studied at Edinburgh from 1825-1827 and much has been written on his time at the University. Many times have the passages from his autobiography been quoted complaining about the formal teaching. Nonetheless, there is one revealing passage which has hitherto been used to bolster Darwin’s unfavourable opinion of Jameson but which reveals

more the atmosphere of the Natural History classes: "I gloried in the progress of Geology. Equally striking is the fact that I, though now only \[\text{seventeen}\] years old, heard the Professor, in a field lecture at Salisbury Crags, discoursing on a trap-dyke, with amydaloidal margins, and the strata indurated on each side, with volcanic rocks all around us, say that it was a fissure filled with sediment from above, adding with a sneer that there were men who maintained that it had been injected from beneath in a molten condition".\(^1\)

Darwin learned more at Edinburgh than he cared to admit; he also learned more than the purely practical arts of collecting and identifying specimens, and careful observation and interpretation.\(^2\) The passage quoted indicates that Darwin was very much aware of the geological debate that was going on around him - no one doing Natural History could fail to be. Furthermore, Darwin admitted in the same passage that he "gloried in the progress of Geology". The great contribution to this progress was made by Hutton as popularized by Playfair. It appears unlikely that Darwin would have been unaware of Huttonianism and might thus have been affected by the germs of the evolutionary idea.

Another idea of Hutton's, was one in which he broke away from gradual change in the mineral world and turned to the same process in the biosphere, the animal world. Hutton proposed in 1797 a clear theory of evolution by natural selection as related to dogs. He wondered

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given that the species existed (and Hutton was never one to question origins) how did varieties within the species dog, occur?¹

Hutton offered two alternative solutions - the original existence of different breeds, from the interbreeding of which the mongrel would arise. A mongrel could become a new variety by breeding with a similar dog - a process which either nature or human control could ensure. The alternative was that of natural selection and it is necessary to quote this lengthy but astonishing quotation in full:

"Let us suppose only one form originally in a species; and that there had been established in the constitution of the animals, a general law of rule of seminal variation, by which the form of the animal should constantly be changing, more or less, by the influence of external causes, but not with any particular attention. We should thus find varieties in the forms of a species, propagating for a long course of time under the influence of different circumstances or in different situations; and we should in this see a beautiful contrivance for preserving the perfection of the animal form, in the variety of the species. The form of the animal would thus always be adapting itself to the instinctive arts with which the species had been endowed; and the economy of this animal would always appear to be in perfect wisdom.

To see this beautiful system of animal life (which is also applicable to vegetables) we are to consider, that in the infinite variation of the breed that form best adapted to the exercise of those instinctive arts, by which the species is to live, will be most certainly continued in the propagation of this animal, and will always be tending more and more to perfect itself by the natural variation which is continually taking place. Thus, for example, where dogs are to live by the swiftness of their feet and the sharpness of their sight, the form best adapted to that end will be the most certain of remaining, while those forms that are least adapted to this manner of chase will be the first to perish; and, the same will hold with regard to all the other forms and faculties of the species, by which the instinctive arts of procuring its means of substance may be pursued."

Hutton had here used the concept of gradual development in the geosphere to explain development in the biosphere. An appreciation of Hutton's ideas puts Darwin's contribution to evolution in some perspective.

Darwin's time at the University included the company of his fellow students and extra-curricular opportunities for learning Natural History. While it is true that the situation of giving papers to and attending various university societies would have been valuable, and that his acquaintance with Robert Grant could also have drawn his attention to the scientific ideas which ultimately made him famous, both are secondary reasons to the general atmosphere to be found at Edinburgh in the early nineteenth century. The extra-curricular societies existed and concerned themselves with particular matters because those matters were currently fascinating. Scientists at that time were pre-occupied with theories of the earth and associated topics. Darwin's colleagues, like Grant, were concerned with their particular research for the same reason. Edinburgh was agog with the vast depth of Hutton's legacy and it is no wonder that it took until 1859 for Darwin


The most interesting of Darwin's friends was undoubtedly Robert Grant, a student of Jameson, whose work on sponges is his greatest claim to fame. (see H. Halse Bellot's quotation from a MS. in the University College, London, Library by Professor D.S. Watson entitled "Notes on the History of the Zoology Department" ff. 1-2 in University College, London, 1826-1926, (London, 1929), 139.

Grant amplifies my point about the currency of evolutionary ideas because he wrote the following passage in the Edinburgh New Philosophical Journal in 1826: "Out of the vast number of animal remains, but few belong to species now living, and these only in the most recent rock formations. . . . May this destruction, as is commonly received, have been the result of violent accidents and destructive revolutions of the earth [Catastrophism], or does it not rather indicate a great law of nature, which cannot be discovered by reason of its remote antiquity [Huttonianism]?" (Edinburgh New Philosophical Journal, I (1826), 296 and quoted in Loren C. Eiseley, Darwin's Century: Evolution and the Men who Discovered it, (London, 1959), 147.)
to realize the full implications of the geological genius. Evidence for the preoccupation is to be found in the number of articles devoted to Natural History in the Edinburgh and Quarterly Reviews.¹

Having considered the man who has been most closely associated with the idea of evolution, it may seem out of place to retreat one stage and consider James Cowles Prichard, whose ideas like Lyell's have been seen as part of the Darwinian prelude. For Professor Daniel Cunningham, he was the greatest anthropologist of his time - greater even than Johann-Friedrich Blumenbach.² Prichard studied medicine at Edinburgh from 1806-1808 but anthropology occupied him most among his many interests. His M.D. thesis was entitled De humani generis varietate and was published in 1813 as Researches into the Physical History of Man. From the title of his thesis, it can be gathered that it was at the University that he took his ideas about the varieties of the human race.³

1. see the Wellesley Index for the relevant years which shows, for example, Francis Jeffrey, not an avowed natural historian, writing an article on "Huttonian and Neptunian Geology" in Edinburgh Review, II, no. 4, (July, 1803), Article 5. Also note Henry Holland, co-author with Sir George Mackenzie and Richard Bright of the book on Icelandic travels, when writing to Archibald Constable, April 22nd, 1812: "I am happy to find that the Edinbr. Review speaks well of us - and I am further gratified by learning from Longman and Co. that there is a great probability of a favourable article in the Quarterly. These circumstances, conjoined with the previously rapid sale of the book, will I suppose authorize a second edition without much delay". (N. L. S. MS. 682, f. 136.)

2. D.J. Cunningham, "Anthropology in the Eighteenth Century", Journal of the Royal Anthropological Institute, XXXVIII (1908), 27. Professor Cunningham was Professor of Anatomy and Dean of the Faculty of Medicine at the University of Edinburgh, and this was his presidential address to the Institute. Note that Blumenbach once introduced the son of a friend to the University of Edinburgh in 1824. (see N. L. S. MS. 150, f. 38.)

3. This is also assumed by two writers: see Denis Leigh, The Historical Development of British Psychiatry, I (London, New York, and Paris), 1961, 151; and Michael Banton, "Race as a Social Category", Race, VIII (1966), 3. The second item was Professor Banton's inaugural lecture as Professor of Sociology at Bristol.
His book, which went through four editions, stressed the apparently accidental way in which variations in mankind were produced. Much as Hutton had suggested that variation in breeds of dogs was due to their adaptation to the instinctive arts by which they lived, so Prichard suggested that there was an association between man's physical traits and his environment and that changes in man's manner of living accounted for changes in bodily structure. In making these suggestions, Prichard came closest, of the pre-Darwinian evolutionists, to explaining how new forms of man occurred, through the operation of natural selection.2

The work of Prichard supports the argument about the value of the University of Edinburgh at this time lying not only in the training or the facilities, but in being the forum where Huttonian ideas were thrashed out. The preoccupation of the professoriate with rival geological theories would also have been transmitted to their students. Hence Lyell, through Playfair, Prichard and Darwin assumed important parts in the greatest intellectual debate of Victorian Britain. It was out of the early nineteenth century University of Edinburgh that the pioneer work had come, both in the formation of ideas and in the training of men.

1. Banton in Race, VIII, 5.
VI

The professors discussed in this chapter have exemplified the transition of science from theory to practice. Chemical experiments were both popular and necessary; the study of Botany necessitated a Garden and knowledge of Natural History could only be furthered by a Museum and the class field excursion. While the predecessors of Hope, Graham and Jameson had - to a varying degree - appreciated the necessity of these facilities, they had not been implemented with quite the same degree of enthusiasm. All three men were keen scientists but also teachers. They contributed to their disciplines but also succeeded in training some exceptional students.

The best example of a man training students to pursue knowledge successfully was, ironically, Jameson. Intensively trained himself, he adapted both his teachers' methods for the training of others. He devoted much energy and time to making the Edinburgh Museum a highly important repository. He took great care in his institution and conduct of the field excursion. So successful was he, in fact, that his students were among those who condemned or rejected him later. It has been shown that at least three distinguished geologists, Fitton, Bous and Mackenzie became Huttonians. Their conversion was due to their direct examination of material. The importance of research and observation had been inculcated and stressed by Jameson in his classes. While they went out Wernerians, experience made them Huttonians.

The importance of truth had also been imbued: however much their debt to the Professor, Jameson's students felt that standards had to be maintained. Hence Mackenzie, John Gillies and Hibbert were among those who complained to the 1826 Commission about Jameson's perversion of truth and suppression of knowledge in his use of the Museum and restriction of entry. Whatever his failings as a theoretical geologist, Jameson had been a highly successful teacher and his didactic methods
ensured the success of a rival theory of the earth to that which he held. In the end, his teaching ensured not only progress in the knowledge of Natural History but paved the way for a more general advance in related spheres of science.
APPENDIX II

Twenty-six Edinburgh alumni, 1790-1826, appearing in A Biographical Index of Deceased British and Irish Botanists:

James Anderson, d. 1809. M.D. Edin. 1800. East India Company Surgeon from 1762 and Physician General to the Forces 1786. Author of several papers.

Joseph Arnold, 1782-1818. M.D. Edin. 1807. Naval physician who went as a naturalist to Botany Bay in 1815 and was under Stamford Raffles in 1818.


Francis Boott, 1792-1863. M.D. Edin. 1824. Fellow and Secretary of Linnean Society. Botanical studies devoted to the genus Carex - a large genus of grassy looking plants.


Robert Dickson, 1804-1875. M.D. Edin. 1826. Lecturer at St. George's Hospital for fifteen years.


William Jameson, 1796-1873. M.D. Edin. 1818. Naturalist journeys to Greenland (1818), South America (1820) and Quito (1826). Professor of Botany, Quito, 1827.


Sir John Richardson, 1787-1865. M.D. Edin. 1816. Surgeon and Naturalist in Franklin's 1st (1819) and 2nd (1825-1826) expeditions. 3rd Arctic expedition, 1851.

Peter Mark Roget, 1779-1869. M.D. Edin. 1798. Private physician to Lansdowne and a founder of the Manchester Medical School. Compiler of the Thesaurus. Also wrote on animal and vegetable physiology.

John Forbes Royle, 1799-1858. Educ. at Edin. Served in East India Company's medical service and was Curator, Saharanpur. Professor, Materia Medica, King's College, London, Secretary, Horticultural Society.


CHAPTER FIVE

Medical Education
"the degree of M.D. from Edinburgh is to some persons, and in some places, more valuable than the same degree from . . . other universities, notwithstanding that in these a much fuller preliminary education is required. As it does not convey the same privileges and immunities, this must be solely on account of its higher reputation in a professional character". (Andrew Duncan, junior, Medical Education, (Edinburgh, 1827), 20.)

I

It has long been known that medical education in Edinburgh was outstanding certainly from the mid-eighteenth to the early nineteenth centuries. In terms of numbers alone the University's Faculty of Medicine, in the late eighteenth century, outstripped the rest. In terms of the education available, the Faculty and the Royal Colleges could claim highly reputable teachers even after the passing of the first Alexander Monro and William Cullen. Along with their colleagues in other science subjects, the medical teachers introduced new, and expanded existing practical techniques of demonstration. The Edinburgh medical school already had an international reputation. Edinburgh was the first city in Britain which could claim all the following features - a University medical school, Royal Colleges of Physicians and Surgeons, many private lecturers and extensive hospital and dispensary facilities.

The contribution of the Edinburgh medical school to British life after 1790 is considered here under four heads: first, an account of some individual doctors or types of specialist who studied or graduated in Edinburgh between 1790 and 1826, in order to illustrate the types of prominent medical practitioners who emerged; secondly, a comparison between the alternative places of medical education available to a budding doctor or surgeon and thirdly, an account of Edinburgh-trained men who played a part either in reforming existing schools or in founding
new ones. There finally follows an account of the medical teachers, their methods of training and courses during the period - the factors that would have been brought to bear on the students discussed under the first head.

It is important to remember that neither Edinburgh's University nor her Royal Colleges monopolised the production of the most distinguished medical practitioners of the nineteenth century. They did produce, however, the majority of systematically trained practitioners and large numbers of those who filled the middle ranks of the Army, Naval and East India Company's medical departments. Nonetheless, several celebrated doctors and surgeons did go South and make their names, overcoming by talent or influence ingrained prejudice against a Scottish degree. There was also a tendency for the Edinburgh-trained doctors to become professors (at their Alma Mater or elsewhere), or interest themselves in public health and in the treatment of the mentally sick.

The Edinburgh medical graduate was in a difficult position if he wished to practise in England. He faced two obstacles - one of a cultural nature and the other social and legal. In the first place, Englishmen expected their physician to be "a cultured and highly educated gentleman, with quite secondarily, an adequate knowledge of medicine". Dr. Kitson Clark has pointed out that the Victorians distinguished between a professional and an educated man: professional training was

1. "the University of Edinburgh, where most medical degrees in this country are obtained". see Dr. John Yelloly's evidence in Sel. Comm. Part I: Royal College of Physicians, London, 298.
not regarded as part of a gentleman's education. The Edinburgh medical alumnus lacked the English definition of culture because he had not had a Classical education and because he had undergone an intensive, professional course of study.

The social and legal obstacle stemmed from the cultural difference between England and Scotland: the English medical profession at the beginning of the nineteenth century was highly stratified. Physicians treated the gentry and their servants while apothecaries evolved into general practitioners for those needing cheaper treatment.  

The position of the apothecary was strengthened by the Apothecaries Act of 1815 which prevented practice as an apothecary without a licence from the Apothecaries' Company in London. John Thomson, a former Edinburgh professor, told the 1826 Commission: "Though the Act apparently only confers on the Company the exclusive privilege of licensing Apothecaries, it is well known, that, under this denomination are included nine-tenths of the country Practitioners in England. It is only in large towns, if even in them, that the different departments of the Physician, Surgeon, and Apothecary can be kept separate. In other places, it is absolutely necessary for every Practitioner to dispense drugs, so that the Act really confers on the Apothecaries' Company a monopoly of licensing all the general practitioners in England and Wales."

The qualification for an apothecary's licence necessitated an apprenticeship of five years. The 1826 Commissioners reported that

2. see Newman, 1-3.
"The result of the operation of this statute is to exclude the whole graduates of the Scotch Universities from practising in England unless they have served the requisite apprenticeship". If the Edinburgh graduate wished to practise within seven miles of London he had to qualify as a licentiate of the London Royal College of Physicians; if he wished to practise elsewhere in England he had to qualify as an extra-licentiate. Professor Major Greenwood calculated that 258 out of 371 M.D.s who became Fellows, Licentiates or Extra-Licentiates of the London College between 1800 and 1825 were Scots-educated.

The Edinburgh student had received a better professional education than either the apothecary or the London licentiate, as will be shown later. Nonetheless, he was regarded as inferior to both. Andrew Duncan junior, Professor of Materia Medica, told the Commission: "At this time the degree from Edinburgh is in the highest reputation of any degree of Doctor of Medicine". Thomson commented of the apothecaries' training that "it is in vain to expect, that even the most conscientious master can compensate to his apprentices, by his own instruction, for the want of those opportunities of acquiring a knowledge of the different branches of Medicine that are afforded by attendance on the instructions and lectures of professed teachers". Yet, the Edinburgh-trained doctor overcame the obstacles to practice in England, either by sitting further examinations or serving a tedious apprenticeship.

5. Ibid., I, 472.
There is much evidence as to the quality of medical education available in Edinburgh, and the calibre of doctor it sought to produce. In their report, the 1826 Commission concluded: "The Medical Department of education in the Universities of Scotland is evidently of the greatest importance. During a long period, a very large proportion of the persons who have practised Medicine throughout the country, and who have occupied the medical stations in the army and navy, have been educated for their profession in one or other of those Universities. The Medical School of Edinburgh has, indeed, long possessed very high celebrity".¹

The Dean of the Faculty of Medicine at the time of the 1826 Commission, William Pulteney Alison, said in evidence: "the Medical Degree in the University is at present held in such estimation, that there does not appear to be any occasion for a considerable change in regard to it".²

Alison also maintained that when Edinburgh medical graduates went out into the world they "do us credit, and have generally attained to very high rank in the profession".³ To support his first assertion came forward first, Sir James M'Grigor, Director-General of the Army Medical Department, who considered "those educated at Edinburgh to be equal to any in the Medical Department of the Army".⁴ Then Dr. William Burnett, Medical Commissioner of the Navy noted: "We have generally found them very efficient, particularly those who have taken degrees;
so much so, that if a gentleman was to present himself with a degree from Edinburgh to us, without any recommendation or interest whatever, we should prefer him to one recommended by the most powerful interest, who had not such qualifications." 1

The University of Edinburgh prided itself on producing professional men. As T.C. Hope told the Commission when confronted with the idea of incorporating Arts into the medical curriculum: "the consequence would be that there would be less general medical information to be met with, in practitioners over Great Britain, though, perhaps they would be better Greek scholars than at present... I believe that the character of the Medical School will depend more upon the acquirements that are professional." 2 James Home, Professor of Physics, admitted that "perhaps there may be those who are not good scholars, or are not good Natural Historians or Natural Philosophers, but I apprehend none go away from this University having a degree, who are incompetent to practise Medicine, which is all we look to at present, at least it is our principal object." 3 Dr. Kitson Clark has concluded: "In the early years of the nineteenth century many medical practitioners gained their training at Edinburgh or Glasgow, and the importance of such men not simply in medicine but in all spheres of English life was very great indeed." 4

The prospective Edinburgh medical student came to the course either with the literary classes of the University behind him (if he came

1. Ibid., I, 531.
2. Ibid., I, 282.
3. Ibid., I, 253.
4. Kitson Clark, 263.
from Edinburgh)\(^1\) or with anything up to seven years apprenticeship. If he came from London or Dublin he might already be a skilled anatomist and many had served as surgeons in the Army and Navy.\(^2\) They might have left the forces on half-pay to complete their medical studies. There are no comparative figures available prior to 1811 to show the students' countries of origin - apart from James Gregory's figures of 1785-1790, which were quoted in Chapter One. However, the figures for the subsequent years are as follows:

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1. Evidence, I, 312.
2. Ibid., I, 247.
3. Evidence, I, 128\(^7\) and 129
The figures are more complete for the graduates and their countries of origin from 1790-1826:

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<td>56</td>
<td>45</td>
<td>7</td>
<td>2</td>
<td>140</td>
</tr>
<tr>
<td>1826</td>
<td>32</td>
<td>29</td>
<td>45</td>
<td>6</td>
<td>7</td>
<td>119?</td>
</tr>
</tbody>
</table>

In these years, therefore, 2309 doctors graduated at the University of Edinburgh and thousands more studied here. The following are the numbers of the diplomas granted by the Edinburgh Royal College of Surgeons in the same years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Diplomas</th>
<th>Year</th>
<th>Diplomas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1790</td>
<td>25</td>
<td>1809</td>
<td>79</td>
</tr>
<tr>
<td>1791</td>
<td>19</td>
<td>1810</td>
<td>70</td>
</tr>
<tr>
<td>1792</td>
<td>13</td>
<td>1811</td>
<td>79</td>
</tr>
<tr>
<td>1793</td>
<td>18</td>
<td>1812</td>
<td>101</td>
</tr>
<tr>
<td>1794</td>
<td>39</td>
<td>1813</td>
<td>85</td>
</tr>
<tr>
<td>1795</td>
<td>23</td>
<td>1814</td>
<td>107</td>
</tr>
<tr>
<td>1796</td>
<td>24</td>
<td>1815</td>
<td>153</td>
</tr>
<tr>
<td>1797</td>
<td>28</td>
<td>1816</td>
<td>137</td>
</tr>
<tr>
<td>1798</td>
<td>39</td>
<td>1817</td>
<td>150</td>
</tr>
<tr>
<td>1799</td>
<td>24</td>
<td>1818</td>
<td>128</td>
</tr>
<tr>
<td>1800</td>
<td>41</td>
<td>1819</td>
<td>131</td>
</tr>
<tr>
<td>1801</td>
<td>36</td>
<td>1820</td>
<td>96</td>
</tr>
<tr>
<td>1802</td>
<td>52</td>
<td>1821</td>
<td>81</td>
</tr>
<tr>
<td>1803</td>
<td>49</td>
<td>1822</td>
<td>93</td>
</tr>
<tr>
<td>1804</td>
<td>49</td>
<td>1823</td>
<td>128</td>
</tr>
<tr>
<td>1805</td>
<td>46</td>
<td>1824</td>
<td>130</td>
</tr>
</tbody>
</table>

1. *Ibid.*, I, [149-150]. The Irish figures in both sets of statistics are accounted for below.
<table>
<thead>
<tr>
<th>Year</th>
<th>Diplomas</th>
<th>Year</th>
<th>Diplomas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1825</td>
<td>152</td>
<td>1826</td>
<td>163</td>
</tr>
</tbody>
</table>

Total number of diplomas,
1790-1826: 2722

The importance of the Edinburgh medical school can, therefore be gauged in terms of numbers if nothing else.

II

It is more revealing to reach behind the figures and form an impression of who the students were and what they did upon the completion of their formal training. It would be impossible to list and comment on the large numbers of Edinburgh medical students who found their way into the Forces or the East India Company. It was estimated by Robert Graham, the Professor of Botany, that one-third of all the doctors in the Army, Navy and colonies were educated at Edinburgh. In these

1. Ibid., I, 214. The hiatus both in the University's list of graduations and the College's list of diplomas after 1813 and 1811 respectively can be attributed to the gradual return of men on half-pay from the war, to complete medical studies. (Ibid., I, 451.) The Surgeons' total of diplomas cannot necessarily be added to the University's total of graduates since many students would have taken both the degree and the diploma. It would be impossible to check how many would have taken both, but of the 86 selected Edinburgh alumni discussed in the ensuing section of this chapter, 23 had a qualification from both the University and the Royal College of Surgeons.

2. The years 1795-1829 saw the greatest increase in the number of medical matriculations. (Alexander Morgan, "Matriculates in the Faculty of Medicine, Prior to 1858", University of Edinburgh Journal, VIII (1926-1937), 125.

3. Evidence I, 330. The realization that so many Edinburgh graduates entered the Forces annoyed James Hamilton, Professor of Midwifery: "Now, a very large proportion of Scotch and Irish are poor men, who cannot afford to pay what is absolutely necessary; it is with difficulty scraped together; they sink their degree; they go into the Army or Naval as Hospital Mates and Surgeons' Mates". (Ibid., I, 307.) John Thomson, Professor of Military Surgery, issued the following numbers of gratis tickets to his class in the years immediately following the Napoleonic wars:

1815-1816: 18 Army medical officers
62 Navy medical officers
Summer 1816: 17 Army M.O.s
28 Navy M.O.s
1816-1817: 51 Army M.O.s
53 Navy M.O.s

("Notice of some of the leading Events in the Life of the late Dr. John Hamilton," Annals of the Medical and Chirurgical Faculty of the University of Edinburgh (1847), 167, 168.)
forms of employment they were general practitioners: Alison told the
1826 Commission "At present a great proportion of our graduates, who
settle in England and Ireland, and almost the whole of those who settle
in Scotland, and all of our graduates who enter the Army or Navy, or the
East India Company's service (who form a large proportion of our
graduates in the first instance), all these act as general practitioners
in the early part of their lives".¹ According to Dr. William Cullen
(nephew of the celebrated Professor of that name) the Edinburgh Royal
College of Surgeons' diploma was in great demand by those wishing to
enter the Army and Navy.² The College's diploma was also accepted by
the East India Company from 1798. Previously, those wishing to serve
in the Presidencies or shipping service had had to undergo the further
examination of the London College of Surgeons.³

The Edinburgh students appear to have filled the middle ranks
of the Armed Forces' medical service. Sir James M'Grigor gave somewhat
contradictory evidence to the Commission. He began by saying: "The
Medical Officers of the Army are of various ranks or classes. For the
junior or lower, the present system at Edinburgh, or even that pursued
before the recent improvements, abundantly qualified gentlemen; but
for the superior classes, particularly the Staff-Surgeons, Physicians
to the Forces, and the Inspectorial Officers, something further is very
desirable, and is now expected".⁴ M'Grigor continued, however, by

¹ Evidence, I, 194.
² Ibid., I, 362.
³ Clarendon Hyde Craswell, The Royal College of Surgeons of Edinburgh:
  Historical Notes from 1505-1905, (Edinburgh, 1926), 169-170.
⁴ Evidence, I, 528. The recent improvement of which M'Grigor spoke
  was the revision of the medical Statuta Solennia in 1824.
saying that Edinburgh graduates "have generally been found very competent to fill every office in the Army".\(^1\) When asked whether those who had attended Scottish universities were less distinguished and less capable of qualifying for the higher branches of the Army's medical department that those from English and Irish universities, he replied: "They are not upon the whole, although there may be some exceptions".\(^2\)

Statistics were presented to the Commission showing the numbers of Assistant-Surgeons entering the Navy between 1822 and 1827, where they were educated and the rate or degree of qualification.\(^3\) The figures show that former Edinburgh students filled the middle ranks. 91 who had been entirely trained in the Scottish capital were broken down as follows:

<table>
<thead>
<tr>
<th>Rate</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Two Edinburgh men were rejected. Of four Assistant Surgeons who were trained at Dublin and Edinburgh, there was one each in rates one, two, three and six, and one more was rejected. One man trained in Edinburgh and London received a number two rating; two men trained in Glasgow and

\(^1\) Ibid.

\(^2\) Ibid., I, 529.

\(^3\) Ibid., I, 535. No. 1. was the highest rate of qualification, and No. 6 the lowest.
Edinburgh received a number one rating and the one man who had been at Edinburgh; Glasgow and London received a number three rating. Altogether, then, Edinburgh provided at least partial training for 99 out of 282 Assistant Surgeons admitted to the Navy in the five years. The figure illustrates that one-third of the Navy's medical staff had spent at least part of their time in the Edinburgh medical school. No similar statistics for the Army were presented to the Commission.

There were six men who played conspicuous parts in the Army or Navy. Sir William Burnett, whose evidence to the 1826 Commission has been quoted earlier, studied at Edinburgh and became the Navy's first medical Director-General. He was responsible for the improvement of the medical condition of the Navy, including the opening of the naval hospital at Chatham. John Davy, brother of Sir Humphrey, graduated M.D. from Edinburgh in 1814. He served mostly with the Royal Army Medical Corps in Ceylon, the Ionian Islands, the West Indies and England and ultimately rose to become Inspector-General of Hospitals. John Liddell who graduated M.D. from the University and took a diploma from the College of Surgeons in 1821 became a successor to Burnett as Director-General of the Navy's Medical Department. In 1844 he was Inspector General of the Royal Hospital at Greenwich. Enough has been said of James M'Grigor whose M.D. was from Aberdeen although he had studied in Edinburgh. Thomas

1. Ibid.
Shortt (M.D. 1815) was the medical officer on St. Helena during Napoleon's imprisonment and was one of the five Army doctors present at the former Emperor's autopsy. Sir Andrew Smith (M.D. 1819) was a successor to M'Grigor as Director-General of the Army and Ordinance Medical Departments.

An estimate was made that one-third of Edinburgh's medical alumni served either in the Armed Forces or overseas; it was seen in the last chapter that others sought full-time employment in sciences auxiliary to medicine such as Botany or Natural History. In order to discover the activities of some of the remainder, who stayed in civilian medicine, remembering that most would have been lost in the relative obscurity of general practice throughout Britain, 86 prominent examples are given in the table below.¹ These doctors tended to follow careers

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¹. These 86 men, who do not include those who became Edinburgh professors or teachers between 1790-1826, have emerged from an examination of the following: Royal Kalendar and Court and City Register for England Scotland, Ireland and the Colonies, 1835-1855 to discover Edinburgh alumni engaged in the work of the Poor Law and Metropolitan Lunacy Commissions; Dictionary of National Biography and other general works of brief biographical information; Viri Illustres, ed. Patrick Geddes (Edinburgh, 1884); Edinburgh's Place in Scientific Progress, ed. C.G. Knott, (Edinburgh and London, 1921); William Mac Michael, Lives of British Physicians, (London, 1830); William Munk, Roll of the Royal College of Physicians, 4 vols. II, III (London, 1878); Pierr's Lives of the fellows of the Royal College of Surgeons of England, rev. Sir d'Arcy Power, W.C. Spencer and Professor G.E. Gask, 2 vols. (London, 1930); C. Fraser Brockington, Public Health in the Nineteenth Century, (Edinburgh, 1965); Comrie, History of Scottish Medicine; books on prominent public health workers such as S.E. Finer, The Life and Times of Sir Edwin Chadwick, (London, 1952) and R.A. Lewis, Edwin Chadwick and the Public Health Movement 1832-1854, (London, 1952); other biographies; histories of London University, its constituent colleges and medical schools; histories of other British medical schools and various journals devoted to the history of medicine. These and other works - the most interesting or least known of which appear in subsequent references - have, by their nature, concentrated on prominent alumni. Their number and contribution is such that it is worth examining their work against the background of their medical education, remembering that most Edinburgh alumni were doubtless capable general practitioners at home or overseas.
in medical teaching, and mental and public health work:

<table>
<thead>
<tr>
<th>TEACHERS</th>
<th>LUNACY</th>
<th>PUBLIC HEALTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas Addison</td>
<td>William Browne</td>
<td>John Abercrombie</td>
</tr>
<tr>
<td>Charles Badham</td>
<td>John Conolly</td>
<td>James Arnott</td>
</tr>
<tr>
<td>John Barclay</td>
<td>James Douglas</td>
<td>Malachi Blake</td>
</tr>
<tr>
<td>Charles Bell</td>
<td>Thomas Drever</td>
<td>Joseph Brown</td>
</tr>
<tr>
<td>James Blundell</td>
<td>Thomas Hancock</td>
<td>Francis Cooper</td>
</tr>
<tr>
<td>James Carson</td>
<td>Cornwallis Hewett</td>
<td>George Cumming</td>
</tr>
<tr>
<td>John Cheyne</td>
<td>John Hume</td>
<td>Charles Hastings</td>
</tr>
<tr>
<td>Abraham Colles</td>
<td>Alexander Morison</td>
<td>William Henry</td>
</tr>
<tr>
<td>Dominic Corrigan</td>
<td>James Prichard</td>
<td>Joseph Hume</td>
</tr>
<tr>
<td>John Elliotson</td>
<td>Henry Reeve</td>
<td>William Kay</td>
</tr>
<tr>
<td>Robert Ferguson</td>
<td>John Reid</td>
<td>James Kay-Shuttleworth</td>
</tr>
<tr>
<td>George Fife</td>
<td>Edward Seymour</td>
<td>Richard Owen</td>
</tr>
<tr>
<td>Robert Grant</td>
<td>Henry Southey</td>
<td>John Robertson</td>
</tr>
<tr>
<td>Robert Graves</td>
<td>William Thomson</td>
<td>Thomas Southwood Smith</td>
</tr>
<tr>
<td>John Haviland</td>
<td>Thomas Turner</td>
<td>John Sutherland</td>
</tr>
<tr>
<td>Joseph Jordan</td>
<td>(15)</td>
<td>John Wilson</td>
</tr>
<tr>
<td>Robert Knox</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robert Liston</td>
<td>MEDICAL SCIENTISTS</td>
<td></td>
</tr>
<tr>
<td>John Lizaars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alexander Mercat</td>
<td>Thomas Beatty</td>
<td></td>
</tr>
<tr>
<td>John Reid</td>
<td>Richard Bright</td>
<td></td>
</tr>
<tr>
<td>Peter Roget</td>
<td>James Copland</td>
<td></td>
</tr>
<tr>
<td>William Sharpey</td>
<td>Robert Gooch</td>
<td></td>
</tr>
<tr>
<td>John Smith</td>
<td>Marshall Hall</td>
<td></td>
</tr>
<tr>
<td>William Stokes</td>
<td>Thomas Hodgkin</td>
<td></td>
</tr>
<tr>
<td>James Syme</td>
<td>James Hope</td>
<td></td>
</tr>
<tr>
<td>Anthony Thomson</td>
<td>Arnold Knight</td>
<td></td>
</tr>
<tr>
<td>Thomas Thomson</td>
<td>Ephraim McDowell</td>
<td></td>
</tr>
<tr>
<td>Thomas Traill</td>
<td>Philip Physick</td>
<td></td>
</tr>
<tr>
<td>Edward Turner</td>
<td>John Reid</td>
<td></td>
</tr>
<tr>
<td>Thomas Watson</td>
<td>Alexander Walker</td>
<td></td>
</tr>
<tr>
<td>John Yelloly</td>
<td>(12 including one duplicated under Lunacy)</td>
<td></td>
</tr>
</tbody>
</table>
The teachers double the number of those in other specialities in this list. Many of them are mentioned later with reference to the development of other British medical schools, but some were outstanding in more ways than teaching. Consider John Elliotson, who was trained at Edinburgh, Cambridge and the London hospital of St. Thomas' and Guy's; of his career, a recent writer has said that it showed "the use which was made by English doctors of the Scottish medical schools, of the London teaching hospitals, and, for purely decorative purposes, of the ancient universities". For Professor Bellot he was one of the ablest thinkers among the metropolitan physicians; he experimented with chemical compounds as medicines and along with Thomas Hodgkin (M.D. 1823) was among the first to advocate the use of the stethoscope. "For years", said The Lancet, "the name of Elliotson was second to none amongst the practitioners of medicine - whether as a lecturer, a clinical teacher, or a consulting physician". Charles Badham, who graduated M.D. in 1802 and became Regius Professor of Medicine at Glasgow in 1827, was the first to recognise, in 1808, that bronchitis could be separated from other diseases of the chest, such as pneumonia and pleurisy. Of the distinguished physicians and surgeons, five were connected with the Royal Family. James Begbie was a Royal Physician in Scotland while Sir Henry Holland was Queen Victoria's physician and Sir William Knighton physician to George IV and Keeper of the Privy Purse. James

3. The Lancet, August 8th, 1868, 203.
Wardrop was the same King's oculist while Sir Charles Locock attended Queen Victoria at the birth of all her children. Holland, according to the Dictionary of National Biography, tended to forsake his Edinburgh scientific background using the fashionable method of half an hour's genial conversation as a therapeutic agent. It fitted in well with his being one of Sir Henry Halford's seven appointees to a Fellowship of the London Royal College of Physicians. Only 168 such Fellows were admitted between 1771 and 1833, and Halford, the President of the College, had the right of nominating them. Of his seven choices, Sir George Clark has written: "When he did exercise his statutory rights of nominating, he chose well. None of his nominees had been at Oxford or Cambridge, but they all satisfied his standards of liberal education and sociability". Five of the seven were former Edinburgh students - Holland, Henry Herbert Southey, Sir James M'Grigor, Peter Mark Roget and William Prout.

Edinburgh alumni also made important contributions to medical science. Richard Bright was to show that dropsy was the result of kidney disease and Thomas Addison did preliminary research into appendicitis and like Bright, gave his name to a disease - this time concerned with diseased suprarenal capsules. Marshall Hall (M.D. 1812) discovered the human reflex action on Christmas Day, 1809, Ephraim McDowell of Kentucky performed the first successful operation to remove

1. Reader, 16.
3. Ibid., II, 662-663. Southey, the brother of the poet, became a physician to George IV through the influence of his fellow Edinburgh alumnus, Sir William Knighton.
an ovarian tumour; Philip Physick (M.D. 1792) was the first American to wash out a stomach with a tube in a case of poisoning. He had seen the tube used by Alexander Monro secundus to feed soup to a man who had cancer of the esophagus. Physick and Monro disputed the priority of the invention. James Copland (M.D. 1815) wrote a Dictionary of Practical Medicine.

The two remaining fields of endeavour in which Edinburgh alumni figured prominently – Lunacy and Public Health – are of particular importance in assessing the contribution of the medical school's training for nineteenth century social problems. The fourteen alumni who worked in mental health can be subdivided as follows:

**Commissioners in Lunacy**

William Alexander Francis Browne (L.R.C.S. 1826; First Commissioner in Scotland)

Thomas Drever (M.D. 1798; Commissioner, 1829-1830)

Cornwallis Hewett (studied in Edinburgh, circa 1809; Commissioner 1840-1841)

John Robert Hume (M.D. 1803; thesis De Tinea Capitis; Commissioner 1829-1855)

James Cowles Prichard (M.D. 1808; Commissioner, 1845-1848)

Edward James Seymour (studied in Edinburgh 1816-1818; Commissioner 1831-1839)

Henry Herbert Southey (M.D. 1806; Commissioner 1829-1848)

Thomas Turner (studied in Edinburgh after 1820; Commissioner 1829-1855)

**Mental Health Specialists**

U.A.F. Browne

John Conolly (M.D. 1821; thesis De Stato Mentis in Insanitatem et Melencholia)

James Douglas (M.R.C.S. 1820)

Thomas Hancock (M.D. 1806)

Sir Alexander Morison (M.D. 1799; thesis De Hydrocephalo; L.R.C.P. 1800; F.R.C.P. 1801)

J.C. Prichard

Henry Reeve (M.D. 1803)

John Reid (M.D. 1798)

E.J. Seymour

William Thomson (M.D. 1824 or 1827)

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1. see a leaflet in the Science, Medicine &c articles box in the E.U.L. Drummond Room, The Ephraim McDowell Memorial, Danville, Kentucky.

Before the Gordon-Ashley Act of 1828, the care of the insane in the Metropolitan area of London was under the surveillance of five London F.R.C.P.s. Their unsatisfactory work led to legislation in 1828 to replace them by fifteen Metropolitan Commissioners in Lunacy. In 1842 they inspected provincial areas which led to the 1844 report on the state of English and Welsh asylums. The report in its turn led to the Act of 1845 which set up new Commissioners in Lunacy. Four of the fifteen first appointed Metropolitan Commissioners were Edinburgh alumni. One, John Robert Hume, after studying in Edinburgh from 1796-1797, became an M.D. of St. Andrews in 1816, an Edinburgh F.R.C.P. in the same year, and later held the post of Inspector-General of Army Hospitals. Prior to receiving any of his formal medical qualifications he had been the Duke of Wellington's physician in the Peninsular. Prichard's anthropological interests were discussed in Chapter Four: he was also the first English psychiatrist to separate a "new" group of mental diseases. He distinguished moral insanity (such as schizophrenia and manic depression) from other forms such as delusions and hallucinations. He was also the first practising psychiatrist to be made a Metropolitan Commissioner in Lunacy.

Of the seven who were mental health specialists, Browne was medical superintendent of the Royal Asylum, Montrose from 1834 and of the Crichton Institution, Dumfries from 1839. His What Asylums are, are, and ought to be (1837) was a manifesto for ameliorating the

treatment of the mentally sick. He also foresaw the advantages of group therapy. Hancock’s were written contributions such as his review in The Philanthropist of Samuel Tuke’s Description of the York Retreat which publicised the need for an asylum in London similar to that in York. Hodgkin also introduced John Conolly to Tuke and was the Tuke family’s medical consultant. John Reid saw the deficiencies of asylum treatment, believing that they could instil rather than cure madness. Reeve was physician to the Norfolk and Norwich Asylum; Edward Seymour’s writings “foreshadowed the present day stress on the need for more and better out-patient facilities, the realization of the harmful effect on patients of social isolation in mental hospitals, and the tendency to return them to their environment at the earliest opportunity when socially intolerable symptoms subside”. Thomson was director of a large asylum in Glasgow in the 1840s.

Sir Alexander Morison and John Conolly are giants in the history of psychiatry: Morison graduated M.D. from the University in 1799, was licensed by the Edinburgh College of Physicians in 1800 and was made a Fellow of the same College in 1801. In 1810 he was inspecting physician of lunatic asylums in Surrey. Sir David Henderson has concluded that there were four great men who developed more humane and enlightened treatment of the mentally ill in France and Scotland - Philippe Pinel (1745-1826) and Jean Esquirol (1772-1840) in France; Andrew Duncun senior and

1. Ibid., 865-866.
4. Ibid., 960-961.
Morison. Duncan was the founder of the Royal Edinburgh Hospital for Mental and Nervous Disorders at Morningside, and he planned there to incorporate the practice of Pinel's enlightened methods. Morison was a student of Duncan's; in 1823 he suggested the establishment of a Chair of Mental Diseases in the University and received the backing of the wife of Thomas Coutts, the banker. The University did not accept the idea, although it had its supporters, including William Pulteney Alison. Morison also failed to receive support both from the Morningside Asylum and the Edinburgh College of Physicians. So, in 1823, he began a course of nine private lectures which continued for thirty years and were the first course on mental diseases to be given in Britain.

The work of John Conolly in public health, but especially that of mental disorders is too little known. He graduated M.D. of Edinburgh in 1821; his thesis, which was entitled De Statu Mentis in Insania et Melancholia, made the point little appreciated at the time, that the healthy mind had to be understood in order to cure the sick one. He also emphasized his dislike of asylums. Of his time in Edinburgh, his colleague Dr. William Browne, later Scottish Commissioner in Lunacy, wrote: "John Conolly displayed, within the University of this town, and in the arena of the Royal Medical Society - - - - those predilections

2. Ibid., 32-33.
3. The Marquis of Lansdowne's proposal to the 1826 Commission that they should consider the establishment of a Chair of Mental Diseases - three years after Morison's conception - is mentioned below.
4. Henderson, 35.
5. Comrie, 470.
and preferences which ultimately determined his destiny, and gave him a position of nearly equal rank among physicians and philanthropists. His thesis was on Insanity, and formed the foundation for that work by which he is most popularly known. He first practised in Chichester which suffered a small pox epidemic because of the low rate of vaccination, especially among the poorer classes. To encourage them to be immunised, Conolly wrote in 1822, An Address to parents, on the present state of vaccination in this country. In the same year he moved to Stratford where he became twice Mayor and initiated many social and sanitary improvements including the establishment of a public dispensary (later the Stratford-upon-Avon Hospital) which offered free vaccination among its services.

From 1827-1831 he was Professor of the Nature and Treatment of Diseases at the new University College, London. He returned to practice in Warwick until 1839, but during that time was Visiting Physician to the Warwickshire Lunatic Asylums. It was in 1839 that his practical work in mental health began; in that year he became Resident Physician at the Middlesex County Asylum, Hanwell, where he remained until 1843.

Hanwell was the largest asylum in the country and Conolly introduced the non-restraint methods. Pinel had established the principle of non-restraint at the Bicêtre in Paris and the Tuke family

2. Richard Hunter and Ida Macalpine, "An Anonymous Publication on Vaccination by John Conolly (1794-1866)", Journal of the History of Medicine, XIV (1959), 312-313. More is said below about the work in Edinburgh, undertaken by professors and students, to ensure vaccination, even prior to Conolly's student years.
3. Ibid., XIV, 315-316.
4. While Professor, he was preoccupied with the problems of insanity but his offer to lecture on the subject was rejected by the University College Council. (Clark, 8.)
had done the same in York. The York Retreat had been founded by a Quaker, William Tuke (1732-1822); his work had been continued by his son, Henry (1755-1814) and grandson, Samuel (1784-1857). When Samuel Tuke had visited Edinburgh in 1821, Thomas Hodgkin had introduced him to Conolly. In his M.D. thesis, Conolly had acknowledged the work of the Tukes: "I do not hesitate to assert that more insane persons would be cured if moral treatment were better understood and administered in time... In Britain the credit for this kind of treatment justly belongs to the Friends".  

Conolly not only practised the non-restraint method "on a large scale, under the eyes of the profession, and even of the public", but he was also "an active and effective propagandist". Hanwell was often visited by physicians — especially medical superintendents of lunatic asylums, British and foreign. Even Samuel Tuke was impressed when he visited Hanwell in 1841: his family's work had been taken to its logical conclusion by Conolly. "From the zeal, talents and integrity of Dr. Conolly," he wrote, "we shall doubtless learn in the most satisfactory manner, the further results of this large and most satisfactory manner, the further results of this large and most satisfactory experiment". Samuel Tuke recommended that his son, Daniel Hack Tuke, a medical student at St. Bartholomew's, attend Conolly's clinical demonstrations at Hanwell.

2. Clark, 15.
4. Clark, 16.
5. Tuke, 23.
6. Ibid.
In 1842, Conolly gave the first formal course of psychiatric clinical instruction in England when the magistrates of Middlesex allowed him to admit selected pupils from the London medical schools to lecture demonstrations at Hanwell.¹ They were designed to illustrate the various forms of insanity and he exercised a more powerful influence than the Tukes not only by practising non-restraint but also by expounding the humane and scientific theory behind it.² He was an advocate of clinical teaching schools being attached to asylums, and of local health services which would provide both in-patient and domiciliary treatment.³

Little more needs to be said about the contribution to nineteenth century public health of three Edinburgh alumni - James Moncrieff Arnott, James Phillips Kay-Shuttleworth and Thomas Southwood Smith.⁴ Kay-Shuttleworth's biographer certainly believed that his subject's experiences in the Edinburgh New Town Dispensary and the Queensferry Fever Hospital, under the supervision of Professor Alison, made Kay-Shuttleworth a social reformer.⁵ The others listed in the public health category performed no less valuable work though their impact was more local: Malachi Blake (M.D. 1793) was the moving spirit behind the foundation of the Taunton and Somerset Hospital;⁶ Joseph Brown (M.D. 1819) was

1. Conolly, 23.
2. Hunter and Macalpine, Three Hundred Years of Psychiatry, 805 and Conolly, 1.
3. Hunter and Macalpine, Three Hundred Years of Psychiatry, 806.
6. Laurence Dodson, "The Taunton and Somerset Hospital: 150th Anniversary", The Hospital, (November, 1959), 907-912. Blake called for a meeting of the inhabitants of Taunton "for the purpose of proposing and taking into consideration and most effectual plan for establishing in Taunton a public Medical Institution, for the use of its poorer inhabitants".
an ardent sanitary reformer in Sunderland where he became Mayor;\(^1\) Francis Cooper (L.R.C.S. 1827) was Southampton's Medical Officer of Health from 1850 and died of cholera in 1865 when still in office; George Cumming (M.D. 1802) formed and managed the Denbighshire Infirmary and general dispensary; Sir Charles Hastings (M.D. 1818) not only founded the British Medical Association but was President of the Public Health Section of the Social Science Association, and William Henry (M.D. 1807) wrote an elaborate report on the 1834 cholera epidemic for the British Association. Joseph Hume (M.R.C.S. 1796) - the well known Radical leader - was Chairman of the select committee of M.P.'s to examine how far the principles of the Health of Towns Commission could be carried out with respect to waterworks and drainage; William Kay (M.D. 1837) was Medical Officer of Health for Merthyr Tydfil from 1853-1855 and the author of a sanitary report on Bristol and Clifton in 1842; Sir Richard Owen, the physiologist, who studied at Edinburgh from 1824, served with Edwin Chadwick on the 1847 Royal Commission on London; John Roberton (L.R.C.S. 1817) was concerned with hospital construction in Warrington; Seymour, the Lunacy Commissioner, was Secretary to the Central Board of Health in 1831; John Sutherland (who studied medicine at Edinburgh from 1823, became an L.R.C.S. in 1827 and an M.D. in 1831) was an inspector under the first Board of Health in 1848, editor of the Journal of Public Health and Monthly Record of Sanitary Improvement, and founder in 1844 of the Liverpool Health of Towns' Advocate; and John Wilson (M.D. 1823) became Inspector-General of Hospitals.

\(^1\) see The Lancet, December 5th, 1868, 750.
One historian of medicine in the reign of George III has written of the rise of dispensaries and hospitals: "At that time, physicians of great ability were beginning to flock to England, especially from the rising school of Edinburgh. The possibilities of obtaining positions where they could found professional reputations as teachers were few, and the staffs of existing hospitals were limited and exclusive. In this difficulty, the more enterprising spirits threw themselves with ardour into the project, and so it came to pass that the new hospitals and dispensaries were staffed by some of the ablest and most enlightened physicians in the country". The contribution of Edinburgh medical alumni of 1790-1826 to all these spheres - the forces, medical science and teaching, lunacy and public health - was considerable. The final section of this chapter endeavours to show that the training they received in Edinburgh aroused their interest and provided a basis for their future work.

III

Before the Edinburgh medical school - the tripod, Dr. Douglas Guthrie has called it, of the University and the Royal Colleges - can be assessed, it is necessary to consider the other available institutions in Britain. Training by apprenticeship is not considered here because it did not pretend to be a systematic procedure.

One blatantly Edinburgh view on other medical schools was written in 1818. It took the form of an article entitled "On Medical Legislation" in the Edinburgh Medical and Surgical Journal: "Physicians at the present day are found to emanate from various sources; chiefly from the several universities of the united kingdom. There are doctors

of Oxford and Cambridge, whose degrees are obtained by a certain observance of acts and terms, and are testimonies, rather of regular literary education, than proofs of ability for medical practice; of Edinburgh and Glasgow, in both of which Universities, a regular course of medical education, resident study, and actually examination, as to the reality and extent of medical acquirement, are essential to obtaining degrees; of Dublin, which issues degrees on two foundations; one of the University, the other of the School of Physic, agreeing with Edinburgh and Glasgow; of Aberdeen and St. Andrews, where the mere certificates of private individuals are deemed sufficient testimonies of medical desert, and a warrant for granting medical honours; and finally, of various foreign Universities.¹

The other available British institutions to be considered are Oxford, Cambridge, London’s hospitals and Royal Colleges, Dublin and Glasgow. In 1827 England had no systematic medical education, and S.W.F. Holloway does not discern any change until 1830—only between that date and 1858 did "the ancient libraries of Oxford and Cambridge and the apothecary’s daily round [give] way to the teaching hospital as the training ground of medical students."² At Edinburgh, on the other hand, "The combination of a university education along with clinical instruction in the hospital, modelled on the pattern of Leiden, offered an academic training in medicine not obtainable elsewhere in

¹ "On Medical Legislation", Edinburgh Medical and Surgical Journal, XIV (1818), 12-13.
Britain at that period: Glasgow and Aberdeen developed the system later; no steps were taken at Oxford and Cambridge and the London facilities of apprenticeship and the anatomical and hospital schools merely prepared students for diplomas. The vested English interests of the time, however, would not be drawn into complimenting Edinburgh, even as late as 1834. The evidence of Dr. Pelham Warren, a former Censor of the London College of Physicians, to the Select Committee on Medical Education bears witness:

Q: "The Scotch Universities are much more important as medical schools than the English, are they not? - There is more medical education in Edinburgh.

Q: "Independently of general education, does not Edinburgh possess the means of giving a better medical education than the English Universities? - As far as I know of the University of Edinburgh there are more Professors and more lecturers upon all points relating to physic, than there are in the English universities."

The reform of medical education at Oxford dates from 1839 when the Regius Professor of Medicine and the Reader in Anatomy began to lecture. After 1781, the medical course might be eleven years in length but seven of those years were spent in taking the M.A. and the remainder were devoted to medicine. There were no written examinations, the viva voce was short and not severe. No lectures were given on physiology, pathology or materia medica. Applying sarcastic strictures

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2. Sel. Comm. I, 93. see also Chaplin, 17; there is mentioned the perfunctory reading of medical and anatomy lectures at Oxford and Cambridge as also those of Botany and Chemistry. No practical instruction was given in these subjects - a direct contrast with Edinburgh in the reign of George III.
4. Edward Mansfield Brockbank, The Foundation of Provincial Medical Education in England, and of the Manchester School in particular, (Manchester, 1936), 44.
to both English universities for their medical curricula at the end of the eighteenth century, Professor Major Greenwood wrote: "The regulations of the two English universities did not impose any serious clinical training on candidates; it would have been possible to proceed M.D. without ever having examined a patient or dissected a subject, but, if the regulations were obeyed, not possible to do so without having an intimate acquaintance with at least several hundred pages of the writings of Hippocrates and Galen".¹

In 1800, the Regius Professor of Medicine at Cambridge had not lectured for one hundred years.² The historian of Cambridge medicine has written: "From the earliest days of the University until the last quarter of the nineteenth century the number of medical students in residence was small, and until the early nineteenth century those responsible for the Faculty of Medicine, which had existed from the first, were much inclined to treat their posts as sinecures".³ John Elliotson was asked by the Select Committee: "You, having witnessed the medical education both at Edinburgh and at Cambridge, and having resided for three years at Cambridge, will you state whether you think the medical education at Edinburgh is inferior or superior to that at Cambridge?". To which Elliotson simply replied: "There was no medical education at Cambridge in my day, at all".⁴ When asked whether the Cambridge reforms had put that University on a par with Edinburgh Elliotson commented: "I do not know exactly what improved system has

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1. Greenwood, 11.
taken place at Cambridge, but I am sure that it cannot be equal to that of Edinburgh, where there are courses of six months duration given, and great clinical instruction, both medical and surgical; I should think Cambridge cannot be compared with Edinburgh in this respect".¹

An idea of the completely alien nature of London practice to the average Scottish medical graduate can be gathered from W.J. Reader's analysis of Sir Henry Halford's evidence to the Select Committee on Medical Education. Halford preferred Oxford and Cambridge graduates as members of the London College of Physicians because they had undergone "a moral and intellectual trial" which was not available in the Scottish universities. The trial consisted of residence in College (moral) and conventional classical training (intellectual). Halford also emphasized that the physician had to be a gentleman for economic reasons and reasons of pride - he was, after all, going to be treating those in high stations in society, who had had the same education as himself at the English universities. Halford described the physician's chief assets not so much as learning, as an impressive manner, experience and elaborate etiquette. Dr. Reader's research led him to conclude that family connections, the influence of the Royal Colleges and parliamentary considerations dominated the coveted appointments to the London hospitals which were the basis for a wide and fashionable practice.²

The evidence presented to the Select Committee on Medical Education included a revealing comparison of the studies and examinations

¹ Ibid., I, 107.
² Reader, 17, 19-20.
required in 1826 by the Edinburgh and London Colleges of Surgeons.

The table below speaks for itself and asserts the superiority of Edinburgh's requirements:

<table>
<thead>
<tr>
<th>Preliminary Qualifications</th>
<th>R.C.S. London</th>
<th>R.C.S. Edinburgh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of Studies</td>
<td>16 months</td>
<td>3 years, or 2 years in the case of a previous apprenticeship for 3 years for a regular practitioner.</td>
</tr>
<tr>
<td>Subjects to be studied</td>
<td>1. Anatomy - 3 courses of lectures - 2 courses of dissection</td>
<td>1. Anatomy</td>
</tr>
<tr>
<td></td>
<td>2. Surgery, one course.</td>
<td>2. Chemistry</td>
</tr>
<tr>
<td></td>
<td>3. Hospital attendance for one year.</td>
<td>3. Materia Medica</td>
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<tr>
<td></td>
<td>4. Institutes of Medicine</td>
<td>4. Institutes of Medicine</td>
</tr>
<tr>
<td></td>
<td>5. Practice of Medicine</td>
<td>5. Practice of Medicine</td>
</tr>
<tr>
<td></td>
<td>7. Clinical Surgery</td>
<td>7. Clinical Surgery</td>
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<tr>
<td></td>
<td>8. Midwifery</td>
<td>8. Midwifery</td>
</tr>
<tr>
<td></td>
<td>10. Attendance on a public hospital for a year.</td>
<td>10. Attendance on a public hospital for a year.</td>
</tr>
<tr>
<td>Nature and Number of the Examinations</td>
<td>R.C.S. London</td>
<td>R.C.S. Edinburgh</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>1. Descriptive Anatomy</td>
<td></td>
<td>1. Anatomy and Surgery</td>
</tr>
<tr>
<td>2. Surgery in its more limited sense.</td>
<td></td>
<td>2. Anatomy and diseases of some part of the body, with the surgical operations and bandages required.</td>
</tr>
<tr>
<td>One examination of about half an hour.</td>
<td></td>
<td>3. Materia Medica, Chemistry, pharmacy, uses and doses of medicines.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. On a probationary essay, composed by the candidate, on some part of surgery or surgical anatomy.</td>
</tr>
</tbody>
</table>

Fellows undergo four examinations, on four separate days.

Members have the same examination, excepting the essay.

London hospitals in the period 1790-1826 disappointed those who were familiar with Edinburgh, and the use made there of the Royal Infirmary for treatment and teaching. Edinburgh alumni were inclined to assert the superiority of their alma mater. On October 7th, 1793 Robert Jameson, later Professor of Natural History and an M.D. of the University of Edinburgh, visited Guy's. Of this visit he wrote: "Went this day to Guy's Hospital ... which I did not find near so clean or neat as the Edinburgh. The great stair I suppose has not been washed these 2 or 3 years, The operation room is small in comparison to the Edinburgh one but pretty neat being supported by two pillars where the operators stand and neatly painted. In some of the wards the windows

were planted full of Geraniums in pots which I did not think healthy.\(^1\)

In 1820, Sir Robert Christison went to St. Bartholomew’s and he remarked
that the wards were not used for medical teaching. Edinburgh was superior
with medicine proper holding a prominent place in the system of hospital
instruction.\(^2\)

In 1832, the *Quarterly Journal of Education* was comparing London
with Edinburgh in the days before the foundation of University College,
London. London might have been the only place in England where anatomy
and medicine could be learned but the cost of living in Edinburgh would
have paid for an "obscure garret in Tooley Street . . . at a distance
from polite amusements, and with few or no opportunities of associating
with good company".\(^3\)

On more pertinent grounds, the *Journal* felt
that on the one hand London medical education required a long and servile
apprenticeship or on the other, attendance on London lecturers who,
while eminent in anatomy and surgery, were of little consequence in
medicine. "Whilst the Edinburgh teachers were making physicians," it
said, "the London teachers were making tradesmen. Whilst the Edinburgh
teachers were becoming celebrated, each in his department of teaching,
the London teacher was lecturing on several subjects, without time to
prosecute original enquiries into any, . . . ."\(^4\)

A later historian,
Dr. Charles Newman has concluded that students at the London hospitals in
1800 were there to learn techniques - teaching was not provided.\(^5\)

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1. E.U.L. Ms. DC. 5, 34, 48-49.
   (Edinburgh, 1885), I, 193-194.
3. "The Recent Improvement of Medical Education", *The Quarterly Journal
   of Education*, IV (July-October, 1832), 3.
4. Ibid., IV, 3-5.
Dublin was another capital with problems for aspiring medical students. Edinburgh and London were far in advance of it.\(^1\) William Dease, a Dublin surgeon, was complaining in 1782 that Irishmen had to obtain their medical education abroad. The University of Dublin was not providing the expected facilities: the only chairs were of Anatomy, Chemistry and Botany; the bequest of Sir Patrick Dun for instituting lectureships in all branches of medicine was not used, and there was no co-operation between the Irish physicians and surgeons.\(^2\) In 1785 was passed the Irish School of Physic Act to reform the medical school. Under its terms a number of new, well-endowed chairs were established and facilities granted for the development of medical education. However, "the event . . . was the opposite of what had been expected, and during the last decade of the eighteenth century the School reached almost the lowest level in its history".\(^3\) A second Irish School of Physic Act (1800) again failed to provide a complete medical school; indeed the necessary co-operation between Trinity College, and the Dublin College of Physicians and Surgeons was not forthcoming until 1850. The University matriculation figures show the large numbers of Irish students coming to Edinburgh as a result.

Andrew Duncan junior told the 1826 Commission that Dublin granted two medical degrees: the first was the equivalent of an Oxford

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or Cambridge M.D. and required three years medical education after taking a B.A. at Trinity College. The second degree was cheaper and took less time to obtain; it was designed to stop the Irish coming to Edinburgh and was meant to be the equivalent of an Edinburgh M.D. However, "after a time the high University men declared the testimonium [for the second degree] to be of no use, and that the degree was no degree; the consequence has been, that the Dublin students, even those who study their profession entirely in Dublin, sometimes come here to graduate". ¹

Edinburgh responded to the Irish influx by requiring a year's residence before graduation - Alison explained the situation to the Commissioners: "it was formerly stated that it was understood and expected men would take one year here, but it was not absolutely required, and latterly it became a practice, which was rather increasing, for men to come here from Dublin who had attended all their time there, and who came here merely to graduate; and, as we had no means of knowing the character of these men, we thought some abuse might be practised in that way, for men might come who had been rejected there, and it seemed desirable to know a little more of their character; that regulation was therefore made absolute". ²

The challenges to Edinburgh nearer home did not have the force of later years. Aberdeen and St. Andrews certificates were issued to applicants but there was no pretence at formal and systematic medical education. ³ Aberdeen complained that medical students went to Edinburgh

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1. Evidence, I, 240.
2. Ibid., I, 206.
to complete their education. Glasgow deprecated that as an Edinburgh or London diploma was necessary for a student to be an Army medical officer and be promoted, "This gives an eminence to the Medical School of Edinburgh over that of Glasgow, and it gives the student a preference for continuing there rather than in Glasgow." But Glasgow did not provide severe competition for Edinburgh: in 1803, John Bristed complained that - of all fundamental subjects - anatomical instruction was inadequate at Glasgow.

Edinburgh's pre-eminence was partially due to good relations between the Royal Colleges and the University. This and the foundation of the Royal Infirmary, according to an historian of the University of Glasgow, provided Edinburgh with powerful teachers and means for organized clinical teaching. In Glasgow, there was only slow co-operation in the eighteenth century between the University and the Faculty of Physicians and Surgeons. The pace meant that Edinburgh attracted the eminent Glasgow men - Joseph Black and William Cullen to name but two: "The story of Glasgow medicine in the eighteenth century is an essay upon this theme".

Compared with Edinburgh's large medical professoriate, Glasgow only had two chairs and three lectureships in 1801. The Surgery and Midwifery chair was not founded in Glasgow until 1815; Chemistry in 1817; Botany in 1818; Materia Medica in 1831; Physiology and Forensic Evidence, IV (Aberdeen), 34.
2. Ibid., II (Glasgow), 132.
Medicine in 1839. 1824 was the first year when hospital attendance was demanded of the prospective Glasgow graduate. But the real drawback was the insistence upon their rights of the Glasgow Faculty of Physicians and Surgeons whose charter gave them a monopoly over licences to practise surgery in the Glasgow area. The University was taken to court, lost, bore great costs and did not gain recognition for its degree in the Glasgow area until the Medical Act of 1858.¹

Edinburgh alumni of the years 1790-1826 were among those who repaired the condition of medical education outwith Edinburgh. The institutions with which they were concerned were Cambridge, the new London University, new and existing London hospitals, Dublin, Manchester, Liverpool, Bristol, Newcastle and St. Andrews. John Haviland, who studied at Edinburgh from 1807-1809, became Professor of Anatomy at Cambridge in 1814 and Regius Professor of Physic there in 1817. He was the first Professor of both subjects to give a regular course of lectures at Cambridge. Furthermore, "at his suggestion and by his efforts a lengthened and systematic course of study has been required, rigid examinations have been instituted, and lectures on various branches of medicine, and the collateral sciences, have been regularly given in the medical school of the University".²

Haviland instituted a personal and unofficial examination for the M.B. degree: in 1821 the Senate made two terms of lectures from him a requirement for the degree; in 1827 every Cambridge medical student — unless licensed by the London Royal College of Physicians —

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¹. Ibid., 243, 263, 252-253.
². Gentleman's Magazine, new series, XXXV (1851), 206.
had to undergo the M.B. examination and after 1827, a Syndicate was appointed to inquire into medical degrees and examinations. They recommended that the Anatomy, Chemistry and Botany professors assist Haviland in the examination, and that the examination cover pathology, the practice of medicine, clinical medicine, anatomy, physiology, chemical pharmacy and botany in its relation to medicine. ¹

To Joseph Jordan has been ascribed the title "Father of Provincial Medical Education". Educated at the University and both Royal Colleges of Edinburgh he started the school of medicine in Manchester. ²

James Carson (M.D. 1799) became the authority in the Liverpool medical school on circulation and respiration. William Kay, previously noted as a Medical Officer of Health, became a lecturer on Forensic Medicine at the Bristol Medical School. George Fife (M.D. 1827) became the first lecturer in Medical Jurisprudence and Materia Medica in the Newcastle-upon-Tyne medical school, and John Reid became Professor of Anatomy at St. Andrews.

It was to the Dublin and London medical schools that Edinburgh's contribution was the greatest. To Dublin returned Abraham Colles, James O'Beirne, Thomas Beatty, John Cheyne, Sir Dominic Corrigan, Robert Graves and William Stokes. The last two have been called by Dr. Comrie, the leaders of the Dublin School. ³ Graves graduated M.D. in 1819 and became Professor of Physiology at Dublin. Stokes, later Regius Professor of Physic at Dublin, graduated M.D. in 1825. Colles, (M.D. 1797) became

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2. Brockbank, 63-65.
3. Comrie, 733.
Professor of Anatomy, Physiology and Surgery at the Dublin College of Surgeons; O'Beirne (M.D. 1816) was a surgeon to several Dublin hospitals while Beatty (M.D. 1820) wrote much on medicine and midwifery. Cheyne (M.D. 1795) became Professor of Medicine at the Dublin College of Surgeons in 1811, and was the founder of clinical teaching in Dublin. Corrigan, (M.D. 1825) was physician to several Dublin hospitals and lectured on the practice of medicine. He was five times President of the Irish College of Physicians.

Eight of the first professors of medicine at University College, London, had been educated at Edinburgh. One, Robert Grant, Professor of Comparative Anatomy, was mentioned in the chapter on Natural History. Charles Bell, renowned for his work on the nervous system, not only was a professor at the new University College but in 1835 founded the Middlesex Hospital Medical School. Anthony Todd Thomson, founder of the Chelsea, Brompton and Belgrave Dispensary, was Professor of Materia Medica from 1828-1849 and of Medical Jurisprudence from 1830. John Conolly was Professor of the Nature and Treatment of Diseases. One of his biographers believed he was appointed to the Chair through Lord Brougham's influence. The first Professor of Medical Jurisprudence was John Gordon Smith who graduated with highest honours in medicine in 1810. John Elliotson and Robert Liston held the Chairs of the Principles and Practice of Medicine and of Clinical Surgery, respectively. William Sharpey - the Secretary of the Royal Society, 1853-1872 - was the eighth

Edinburgh alumnus and Professor Bellot has called him the father of modern physiology in Britain.  

Guy's Hospital was the other London centre to which Edinburgh alumni of 1790-1826 flocked. They included Richard Bright, Thomas Addison and Thomas Hodgkin who founded the Guy's Society for Clinical Reports. Others who were physicians at Guy's were Alexander Marquet, James Laird and William Back. James Blundell (M.D. 1813) was Guy's lecturer in Obstetrics. Physicians at other London hospitals included James Hope at St. George's and Thomas Bradley at the Westminster. At the teaching level were James Moncrieff Arnott, a co-founder with Charles Bell of the Middlesex Hospital Medical School; Thomas Watson, a Professor of Forensic Medicine at the Middlesex and King's and Robert Ferguson, Professor of Midwifery at King's. It is from the contribution of such men to teaching in London and elsewhere, and from the work of their fellow alumni in public health that it is necessary to turn to see the professors, courses and methods of medical education with which they would have met in Edinburgh.

IV

The University and College of Surgeons of Edinburgh are comprehended here. Those studying for a diploma of the College could attend University lectures and University students, particularly of Anatomy, attended the extra-mural lectures of the Fellows of the Royal

1. Bellot, 166.
In 1806 there was a revision of the examination requirements for the College of Surgeons' diplomas and certificates. In December, 1824 the University also revised its *Statuta Solennia* for the degree of M.D. Prior to 1824, the M.D. course lasted three years; classes were to be attended (some not compulsorily) in anatomy, surgery, materia medica, pharmacy, the theory and practice of medicine, clinical medicine, midwifery, chemistry and botany. Further, three months' courses were required in two of the following - practical anatomy, Natural history, medical jurisprudence, clinical surgery and military surgery. At the time of the 1826 Commission, the following "Comparison of the Courses of Study required by the Statuta Solennia of the University, and the regulations of the Royal College of Surgeons of Edinburgh, A.D. 1826" was presented:

"The duration of the course of study is, -

For Medical degrees Four years
For Surgical diplomas Three years

The Courses prescribed by the University must be delivered by Professors in a University; or by Resident Fellows of the College of Physicians and Surgeons of London, Dublin, Glasgow, or Edinburgh.

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In terms of professional education, there was not much to choose between the requirements of the two curricula: the difference lies more in an education given by professed teachers at the University and lectures given almost as a sideline by professional surgeons. The University provided teachers, courses and facilities in Edinburgh to help students fulfil the requirements. The College was not as well
equipped with facilities or a full range of teachers: the facilities for anatomical study in the period were good but if the prospective licentiate was to acquaint himself with other requisite branches of education he would either have to attend the University or apprentice himself to "Resident Fellows" in Edinburgh, Glasgow, London or Dublin. While the requirements of the University and College might be similar, the University provided a superior and systematic method of attaining them.

(a) Anatomy

"The most distinguished periods in the history of the Medical Faculty", wrote Alexander Miles, "have always coincided with the periods during which the teaching power of the Extra-mural School was at its highest". He went on to say that whenever and wherever one was weak, the other supplied the defect. In this most distinguished period the Anatomy department in Edinburgh could boast Alexander Monro secundus within the University and later distinguished men as John Barclay, John Gordon, John Bell and Robert Knox were later to be found outwith. There was a large demand for anatomical instruction in the period because so many students were coming for medical education and because anatomy was a basic requirement for the College's diploma, the University M.D. and for public boards and service.

The second Alexander Monro held the University's Chair of Anatomy and Surgery from 1754-1798. Succeeding his father he "showed himself the greater man both as a teacher and investigator, and, among more brilliant colleagues than those with whom his father had to compete,

he maintained any easy equality and was the acknowledged head of the developing medical school.\(^1\) His most famous discovery was the opening in the cerebral ventricles known as the foramen of Monro.\(^2\) As a teacher, "He was totally devoid of conceit and unlike many professors who have lectured for nearly half a century, did not remain satisfied with the lectures he had written at the beginning of his career. On the contrary, he was in the constant habit of altering and improving them."\(^3\) His class attendance, in the only years for which figures are available, ranged from 307 in 1794 (the total number of medical students was 374) to 333 (out of 367 medical students) from 1797-1798.\(^4\)

He was succeeded by his son, Alexander Monro tertius, who held the Chair from 1798-1846. The circumstances in which he had to teach were very different from those of his father and grandfather. Given the demand for anatomical instruction, the third Monro had person deficiencies on the one hand and certain obstacles which he did not overcome, on the other. These obstacles were the lack of bodies available for teaching purposes and the calibre of the Edinburgh extra-mural anatomical teachers.

Rex E. Wright-St. Clair has discredited an old story about Monro that he simply read his grandfather's lectures verbatim - including the passage "When I was in Leyden in 1715".\(^5\) However, Monro was discouraged

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1. Comrie, 320.
4. Evidence, I, 1307
by his inability to compete adequately with the increasing opposition; he had a tendency to cause confusion among students by going off on tangents in his lectures; and his methods were out of date; new and exciting anatomical analysis was available elsewhere in Edinburgh. In 1810, John Bell, the leading operating surgeon in Edinburgh, wrote: "In Dr. Monro's class, unless there be a fortunate succession of bloody murders, not three subjects are dissected in the year. On the remains of a subject fished up from the bottom of a tub of spirits, are demonstrated those delicate nerves which are to be avoided or divided in our operations; and these are demonstrated at a distance of 100 feet! - nerves and arteries which the surgeon has to dissect, at the peril of his patient's life". Bell himself began to lecture and built up an anatomical school - "It is no exaggeration to say that he founded the subject of Surgical Anatomy".

In those days, students did not undertake individual dissection because of the insufficient material available. Instruction was by lecture-demonstration; preparations already dissected were used as well as plates, tables and coloured illustrations. The material covered in Monro's course were the structure and position of all the parts of the human body and that of several inferior animals. He explained the uses of bodily organs, the diseases to which they were liable, symptoms and methods of treatment.

1. Ibid., 116-117.
3. Comrie, 324.
4. Ibid., 498.
5. Report, 147.
Monro's attendance dropped by 50% in twenty years — from 306 out of 417 medical students in his first year (1799) to 205 out of 817 in 1821. The students were going to the extra-mural lecturers. As the Edinburgh Magazine expressed it: "It is, however, by private lecturers that the department of Anatomy is taught with greatest success, ... Indeed it may be said to be by the well-known talent, and great professional knowledge, of some of the private lecturers of this place, that the Medical School of Edinburgh supports in no small degree her great and deserved reputation."

The great anatomists of the time were John Barclay, John Gordon, John Bell and Robert Knox — although Knox's celebrity in the anatomical field did not come until after 1826 when he succeeded Barclay. Barclay, an M.D. of Edinburgh in 1796 and recognised as a lecturer by the Edinburgh College of Surgeons in 1804 and by the Physicians in 1806 "was vigilant and painstaking as a teacher, faithful in collecting data, and sagacious in their interpretation; he framed a new anatomical nomenclature, wrote admirably on biological questions, and established an excellent museum. He made Human Anatomy attractive, and seems to have been the first teacher in Britain to have given a direction to the study of Comparative Anatomy. His lectures were greatly in advance of his time, and helped to sustain the character of the Edinburgh School".

1. Evidence, I, 1307/131 and 1287.
2. "Notice of the System of Education pursued in the University of Edinburgh, with various hints for its improvement", The Edinburgh Magazine and Literary Miscellany, (April, 1826), 450.
the establishment of the Royal Dick Veterinary College. William Dick (1793-1866) had been a pupil of his.¹ John Gordon (M.D. 1805) suffered from Barclay's rivalry and his students never exceeded 100. However, he was a "most accomplished lecturer" and gained his reputation for work on the brain.²

It was fortunate for the Edinburgh medical school that excellent teachers were available out with the University: their existence can be explained in terms other than the deficiencies of the third Monro and a revolt against the medical dynasties. A demand had to be met: anatomy was fundamental to a medical qualification - it was not an option like Medical Jurisprudence. Students were flocking to Edinburgh and the extra-mural lecturers satisfied their demand.

It was seen with respect to the Chemistry class that students were excited by experiments and practical work. Monro could not satisfy that appetite if his class attendance was excessive - he had to demonstrate delicate nerves at a distance of a hundred feet. Smaller groups were possible if the anatomy student attended the different teachers. Monro was not an exciting teacher: he suffered from a dearth of corpses and it might be surmised that it was more difficult for a professor in a public institution to turn a blind eye to doubtful methods of procuring them.

The extra-mural anatomists on the other hand, were exciting; Barclay, for example, was clearly a gifted teacher. He demonstrated

² Struthers, 70-73.
careful observation; he furthered scientific research not only by framing a new anatomical nomenclature but also by emphasizing comparative anatomy. In this way, he anticipated future scientific and medical approaches by his work on non-human species and could, incidentally, obviate the need for a constant supply of human bodies. Hence, the extra-mural lecturers "rescued" Edinburgh anatomical teaching: without their contribution, the medical school would have been deficient in a fundamental subject. In fact, they set standards that were on a par with other courses in the University and medical school.

(b) Materia Medica.

The two professors concerned here were James Home and Andrew Duncan junior. Home, despite his lecturing at eight in the morning in winter raised his class attendance from 58 in 1794 to 255 in 1820. Duncan reached an attendance figure of 328 in 1823. The curriculum included Pharmacology, Dietetics, Pharmacy, the art of prescription and the connection of these matters with Physiology, Natural History, Therapeutics and the Practice of Physic. It was requisite that the Professor of Materia Medica be a practical physician as he taught the application as well as the preparation of medicines. Duncan explained to the Commission the difference between Hope's Chemical Pharmacy and his own Pharmaceutical Operations: "there is more of the precise science, and precisely understood chemical action /in Chemical Pharmacy/; and therefore, for my experiments and preparations I prefer those that are

2. Report, 142.
3. Evidence, I, 201.
called Galenical, where the chemical action is not so well understood by chemists, but which are commonly practised in the shops of apothecaries".¹

Home and Duncan were another pair of successive professors who show how the early nineteenth century turned to practical methods of demonstration. Duncan's teaching methods included lectures, experiments, exhibitions of specimens and plates, and the introduction of the Pharmaceutical Operations.² Unlike his predecessor, Duncan "has a considerable collection of pharmaceutical apparatus, a very valuable and extensive collection of Materie Medica and Alimentaria collected entirely by himself".³

He explained to the Commission that he had sent for a collection of Indian Materie Medica: "It came home; and it is, I believe, the most extensive of the kind that has ever reached Europe. It is now deposited in the Museum of Materie Medica".⁴ He spoke of his exhibiting in his classes "the most complete collection that, I believe, is exhibited by any lecturer in the kingdom". The exhibition was designed to excite the students and impart information. The specimens "are so laid out that there is no interruption, of the lecture and, in general, a considerable time is employed after each lecture by the students coming down to the table, which is very large, and examining the specimens, and in tasting and smelling them, and otherwise acquiring a knowledge of them".⁵

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1. Ibid., I, 223.
2. Report, 142.
4. Ibid., I, 220.
5. Ibid., I, 222.
(c) Institutes of Medicine

Three professors held this Chair in the period - the two Andrew Duncans and William Pulteney Alison. The senior Duncan had a class attendance of between 68-98 prior to 1807, the between 145-205 before his retire in 1819. He was active, as has been mentioned, in lunacy and also public health, which is dealt with below. The junior Duncan held the Chair for two years with a class attendance of between 180-190 students while Alison raised that figure to 259 in 1823-1824.1

The course covered

Physiology - the study of the functions of the living body in health,
Pathology - the study of the alterations which these undergo in disease, and
Therapeutics - the study of the action of remedies on the living body.2

(d) Practice of Medicine

James Gregory, Professor of Medicine 1790-1821, is one of the celebrities of Edinburgh medicine. He gave his name to Gregorian Physic - described by Sir Robert Christison as consisting of free blood-letting, cold affusion, brisk purging, frequent blisters and the nauseating action of tartar emetic.3 The following description of him appeared in the Quarterly Journal of Education in 1832: "He was a man of the old time, 'when there were giants', - of a most vigorous understanding and a most acute penetration, possessed of great learning, and filled with an utter scorn of anything approaching quackery or affectation. As a lecturer he was without a rival, - dignified, eloquent, and forcible. Never perhaps

2. Report, 146.
again will the medical student possess the rare advantage of following
so clear, so powerful, and so sincere a mind through all the labyrinths,
and mysteries, and mummeries of medicine". The *Journal* went on to
compare his relationship to his students as similar to the ancient
Greek philosophers.¹

Gregory could count regularly on well over 300 students which
his successor James Home could not.² It was said that Home was only
appointed to the Chair because he was a Tory like the Town Council,
and his classroom later became disorderly. Home's lecture course gave
an account of the whole history, causes, symptoms and treatment of such
diseases as required little manual operation in their treatment.³

Home introduced examinations into his method of teaching. He
told the Commission of the advantages of supplementing lectures by
examinations; "it forces my students to attend more carefully and
pointedly to the lectures; it obliges them, from the strictness of the
examination, to read at home, and to make the information they get from
me, or from books, much more their own. It brings me much more in
immediate contact with the young gentlemen, and I am enabled to know a
great deal of their talents, character, and information, before they
come for private examination for a Degree".⁴

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¹. *Quotly, Jnl. Educn*. IV, 2. Louis Simond saw Gregory teach during
his tour of Britain in 1810-1811: "Seated in the centre of a vast
amphitheatre covered with 500 heads, his hat on, and playing with
the case of his spectacles, he speaks without any notes, and in a
tone of conversation". His students "manifested their interest from
time to time by a little murmur of applause, which the professor
checked by a motion of the hand, and went on". (Louis Simond,
*Journal of a Tour and Residence in Great Britain*, 2 vols. (Edinburgh
1815), I, 377-378.)

Home emphasized medical practice as opposed to theory, in the examination: "I ask the symptoms of disease - the mode of distinguishing one disease from others nearly connected with it; and when I come to the treatment, I ask them in a very particular manner as to that. I should hope they get that information from their attention to minutiae which it would be impossible in any lecture to give. . . . I confine myself to mere fact. The consequence is that those gentlemen are certainly the best informed, with regard to these minutiae, that come before us".¹

What emerges from Home's evidence, is a clear desire to know the students whom he was teaching and to send them out as knowledgeable medical practitioners. He shared with his professorial colleagues a faith in education and sought to implement that faith by giving an importance to examinations. Gregory's influence to the same end was achieved by personal example - in much the same way as Dugald Stewart. There was no set pattern in Edinburgh for encouraging the pursuit of knowledge: what some professors might accomplish by their personal talents, others effected by educational techniques.

(e) Midwifery

The Chair of Midwifery was monopolised by Alexander and James Hamilton, father and son, from 1780-1840. This study is concerned with their courses and not with the internecine squabbles which James had with his Senatus colleagues over making Midwifery compulsory for the M.D. - a dispute which he caused the Town Council to intervene, the 1826 Commission to be appointed and a decline in the University to be

¹ I, 251.
suffered. Despite his quarrelsome nature, James was regarded as the leading obstetrician in Scotland.

Alexander built up his class attendance - although Midwifery was not compulsory - from 79 in 1794 to 168 in 1799. James continued the trend reaching 240 in 1802; 250 in 1807 and 315 in 1816. After 1819 the numbers began to decline notwithstanding a general increase in the total number of medical students.1 Both Alexander and James divided their course into four parts: Alexander covered the pre-natal condition of women; the treatment during pregnancy of all the various cases which could occur; the management of pregnant women; and the treatment of infant diseases.2 James dealt with the Anatomy and Physiology of the Uterine System, including questions concerning an infant in utero, the changes consequent upon birth and medico-legal questions concerning its viability and proofs of child-murder; his second, third and fourth parts were the same as his father's.3

On December 4th, 1791 Alexander requested the Senatus for a General Lying-In Hospital.4 Prior to this provision, his students had practised midwifery in the Lying-In ward of the Royal Infirmary. It was, however, too small: provision could be made for only six patients at a time and those pupils anxious to see much practice were allowed to accompany him to private deliveries.5 In February 1792, a Lying-In Hospital was established independently "for the purpose of affording

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1. Ibid., I, 1307-131.
5. Comrie, 305.
relief to the wives of indigent tradesmen" and giving students practical opportunities to study obstetrics.¹

James extended the service to women in their own homes. The objects of his Lying-In Institution for delivering Poor Married Women at their Own Houses were "to afford every requisite attendance, either by a Medical Gentleman, or a Midwife, (as circumstances may require) to Poor Married women lying-in at their own habitations; to furnish them with the necessary Medicines; to supply the most needy of them with the temporary use of Child-bed Linen, Flannels, Blankets, &c., and with any other addition to the means of comfort and health that may be essentially necessary. At present, there is not any Public Institution of the same kind established in this City, embracing such manifold advantages to the Industrious Poor at such a period of anxiety, when all the evils of Poverty are felt in an accumulated degree".²

Given his course and hospital, James used to issue the following certificate to his students: "I do hereby testify that Mr - attended diligently my Lectures on the principles and practice of Midwifery for the space of - that during the same period he had the charge as my private pupil of the Cases which occurred in the Edinburgh General Lying in Hospital, and also that he had extensive opportunities of private practice under the Superintendance of the medical officers of the Hospital both in cases of difficult parturition and in the diseases of Women and Children. From my knowledge of Mr - 's abilities I therefore consider

1. Ibid., 304. The Hospital was first in Park Place and then moved to Lauriston Place and became the Simpson Memorial Hospital. (Ibid., 455.)
him to be well qualified for the duties of a practitioner of Midwifery.¹ James' hospital was supported by subscription; he had a Museum of his own costing £1200 and he gave private classes to Edinburgh midwives.²

(f) Clinical Medicine and Surgery

"This important branch of medical education" said Sir James M'Gigor to the 1826 Commission, "was introduced into this country at Edinburgh, I believe, nearly as early as in any part of Europe; but in this kingdom it is still nearly confined to Edinburgh."³ The Royal Infirmary, at a very early period in its history had special wards set aside for the purpose of clinical instruction.⁴ As Edinburgh was concerned with practical medicine, clinical instruction was not confined to the Infirmary: in 1819, for example, Edward Turner, later Professor of Chemistry at University College, London, worked in the Fever Hospital and wrote his M.D. thesis on the fever raging through Edinburgh that year.⁵ A Dr. G. Webster of Dulwich wrote of the Royal Infirmary in 1812: "I have ever remembered and duly valued, the admirable manner in which the Edinburgh Hospital was conducted - the daily visits of all the physicians and surgeons to their patients; the excellent and regular course of clinical lectures on the most important cases; the clinical wards and clinical professors attached to them, in connexion with the university; and the system of constant superintendance, by means of the

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2. Evidence, I, 316.
3. Ibid., I, 529.
4. Logan Turner, 139.
resident house physicians or 'clinical clerks'.

Professor Edmund Cullen of the Dublin College of Physicians noted that Edinburgh's clinical lectures "are considered the most valuable part of the institution."

Clinical medicine was designed to illustrate general truths by special cases. From 1794-1826, the numbers attending the course fluctuated between 68 and 188. Four professors taught the course in rotation. At the time of the Commission they were the Professors of Medicine (Home), Botany (Graham), Materia Medica (Duncan junior) and the Institutes of Medicine (Alison). Each had charge of the clinical wards for three months every second year. Duncan junior spoke of the advantages of the rota system: "Almost every practitioner, even the most skilful and experienced, gets into a kind of routine practice, and in less than three months that practice is known to all the students, so that they look merely to a repetition of the same thing; whereas almost every two practitioners have a different routine practice. But by our method the students have an opportunity of seeing a variety of practice which, I think, is very beneficial to them."

Christison, in his evidence, delineated another advantage: "There is one peculiarity in Edinburgh graduates which I have remarked, comparing them with those of other places, and which peculiarity I am disposed to trace very

2. quoted in Kirkpatrick, 153. Cullen was an M.B. of Dublin in 1793 so may have been a Professor early in the nineteenth century. In 1800, the old rule whereby any member of the Edinburgh College of Surgeons could enter the Infirmary was waived by James Gregory, and instead the surgical work was done by six surgeons elected by the Managers. Two were on permanent duty and all other members of the College were excluded.
5. Ibid., I, 200.
6. Ibid., I, 224.
much to the present system of teaching Clinical Medicine; namely, the
total freedom from the trammels of authority. I believe it would be
difficult to say to what particular school of Medicine Medical graduates
belong who are educated at Edinburgh; for they see so many kinds of
practice that they are led to think for themselves at an early period.\textsuperscript{1}

Andrew Duncan junior, left invaluable and minute accounts of
the conduct of the clinical medicine course in his evidence to the 1826
Commission and in his book, \textit{Reports of the Practice in the Clinical Wards
of the Royal Infirmary of Edinburgh}. In two weekly lectures he showed
how to examine patients and the nature of the questions to be put to them
so as to elicit the truth. He visited the hospital at noon and observed
cases or dead bodies, with the assistance of two advanced students,
called clerks, selected by himself. He had the right of selecting any
of the patients in the hospital waiting room who had already been examined
by an ordinary physician. The clerks then drew up a very accurate
account of the cases selected on the basis of a schedule laid down by
the professor. The professor then criticised the account and might call
for revision. In urgent cases, the professor would call again in the
evening, or during the night. The next step was to report publicly
in English, and prescribe in Latin, by the bedside of each individual
patient. Before dictating the report, however, "it is the business of
the physician to examine the patient; and this is an art of considerable

\textsuperscript{1} Ibid., I, 293. There were two groups of physicians at the Infirmary -
the clinical physicians and the physicians-in-ordinary. The latter
were in charge of the wards and conducted the daily services of the
Infirmary. (Logan Turner, 140). In other words, both the University
and the extra-mural school - in the forms of members of the Edinburgh
College of Physicians - were represented in the Infirmary.
difficulty, which is only to be acquired by experience". He then gave the results of the examination which all the students wrote down in casebooks, where they had already noted the admission of the patient. This was done daily as long as the patient remained in their care. In the case of death, any changes were noted, and the body was dissected before all the students in the hospital so as to show the causes of death. When relatives permitted, the most important morbid parts were also brought into the classroom and chemical experiments might be performed - for example, in the case of diabetes the specific gravity of the urine was ascertained.¹

In his Reports Duncan added that in the concluding lecture of each clinical course, "I am in the habit of giving a systematic abstract of the occurrences which have taken place in the wards during the time they have been under my charge;".² While he recognised the primary function of hospitals as the restoration of health, he also saw them as necessarily giving practitioners personal experience and the pupils valuable instruction. However, Duncan emphasized the collection and accumulation of "a store of professional information on the history of the disease, which cannot be acquired in the most extensive private practice". Hence, he gathered hospital reports which he published in 1818. They were "calculated to give information to the profession and to the public, derived from multiplied experience, in a very condensed and intelligible form. . . . To the profession they may be calculated

¹ Evidence, I, 223-224.
² Andrew Duncan junior, Reports of the Practice in the Clinical Wards of the Royal Infirmary of Edinburgh, (Edinburgh, 1818), vi.
to illustrate particular points in the history of the causes or phenomena of diseases, or the effects of particular modes of practice; while the public at large expect to obtain from them information on some circumstances highly interesting to the community, which can be derived from no other source.\(^1\) The clinical medicine course, therefore, was not only directed towards curing patients but was an invaluable teaching instrument and provided a fund of medical knowledge.

James Gregory had had a great reputation as a clinical professor. The distinguished surgeon, Sir Astley Cooper told the 1834 Committee on Medical Education: "I do not think I acquired such substantial knowledge of practical medicine anywhere as from Dr. Gregory's clinical lectures. The mode in which the reports were made, and the manner in which he dilated upon those reports, once or twice a week in the evening, gave a degree of information which I do not think can be acquired, unless the same system be imitated in the London or other hospitals."\(^2\) As the number of students grew to be too great, in Gregory's time, some took the part of "repeaters" and in good loud voices repeated his dictation.\(^3\) However, after Gregory's time, the wards appropriated for clinical teaching were enlarged.\(^4\)

The Clinical Surgery Chair from 1803-1833 was held by James Russell. The first figures available for his class attendance are in

1. Ibid., 1-3.
3. Evidence, I, 25. Graves of Dublin wrote in 1819 that it "required an exertion almost Stentorian to render this conversation between the physician and his patient audible to the more distant members of the class. Every word was attentively listened to and forthwith registered most faithfully in each student's case-book, and afterwards all the observations of the professors, made in their clinical lectures, were taken down with equal care and fidelity". (Comrie, 454.)
1808 when he had 46 students but after 1812 he had about 100 annually. Russell himself was responsible for having the Chair established in 1803 despite the opposition of the vested Monro interest. In his Memorial on the subject he spoke of the clinical medicine course as chiefly contributing to the students' improvement in the practice of medicine: "Indeed, the establishment of regular courses of clinical lectures is by all who are qualified to judge of the subject considered as one of the most valuable institutions connected with the University and that the advantage derived from it, has more than any other circumstance contributed to render Edinburgh a useful and celebrated School of Medicine". However, the scheme was not applied to Surgery - a Clinical Surgery Chair would complete Edinburgh's medical education, although he had given lectures privately since 1786.

In another place Russell emphasized the rationale behind the Chair: "for nothing is more important in the education of a young man, who is destined for a practical profession, than, early in life, when his mind is flexible, to initiate him in those habits of observation, activity and exertion, which are indispensable to his success, and which are so difficult to acquire at a more advanced age". However, there was a major difference between Clinical Medicine and Surgery - there was no rota system in Surgery. The Commissioners' view was that for the benefit of the students, to ensure better teaching, it was best

1. Ibid., I, 1307/131.
3. Ibid., 5-7.
organized with only one professor. He could then turn his attention entirely to his subject: "Whereas, if the Lectures are to be left to the practising Surgeons in the Hospital, it might happen, that although they are eminently qualified to operate, and do the other duties of practitioners, they might not have acquired the faculty of communicating information, or might be unwilling to take the trouble and risk of coming forward as public lecturers".1

(g) Medical Jurisprudence and Police

The Chair was founded in 1807. Prior to that date, Andrew Duncan senior had, in 1795, begun a series of lectures in which he dealt with forensic medicine and "medical police" - covering both personal and environmental health.2 In September 1798, Duncan petitioned the Town Council about the establishment of a Chair. Among his arguments were that the Continent laid great emphasis on the subject; it would help important improvements in the regulation of hospitals for the diseased, aged, indigent and insane; it would also show that Edinburgh neglected no branch of medical education.3 The Senatus did not support Duncan saying that the importance of the Chair was not obvious.4 However, in 1807, the King issued a Commission establishing the Chair and Andrew Duncan junior became its first occupant. His successors up to 1826 were Alison and Robert Christison.

The first class figures available, in 1808, showed 12 students attending. Until 1820, the numbers varied between 18 and 36, and after

that time, Christison was lucky to attract. Christison never lectured before 1826 on Medical Police which would have dealt with a complete study of public health - cities, villages, food, drink, epidemics and the management of hospitals. His lectures on Medical Jurisprudence covered the relation of Civil and Criminal Law to the medical practitioner which came under three heads - the Causes of Sudden Death; all questions on the structure, functions and changes of the Organs of Generation; and all questions on the subject of Disqualifications. This last matter showed when people were legally disqualified from dealing with such matters as disposing of property, how far they were responsible for crime, how fit they were for holding offices of trust, for doing military service, and for life insurance.

(h) Military Surgery

In 1806, the scope of the Medical School's teaching was widened to include Military Surgery, by the Government endowment of a Chair. The class seems to have originated from the contact which John Thomson (Professor of Military Surgery until 1823) and Sir George Ballingall (his successor until 1856) had had with the war and was an obvious and sensible response to the need for medical officers in the Armed Forces. The University of Edinburgh was the only institution in Britain which could absorb an extra course of this nature into a systematic medical curriculum and probably one-third of Edinburgh's students went into the medical departments of the Army and Navy.

2. Ibid., I, 150-151.
3. Ibid., I, 150.
Furthermore, in 1806 Lord Moira, who had been Commander-in-Chief in Scotland in 1803 and on whose staff Thomson had served, became Master general of the ordnance in the "Ministry of All the Talents", thus giving Thomson access to Government patronage.¹

Thomson and Ballingall were enthusiastic teachers and experienced in their profession. For example, Thomson had given an extra-mural class on Military Surgery in the summer of 1804. In the summer of 1814 he toured medical schools in France, Italy, Austria, Saxony, Prussia, Hanover and Holland. In 1815, he was a Staff-Surgeon in Belgium and was at the Battle of Waterloo.² Ballingall was in the Army from 1806-1808, serving in India, Java and France. He had written a book on the construction of hospitals. The class appears to have been a success:

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1. Francis Rawdon-Hastings, Marquis of Hastings and 2nd Earl of Moira, fought in American and Flanders and was Governor-General of Bengal 1813-1822, and Command-in-Chief of the Forces in India.

2. *Edin. Med. Surg. Jnl.,* LXVII, 164-165. The E.U.L. MS. Gen. 594 consists of Thomson's sketches of the wounded at Waterloo. It is a fascinating book of drawings, illustrating the specific wounds of the soldiers, their names, and regiments, and details of their injuries, e.g. f.l. "John Beattie, 42nd Regiment. A splinter of shell struck him over the right eye. He has also a compound fracture of the left leg, the bones of which were splintered by a musket ball". The book also contains a thorough index, comprehending the name of the soldier, description of wound, site of wound and remarks.

Thomson's illustrations were clearly quite famous. Daniel Ellis told the 1826 Commission of his drawings to exhibit the effects of disease on every organ, which Thomson had collected at great expense and labour. "He has a most extensive collection of the organic affections of all parts of the human body, so that when the description of the effects of disease is given, a figure is at the same time exhibited, representing the form, size, colour, and appearance altogether, of the parts described. In this way, the Science of Medicine is visibly taught, . . . and young men who have not been accustomed to see diseased organs must derive vast information from it, because mere description can never convey to an uninformed person, who has never seen the appearances described, any very accurate knowledge". (Evidence, I, 570.)
Thomson failed to keep class attendance figures but a student wrote that in 1815-1816 between 250-280 students crowded into his classroom. The students were lively and interested: "The army and navy surgeons especially used almost invariably to carry on a keen discussion on the merits of the doctrines propounded in the lecture".  

Thomson covered the proper treatment of gunshot wounds, the comparative advantages of primary and secondary amputation, the causes of traumatic tetanus, traumatic gangrene and hospital gangrene.

Ballingall gave the history and progress of Military Surgery; the preservation of soldiers' health in camp, barracks and billets; hospitals; the transport of the sick and wounded; surgical diseases, wounds, ophthalmia, syphilis and tropical diseases. The last subject had not been taught by Thomson. Ballingall provided such apparatus as models for machines for transporting the sick and wounded.

Ballingall told the 1826 Commission that his was the only Military Surgery Chair in Britain: if the Army and Navy Boards told their men to study the subject, it was tantamount to saying they must go to Edinburgh. Of the Chair, Sir James M'Grigor commented that it had been a valuable addition to the Medical Faculty: "At the end of the last war, upwards of 300 Medical officers of the Army were placed on half-pay; and it is within my knowledge, that many of them profited greatly by attendance on this class, and before they returned to employment on full-pay".

1. Edin. Med. Surg. Jnl. LXVII, 163. Thomson's gratis class tickets to Army and Naval medical officers were noted earlier.
4. Ibid., I, 169.
5. Ibid., I, 329.
6. Ibid., I, 530.
(1) Facilities

There are three matters which come under the heading of Facilities and with which it has not been possible to deal adequately above - the Anatomical Museum, the question of a Chair of Mental Diseases and the Edinburgh Dispensaries which not only undertook valuable public health work, but could also have trained students for later public health activities. The Edinburgh Dispensaries were not unique in themselves, but they were when used as teaching instruments.

The two Anatomical Museums belonged to the Edinburgh College of Surgeons and to the University. The College of Surgeons had begun their collection in 1804 but it grew slowly prior to 1823 and it was only in that year that a Museum could be said to have been founded. Robert Knox became its Curator then and the collection of Charles Bell, formerly housed in the Windmill Street (Anatomy) School, London, was purchased. Knox's plan was to form a Museum of Comparative Anatomy in which there were to be two divisions: the first was one of anatomical sciences which showed the structure and organisation of animal bodies; the second was one of anatomical art which showed manual or power-driven contrivances for demonstrating organisms. Together with Barclay's bequest of his own collection, in 1826, the Museum became second only to the Hunterian.1 The Surgeons' Museum was used for James Russell's Clinical Surgery and George Ballingall's Military Surgery classes.2

The plan at the time of the Commission was for alumni of the Surgeons'...
College, all over the world, to send specimens, as Jameson's students had done.¹ The University's was a Museum of Anatomical Preparations, largely bequeathed by the second Monro, and to which additions had been made. Its purpose was to demonstrate and explain to students the structure, physiology and disease of the human body.²

Andrew Duncan senior's proposal in 1792 for the erection of a public lunatic asylum appeared nine years before Philippe Pinel's Traité médico-philosophique sur L'aliénation mental, even though Duncan's hospital was not founded until 1807. Duncan was moved by the death of the young Scottish poet, Robert Ferguson, who suffered from delirious mania and having been moved from home could only be placed in the City Bedlam.³

Later, Alison, who supported Alexander Morison's plan for a University Chair of Mental Diseases included the matter in his Institutes of Medicine course.⁴ John Abercrombie and Alison both supported the institution of such a Chair before the Royal Commission.⁵ As Alison so rightly said: "A number of men study here, who afterwards become physicians to Lunatic Hospitals in different parts of the country, and have the charge of many persons there confined, and to whom it is an object to have the cure of such patients". The Commission decided: "It does not appear that this class of diseases can be examined as

1. Ibid., I, 452.
2. Report, 179.
their vast importance requires, when merely incidentally treated in an ordinary Course on the Practice of Medicine; and if that be the case, there can be little hesitation, both with a view to the interests of humanity and of science, that a Chair of the nature mentioned should be attached to the University of Edinburgh. ¹ Regretfully, and with a very modern ring, the Government - who had specifically asked the Commission to investigate the possibility - informed the Commissioners that the proposed endowment for a Chair of Mental Diseases could not now be made available.²

An Edinburgh professor who did not belong to the Faculty of Medicine but who has a place in the history of psychiatry, is none other than Dugald Stewart. His lectures and book on the Elements of the Philosophy of the Human Mind encouraged the study of abnormal psychology. Stewart foresaw the scientific potential of mesmerism, which later developed into hypnosis and the modern schools of dynamic psychology. His concept of "sympathetic imitation" was applied to mass psychology.³

Andrew Duncan senior's versatility and vigour showed itself too in the matter of Dispensaries. His 1776 Old Town Dispensary was developed primarily as a medical teaching centre providing different opportunities from the Infirmary.⁴ One of the most important ventures of the Old and New Town Dispensaries was in ensuring inoculation: the Statistical Account of the 1790s implies that only the upper classes had accepted

¹. Report, 191.
². Ibid., 62.
³. Hunter and Macalpine, Three Hundred Years of Psychiatry, 640-641, assessing Dugald Stewart, Elements of the Philosophy of the Human Mind, III (London, 1827), 192-197, 221-223 and 207-209. The lectures were given in the 1790s.
vaccination against small pox. In 1791, Duncan proposed that the two Royal Colleges should concur in offering free inoculations and attend children of poor people in their homes. They also asked the City Ministers to encourage vaccination and help remove prejudice against it. On August 4th, 1809, Duncan junior wrote the following letter to Dr. John Lee, who from 1840 was to be Principal of the University: "You will probably have already learnt, by the News papers, that your sermon, recommending vaccine inoculation is published. And I have no doubt, that, the publication will have good effect - I am directed by a meeting of our Managers held yesterday, to return you their sincere thanks, for complying with their request, by consenting to the publication".

Edinburgh had established a Vaccine Institution in 1801. In 1804-1806 small pox was reckoned a rare occurrence even amongst the poor and the result was the establishment in London, under Government direction, of the National Vaccine Institution. In 1822, the Surgeons of the Edinburgh Vaccine Institution could say: "while they know that some deaths have occurred in Edinburgh, from a second attack of Natural Small-Pox, in the same individual, during a recent visitation of that epidemic to this metropolis, not one fatal case of the disease, when modified by previous Vaccination, took place within the circle of practice at the Royal Dispensary".

In 1815 was founded the New Town Dispensary - its necessity was unquestionable but Duncan senior took its establishment bitterly.

1. Ibid., 30-31.
2. Creswell, 166.
3. N.L.S. Ms. 3432, f. 214. The Managers were those of the Dispensary.
6. see Henry Cockburn, Memorials of His Times, new ed. (London, 1909), 272-273 for an account of the "civic war" occasioned by the foundation.
Two of its founders were John Thomson and Alison. Its objects were to afford relief to the sick and diseased poor, to provide domiciliary attendance to pregnant women and to give free vaccination to children. In its first three months, when it was little known, the following were its statistics on treatment:

<table>
<thead>
<tr>
<th>Medical and surgical patients</th>
<th>509</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwifery patients</td>
<td>36</td>
</tr>
<tr>
<td>Child inoculations</td>
<td>221</td>
</tr>
</tbody>
</table>

Of the 509 medical and surgical patients, 228 were cured; 50 sent to the Infirmary; 17 died and 214 remained on the books. 182 midwifery patients were confined to their houses and regularly visited. It became increasingly used by indigent expectant mothers, especially as James Hamilton's Lying-In Hospital was not to be founded until 1824.

The founders of the New Town Dispensary saw the value of their institution in the fact that hospitals were expensive and overcrowded. They set out to provide for seven groups of people: those with slight complaints which might grow dangerous if neglected; those among the labouring classes who needed remedies while continuing work; those needing hospital treatment but whose circumstances made it necessary for them to remain at home; the chronic sick and incurables; those needing hospital treatment but who could not be separated from their families—especially mothers of young children; the children of the poor and the aged poor. The Old Town Dispensary was open only twice a week,

1. Statement regarding the New Town Dispensary by the Medical Gentlemen Conducting that Institution, (Edinburgh, 1816), 1 and 7.
2. Ibid., 10.
it was not sufficient for Edinburgh's needs, and its doctors made no official domiciliary visits.¹

Dr. Comrie has written that Alison’s reports from the New Town Dispensary were important contributions to the knowledge of fevers and for showing how vaccination modified smallpox.² Professor Flinn has shown how Alison’s experience helped in the compilation of his Observations on the Management of the Poor in Scotland and its Effects on the Health of the Great Towns (1840). He was also a major source for the Scottish material in Edwin Chadwick’s Sanitary Report.³ William Stokes, later a distinguished Professor of Medicine in Dublin, marveled at Alison: "It was my good fortune to be very closely connected with him during my student days in Edinburgh, and to attend him by day and more often far into the night in his visits of mercy to the sick poor of that city to whom he was far many a year physician, friend, and support".⁴ "I was not aware", wrote Dr. John Orr in 1919, "that there is any other medical school in this country which insists upon students attending dispensary practice". Whereas in hospital wards, students saw patients after diagnosis, in the dispensaries they saw diagnosis in the process of evolution.⁵ It has been seen that another student, Edward Turner, worked in the Edinburgh Fever Hospital. Sir Charles Hastings visited the poor in their homes, as a student.⁶ John Abercrombie divided up the poorer areas of Edinburgh

¹ Statement regarding the New Town Dispensary, 13-17.
² J.D. Comrie, "Medical School to 1870", Edinburgh’s Place in Scientific Progress, (Edinburgh and London, 1921), 199.
³ Chadwick’s Sanitary Report, (ed. Flinn), 23.
⁵ John Orr, "Dispensary Practice as a Part of Medical Training", An Inquiry into the Medical Curriculum by the Edinburgh Pathological Club, (Edinburgh, 1919), 252-254.
among his extra-mural students, supervising the whole but giving an excellent introduction to the responsibilities of a prospective public health doctor. General dispensaries were not all: in 1824 John Thomson who delivered lectures on the diseases of the eye in the summer of 1819, went on to found the Eye Dispensary. 

V

It is clear that whether one considered Edinburgh’s anatomical museums, lying-in hospitals, the Royal Infirmary or Dispensaries from 1790-1826, the purpose of medical education lies behind them all. The particular medical professors and teachers introduced new techniques and facilities or expanded existing ones in order to extend knowledge of medical science and produce better doctors. They were supported in their endeavours by the professors of pre-medical subjects - especially Botany and Natural History - who emphasized careful and systematic observation in their training. The dual function of the Royal Infirmary was clear: there in 1814, wrote Daniel Ellis, "the senior surgeons executed the duties of attendance on the sick, and performed the capital operations; while to the juniors was assigned the duty of acting in the absence of the seniors, of assisting them in their operations, of visiting the patients who require surgical aid in the medical wards and of preparing for exhibition such cases of morbid dissection as occurred in the hospital and might be deemed interesting for the illustration of disease." 

The Edinburgh medical school was the only one of its kind but the professors were not content to rest on foundations laid in the late eighteenth century. Men of Gregory’s and Alison’s calibre were examples to aspiring doctors. New chairs of Clinical and Military Surgery and Medical Jurisprudence were founded. The extra-mural anatomists introduced new analysis and comparative anatomy. The importance of mental diseases and public health were realized. In all these ways, Edinburgh showed a high degree of specialization, a concern for knowledge and an appreciation of the importance of education.

The results were constructive: students emerged who had captured the enthusiasm of their teachers. Some became teachers themselves and either modelled the schools they founded on their alma mater (as in London), introduced the Edinburgh concept of attaching a medical school to a hospital or inaugurated clinical lectures in specialised fields (as with Conolly at Hanwell). Still more benefited from the establishment of the Military Surgery course and were equipped to cope with the immediate health problems in the battlefields of the Napoleonic wars. In the longer term, preparation had been given for the needs of nineteenth century industrial society: Edinburgh medical alumni were to be found working in public health, either at the national or local level.

The Edinburgh medical school from 1790-1826, therefore, was staffed by dedicated, talented and enthusiastic teachers, who offered a relevant training and laid the foundations for the future work of their students.
General Conclusion
The University of Edinburgh from 1790-1826 was outstanding because it supported a comprehensive, distinguished and an active professoriate. That professoriate shared a faith in education and a concern for knowledge. The exertions of the professors were channelled into teaching and research. No other British university could claim to be teaching and fostering research, often quite specialised, in philosophy, science and medicine, simultaneously. No other British University could claim so many alumni who contributed to such varied spheres of activity in the nineteenth century. These are the reasons why this study has consistently eulogised the University of Edinburgh. The University was unique and successful.

The University was operating in a particular environment: the Scottish Enlightenment provided the rationale for the professors' activity. The theme of the eighteenth century Scottish philosophic enquiry had been man and society. Essays on the theme were made by men who were not predominantly teachers. A feature of the period after 1790 was that so many of the Edinburgh intellectuals held chairs. Their activity was often not, apparently, moral philosophy: Stewart provided disquisitions on economics, Leslie on meteorology, Alison on medicine. Nonetheless, they had elaborated and broadened the scope of their intellectual heritage.

Materially, their rationales was made relevant by the impact of the Industrial Revolution: not only were new inventions required, but additional specialists would have to be trained for the industrial society. Fresh academic disciplines were to arise - economics was ultimately separated from moral philosophy, chemistry from medicine, geology from natural history. The advance of science was not only to create ancillary and distinct branches, but also encouraged more practical research.
Advanced mathematical and physical formulae could be applied to navigation and engineering; examination of strata opened up new geological worlds; specialised dispensaries and hospitals were founded. Edinburgh professors responded to the dual challenges of the Enlightenment and the Industrial Revolution, and their implied consequences.

Given that the professors were not simply men of science, but also teachers of youth, they were provided with a particular audience. Edinburgh, in 1790, had become a Mecca for the intellectual and the fashionable. It was celebrated for its cultural eminence and also became the resort for those prevented by war from visiting the Continent for pleasure or education. It continued to be the centre of the Scottish Law and Church. It still maintained a native aristocracy. It supported active publishing houses. It was developing and constructing a New Town.

In 1790, the University had already established a tradition of educating doctors, lawyers and divines. It benefitted from the invasion of the City: aristocrats, gentry and a succession of able but more humble Scots and Englishmen, the Palmestones, and Russells, the Horners, Jeffreys, Kay-Shuttleworths and the Conollys - all matriculated. While their social origin clearly helped some in later life, it might also be surmised that the education and ability of others by no means came amiss. Many professors recognised the particular gifts of their students as was seen with Stewart and Francis Horner, Graham and those of his students who named plants after him, and the examples of dedication set by Alison and Gregory to the medical students. If the University was blessed with a distinctive body of professors, the professors were favoured with a distinctive generation of students.
The professors' talent, faith in education and concern for knowledge is apparent: in putting forth the ideal of moral seriousness, of the cultivated citizen, Stewart was much aware of his time and the necessity of imbuing students with a particular set of liberal values. He achieved his success by his eloquence, his character and his acceptance in the highest circles. Playfair too, was a successful teacher, being especially able to distil relevant and current research into a palatable and easily publicised form. Leslie revised both the mathematics' and physics' courses, wrote suitable text books for them and contributed to original research. Graham and Jameson both appreciated the value of teaching and research instruments in their respective uses of the Botanical Garden, field excursions and the Natural History Museum. The science professors increasingly saw the need to emphasize practice in teaching and research. Individual medical professors founded the various medical facilities - the collection of Materia Medica, Anatomical Museums, Clinical Courses, Dispensaries, the Lying-in Institution - which while clearly being of scientific or remedial value, had an equally important function in medical education. In general, the professors were men to be admired by students at an impressionable age.

The result of the professors' activity was that the University of Edinburgh became a training ground for an astonishing range of nineteenth century occupations. Stewart numbered economists, social reformers, politicians and educationists among his students. Engineers emerged from the classes of Robison, Playfair and Leslie. Botanists, geologists and explorers came from the pre-medical courses. Valuable specialists in such fields as mental and public health were produced by the medical school. Despite this training of specialists, an overall vision was
also given: Stewart was not the only professor with a philosophic aim. Leslie and Jameson both appreciated the value of a Scottish liberal education when speaking of their courses. Alison wrote articles in Edinburgh journals in defence of Stewart's philosophy. The professoriate's faith in education was to be justified when knowledge was pursued and action taken across almost the entire spectrum of human endeavour.

The professoriate also pioneered schemes and ideas which were of value to nineteenth century Britain. Stewart revived Smithian economics for the commercial and industrial age. He also put forth a code of moral seriousness and a basis for the liberal ethic which were to contribute to the Victorian temper. He was no mere theorist but had connections with the Whig politicians and the Utilitarians. The Edinburgh Review and its range of interests owed much to his stimulation. His students were among those who determined to found a new University of Edinburgh in London and the Mechanics' Institutes.

Playfair drew attention to the need of English science to come to terms with Continental research and took part in the campaign to reform Oxford and Cambridge. He was also prominent in the geological debate in which the City, University and Natural History Museum of Edinburgh became involved. It was seen how this debate had far-reaching consequences: it was an early stage in the nineteenth century erosion of providentialism and provided the basis for the later pre-occupation on the scientific and polemical level, with biological evolution. The debate also showed how successful Jameson had been in training geologists - one of the most important sciences of the nineteenth century.

The medical professoriate as a whole saw the necessity of conjoining clinical and theoretical medical education. The idea was not
lost on the medical alumni who founded medical schools in the new University of London or in Dublin. Clinical instruction was not confined to the Royal Infirmary: professors, like Hamilton, founded other institutions for obstetric, public health or immunization purposes and involved their students in the work arising therefrom. The scope of the Edinburgh medical education was unparalleled in its time and provided a more than useful basis for the social work of Edinburgh alumni. As an example of what they had known, it was also useful for a more general reform of medical education in nineteenth century Britain. Edinburgh also became a source of medical specialisation in producing doctors trained for the Forces, mental health or research.

The University of Edinburgh provided a stimulating education and contributed, as a result, to nineteenth century British society. The professors saw the place of their specific subject in a scheme of education and were attached to the institution where they taught. Their capacity in a time of political, social and intellectual re-orientation, enabled the University to further improvement and reform.
APPENDIX III

Professional and Student Societies in Edinburgh 1790-1826
Edinburgh societies are an important facet of the University life of the time. They can be divided into two groups - professional and student. The first served the University teachers and gave them an opportunity to communicate with the citizens of Edinburgh who had similar interests. The student societies, which can be divided into "higher" and "lesser" kinds gave the undergraduates opportunities to indulge their extra-curricular interests, practise public speaking and composition, and undertake activities stimulated by the lectures. The student societies were a useful part of the education afforded by the University although they were rarely under the University's control. The professional societies enabled the professors not only to communicate their research to the non-academic world but also to benefit from the work of those not engaged in teaching.

(a) Professional Societies.

The Royal Society had received its charter - a symbol of international repute - in 1788. It was divided into two classes - physical and literary. The physical class covered mathematics, natural philosophy, chemistry, medicine, natural history and matters relating to the improvement of arts and manufactures. The literary class covered literature, philology, history, antiquities and speculative philosophy.\(^1\) Towards the end of the eighteenth century, the number of literary communications declined and separate meetings of the two classes ceased in 1808 and were abandoned in 1827. Between those years, a few literary papers were read but even the presidency of Sir Walter Scott from 1820-1832 did not

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\(^1\) "History of the Society", Transactions of the Royal Society of Edinburgh, I (1788), 12.
re-animate the literary class. He regularly presided but read no papers. The Society became increasingly scientific, perhaps in response to the interests and needs of the time.

Principal Forbes ascribed to the exciting geological disputes the reason why "the Physical Class literally overflowed into the Literary Class". James Hutton had originally propounded his *Theory of the Earth* to the Royal Society of Edinburgh. John Walker, first joint secretary of the physical class, John Robison, first secretary of the Society, and John Playfair, his successor, all gave papers. Later professors, like Leslie and T.C. Hope, did likewise. Dugald Stewart first read his biographies of Adam Smith, William Robertson and Thomas Reid to the same body.

An examination of the Index to the Transactions shows that while the University professors participated in the Royal Society, they by no means dominated it. It was laymen like Hutton, Sir James Hall and Sir David Brewster who often had most to give. It is believed that Hutton and Walker became familiar with each other's work at Royal Society meetings. The co-operation between Playfair and Hall was seen in Chapter Four. The Royal Society had a highly professional purpose and the richness of the Transactions shows how well that purpose was achieved. The Royal Society of Edinburgh facilitated, encouraged

1. "Address by Principal James David Forbes on the History of the Society", *Index to the Transactions of the Royal Society of Edinburgh* 1783-1888, (Edinburgh, 1888), 21. Scott hesitated to accept the presidency of the Society when unanimously asked by the Fellows to succeed Sir James Hall. Yet, he was said to be an effective chairman and became interested in those discussions which pointed to discoveries of practical use. In the Spring of 1823, his interest had been sufficiently aroused for him to head a new company to improve the manufacture of oil gas. (see John Gibson Lockhart, *Life of Sir Walter Scott*, Melrose ed. 2 vols. (London, 1848), II, 53 and 60.)


3. Brewster's only university posts were the principalships of St. Andrews and Edinburgh, 1837-1859 and 1859-1868.

and ensured the pursuit and advance of scientific knowledge. The cross-fertilization of ideas benefitted the university teacher, the world of research and thus, ultimately, the nation.

Another professional society was the Harveian, which had been founded in 1752 exclusively for senior members of the medical profession in Edinburgh. To qualify for membership a candidate had to be a member of either of the Edinburgh Royal Colleges or an active or retired medical officer in the public service. The objects of the Society were to commemorate the discovery of the circulation of the blood, to "cherish a kindly feeling among members of the medical profession" and foster a spirit of experimental enquiry among students at the Edinburgh medical school. The idea of prize essays to achieve this last aim was first mooted in 1801.

(b) Student Societies

John Leslie thought that there were too many student societies and that professors ought to have exercised control over those whose meetings were held in the University buildings. He based his objections on the grounds that young men were tempted to join before they had acquired sufficient knowledge: "I should wish that none but those of ripper years were permitted to take a share in such discussions. There is another cause that has contributed to multiply those societies, namely, the little vanity of being made president, and vice-presidents, and secretaries. To obtain these titles more easily, the societies are often split down into very small bodies". On the other hand, Leslie thought "The higher

2. Hume and Evans, 177.
societies are very useful; but the system of debates is certainly carried too far in this College. Too many young boys enlist in the minor societies".  

William Ritchie, Professor of Divinity, considered that good predominated and that societies were advantageous in sharpening the intellect. The official 1845 history of the Speculative Society, admitted that societies were more numerous than they should have been, "But in any considerable community of inquisitive students, there will always be individuals, or sets, ambitious of founding their own establishments".  

The higher societies, as a whole, thrived in this period: the reasons were not only that there was an increase in the student population and an influx of particularly capable students to Edinburgh because of the war. Societies also thrived because the students' enthusiasm had been roused by the professors' courses: they took an interest in new and developing specialities and found an outlet for their interests in existing bodies which they adapted for their own purposes.

The most celebrated of the higher student societies was the Speculative. Established in 1764 to improve literary composition and public speaking, its meetings took the form followed by virtually all the student groups - a paper was read and discussed, and a debate then took place on another subject. The range of topics covered were history, politics, legislation and general literature. Among the Edinburgh

1. Evidence, I, 132.
2. Ibid., I, 141.
3. H.S.E., 15.
University Manuscripts is a list of questions for debate in the Speculative in an unknown year during Dugald Stewart's time as a professor.

Some of the questions were as follows:

Should representatives in Parliament consider themselves bound to follow the instructions of their constituents?

Ought the slave trade to be abolished?

Is a standing army the best mode of defence?

Should the Test Acts be repealed?

Is the preservation of the Balance of Power justification for entering war?

Is the impressing of seamen justifiable?

Is the possession of territory in the East Indies advantageous?

Is the diffusion of knowledge among the lower ranks of advantage to the Community?

Is the Commercial or Landed Interest more favourable to Liberty?

Can the differences of national Character be accounted for by physical causes?

Ought Honours to be hereditary?

Ought universal toleration be allowed?

Was the Union disadvantageous to Scotland?

Are theatrical representations dangerous to Morality?

Is Ancient Athens, or Great Britain, to be considered as the best school for Eloquence?  

Those who joined the Society while students could continue to belong once their formal studies were over. The Speculative was "not to be viewed as a temporary club, but an academical institution of permanent establishment". Some of the members in the period, who may have gained from the experience, were:

1790 Walter Scott (Secretary, 1791-1795)
1791 John Thomson
1792 Francis Jeffrey
1796 Henry Petty
Lord Binning (later Earl of Haddington)
1797 Henry Brougham
Francis Horner
Charles Kinnaird (later Lord Kinnaird)
James Loch
1798 Andrew Duncan junior

1. E.U.L. MS. Dc. 6. 111. ff. 163-164. This is a selection and not a direct quotation. In 1814-1815, the Society was to debate "Is the present Government of France (Louis XVIII's) likely to prove permanent? Before the question was debated, Napoleon escaped from Elba. (William Kirk Dickson, The History of the Speculative Society, 1764-1904, (Edinburgh, 1905), 15.)


1799 Henry Cockburn
1800 Charles Grant (later Lord Glenelg)
Robert Grant (later Governor of Bombay)
1802 Henry Reeve
1803 Henry Southey
1804 Robert Gooch
1805 William Temple
1806 Henry Home Drummond
1809 Cornwallie Hewett
Richard Bright
Lord John Russell

The members mentioned here were later to be involved in public life -
mainly in the spheres of politics and medicine.

The Speculative Society, like Dugald Stewart, suffered from the
political atmosphere of the 1790s. In 1799, Francis Horner and Jeffrey
were accused of Jacobinism in their Speculative activities by the Tory
Professor of Law, David Hume. The Senatus established sub-committees
to investigate the affairs of the Society. It was found not to be
seditious, but Horner and Jeffrey were reprimanded for their rudeness
to Hume.1 A law was passed prohibiting discussion on political questions
of the day and was not repealed until 1826.2

The Speculative became the model for other societies covering
similar interests: the most important of these were the Philalethic
(which arose from a merger of the Juridical and Logical Societies and
lasted until 1822), the Dialectic, the Didactic and Diagnostic Societies.
A student had to have been at the University of Edinburgh for two years
before he could join the Philalethic: members read essays on a subject

1. College Minutes, I 160-171, March 12th, 28th and April 8th, 1799.
2. Dickson, 23.
of their choice excluding those "of an abstruse, theological or political nature". The Dialectic was exclusively for University students to prosecute literary and philosophical debate. In 1791, the Society unanimously voted in favour of the French Revolution, in response to the question "Will the Revolution of France be of more advantage than disadvantage to Europe?" The Laws of the Didactic Society in 1803, stated that its aims were to write essays and hold debates on a subject in History, Literature, Morals, Politics or Law - avoiding all topics relating to the Christian religion or current politics. The same Laws in 1816 did not exclude politics. The questions debated were akin to those of the Speculative - restrictions on foreign trade; the happiness of man in a savage or civilised state and Roman Catholic emancipation.

The Diagnostic was founded in 1816 largely by Divinity students for improvement in literature and philosophy.

Some of the lesser student societies were very obscure, such as that founded by James Coles Prichard and five others called the Azygotic: it met weekly for literary, scientific and philosophical discussion. James Mill was another who with five colleagues formed the Select Literary Society to discuss general subjects. A third short-lived society which

1. Regulations of the Philalethic Society, (Edinburgh, 1808), 3-6.
5. see Prospectus of the Public Business of the Edinburgh Didactic Society during the session 1820-1821, passim.
adopted a famous name was the Select, from 1811-1818; it had the same
objects as the Speculative but its debates were more exclusively political
at a time when the Speculative was treading warily.\footnote{1} In 1819 was founded
the New Logical Society with the objects of cultivating and diffusing
useful knowledge by the discussion of philosophical, historical,
literary and political subjects, but excluding theology.\footnote{2}

There were two important junior societies - that is, societies
for those who were too young to join the higher bodies. These were the
Juvenile Literary Society, founded in December, 1792 and the Academical
Society, founded in 1795 and lasting until 1816. Brougham and Francis
Horner, who were not to be admitted to the Speculative until 1797 were
among the founders of the Juvenile Literary Society. Politics were
excluded from its discussions and typical subjects for debate were
whether Elizabeth I was justified in executing Mary, Queen of Scots;
whether a lawyer or a divine was more useful to society; whether man
was happier in a rude or civilised state and whether benevolence or
interest was a stronger principle of action.\footnote{3} Henry Cockburn considered
the Academical Society, which practised composition and debate in
Playfair's classroom, a good preliminary training for the higher endeavours
of the Speculative.\footnote{4}

The student societies hitherto considered, were broadly speaking,
concerned with "the humanities". There were also scientific and medical

\footnote{1}{H.S.G. 14.}
\footnote{2}{\textit{Laws and Regulations of the New Logical Society}, (Edinburgh, 1820), 3.}
\footnote{3}{\textit{The Life and Times of Henry, Lord Brougham}, written by himself, 3 vols. (Edinburgh and London, 1871), I, 84-86.}
societies, which can also be classified as "higher" and "lesser".

There were seven scientific societies - the Royal Physical, the Wernerian, the Plinian, the Natural History, two Chemical, and the Academy of Physics. The Royal Physical Society - certainly by 1845 - became exclusively devoted to Natural History and the physical sciences. It had received its charter in 1788 - the same year as the Royal Society of Edinburgh. The story of many societies after 1790 is one of their absorption into the Royal Physical. The first casualty was the American Physical in 1796. It had been founded "to provide occasional home atmosphere" for American medical students in Edinburgh. The next to go, despite the numbers of Irish students, was the Hibernian Medical in 1799. While the American Physical had kept to medical subjects, the Hibernian Medical also dealt with such matters as "suicide, education, electricity, the death of Caesar and the peopling of America". The others which ultimately lost their identity were the Chemical Society in 1803, the Natural History Society in 1812 and the Didactic Society in 1813.

Two points were made about Chemistry in Chapter Four: first, that it was all the rage at this time, and second, that T.C. Hope was unable to give students the opportunity to undertake experiments themselves. Chemical Societies arose for both reasons: the first was founded by Messrs. Brougham, John Thomson, Francis Horner and Webb Seymour in 1800. In June of 1801, Thomson was writing to John Allen of Holland

1. see H.S.S. 10, but note Laws of the Royal Physical Society, (Edinburgh, 1819), where the call is for dissertations on medical or philosophical subjects.
3. Ibid., 16.
House about the activities of the Society: "Lord Lauderdale and I made the galvanic experiment last week, and I exhibited it to the Society on Saturday. We are getting tubes with gold wires and glass stoppers to try its effects on caustic liquors, and we are getting a very broad plate of zinc made, to try whether the increase of power be in proportion to the increase of surface. In that case his Lordship's whole service of plate will be converted into a galvanic battery!"

The second Chemical Society was founded in 1815 by James Syme and Robert Christison. Christison spoke of the Society that, "It very nearly made a chemist, instead of a surgeon, of Syme. Before it came to an end by the dispersion of its members, he had begun to work at the subject of the solvents of india-rubber; and his inquiries ended in his discovering its solubility in cheap menstruum, coal-tar naphtha, and the waterproofing of cloth by means of this solution. He published his discovery, at a very early age. ... Nevertheless, he has never got the credit of this discovery. Macintosh, the manufacturing chemist, reaped all the honours as well as the profit".

The Natural History Society had chemistry and natural history as its objects. It had originally been founded in 1782 and Professor John Walker had encouraged its activities by allowing it the use of his museum, books and specimens. At this time, its members included George Birkbeck (who became its Chairman), Webb Seymour, George Steuart Mackenzie, Henry Reeve and Leonard Horner.

The Academy of Physics was a splinter group of the Literary Society, held its inaugural meeting on January 7th, 1797 and lasted until 1800. Here again were to be found those active in other groups - Brougham, Birkbeck, Webb Seymour, Jeffrey, Francis Horner and Thomas Brown, who later succeeded Stewart as Professor of Moral Philosophy.

The aim of the Academy was "the investigation of nature, the laws by which her phenomena are regulated, and the history of the opinions concerning these laws". The group admitted only of three facts without proof - that mind exists, that matter exists and that every change indicates a cause. The members mentioned indulged their philosophic, political and economic interests at the Speculative and their scientific concerns at the Academy. The minutes of the Academy indicate the character of its business:

1. Pure Mathematics, or the Philosophy of Quantity.
2. Mixed Mathematics, or the Philosophy of Motion and its Effects, comprehending subjects in which the data are inductive, and the reasoning mathematical.
3. The Physics of Matter, or the Philosophy of Body, in which the data and reasonings are both inductive.
4. The Physics of Mind, or the Philosophy of Mind, excluding religious controversies and party politics. Mind is either general or individual, the physics of the former we term general politics.
5. The History of Events, Opinions, Systems, &c.

The members of the Academy were to communicate their observations to their fellow Academicians and perform experiments in the Society.

1. H.S.S., 12.
3. Henry Cockburn, Life of Lord Jeffrey with a selection from his correspondence, 2 vols. (Edinburgh, 1852), 1, 104.
4. printed in Welsh, 499.
5. Welsh, 499-500.
The interests of the Academy were diverse: in 1798, members were clearly absorbed in the geological controversies - six years before Jameson was appointed to the Natural History Chair. Francis Horner wrote to Thomas Logan of Dunglass on July 21st, 1798: "You were aware that much of our attention was devoted, last winter, to geology, the various discordant theories which have been proposed, and the evidence from mineralogical surveys and analysis on which we must proceed in order to discriminate their merits. Since you went to the country, we have had an interesting account of the geological phenomena on the coast of St. Andrews, drawn up on the spot by Mr Layden; ... You must recollect that the Academy has long wished to form a collection if you will take the trouble of packing up some specimens, you can direct them to me, Park Place, or to Mr Brougham, No 7 George Street". 1 Earlier that year, Brougham had written to a newly elected corresponding member, William Manchester: "At present, the chief objects of our enquiry are the theory of the earth, the nature of winds, and the history, natural and civil, of the African continent". 2

Brougham had also written that the Academy was interested in the passing of electric fire through sulphur and iron, and the language and manners of ancient Carthage. 3 In his letter to Manchester, he expressed an interest in Geometry 4 but devoted the bulk of the letter to geology. 5 Brougham also emphasized political economy when writing to Robert Spence of Tavistock, a corresponding member: "No part of

1. N.L.S. MS. 948, no. 76.
3. Ibid., (February 6th, 1790), 1-3.
4. Ibid., (February 12th, 1798), 11-14.
5. Ibid., 15-21.
Philosophy is more interesting, because none is so directly practical and the Academy prizes investigations of excellence on this subject above all the other speculations in Moral Philosophy".  

By and large, the Academy concentrated on science: "The Academy of Physics", wrote Brougham, "was formed here of such men as were attached to philosophical enquiries and saw, with regret, the very little attention which is at present paid to scientific subjects".

Considering the classes that Jeffrey, Smith, Brougham and Francis Horner were attending - especially Stewart's - the Academy and the Speculative were only preludes to the Edinburgh Review. As Brougham wrote to Spankie: "the business of the Academy consists as much in examining the opinions which others publish to the world, as in instituting new enquiries upon philosophical matters not already investigated. The papers read and discussed at the regular weekly meetings are, therefore, of two kinds; original dissertations by the members and their learned correspondents; and analyses (with remarks) of new publications whose merit entitles them to that notice. - Besides such stated business, the attention of the Academy is directed to the philosophical news of the day, and to the reports of the committees appointed to conduct experiments with the apparatus or to examine any particular phenomenon or fact".

In Natural History, Edinburgh and its University afforded a higher and a lesser society - the Wernerian and the Plinian. Robert

1. Ibid. (February 20th, 1798), 25-26.
2. Ibid. (February 21st, 1798), 29.
3. Ibid. (February, 20th, 1798), 24-25.
Jameson told the 1826 Commission that the Wernerian Society was "known all over Europe, not so much by the meetings of the Society as by the excellent volumes they publish". The Plinian was "where young men discuss subjects which they have heard in the class of Natural History, or in other classes where such subjects are considered". Jameson continued that both were founded with his approval but he had no particular control over them. Students were not admitted to the Wernerian until they had finished at the University, had an M.D. or were established in the Church.

The Wernerian Natural History Society was founded by Jameson, John Barclay and others in 1808. The papers which were delivered covered all the numerous topics in Jameson's course as well as comparative anatomy. However, with the gradual triumph of Huttonian doctrines, it was inevitable that the Society - founded to honour Jameson's mentor - should suffer severely. From 1823, "It will be noticed . . . that the number of new members declined rapidly, not owing to the lack of enthusiasm so much as that most of the interested people had already been gathered in and eventually fewer naturalists were adherents to the Wernerian theory".

Jameson's adherence to Wernerian doctrines, despite the evidence of continuing research, was reflected by events within the confines of the Wernerian Society. On February 26th, 1819 a letter was read from Ami Boué who suggested "a similarity between the volcanic rocks of

1. Evidence, I, 145-146.
Auvergne and Vivarais and those of Scotland which were hotly denied by Jameson at the following meeting when he insisted that Arthur's Seat, near Edinburgh (an extinct volcano) was of aqueous origin. As regards the Warrnerian volumes of which Jameson had spoken proudly to the Commission, William Ainsworth, President of the Royal Physical Society of Edinburgh, and Henry Hulme Cheek, President of the Royal Medical Society of Edinburgh, wrote of them in 1830: "no transactions have been given to the public for the last five years".

The most important medical society, which involved both students and professors, was the Royal Medical. Its objects were the advancement of medical science and the discussion of purely medical and allied questions. However, Brougham, who occasionally attended its meetings, noted that the subjects discussed had no relevance to medicine. John Thomson, during the session 1790-1791, wrote an essay on catarrh but also debated the question - "What are the Agents which Nature employs in the consolidation of the Strata of our Globe?" Geological controversies seem to have been of absorbing interest to many groups at the time.

Among those who belonged to the Society in the period were:

1790-1791 Andrew Duncan junior
1793-1794 William Woolcombe
John Reid

1. Ibid., 215.
2. The Edinburgh Journal of Natural and Geographical Science, II (1830), 269.
3. Hume and Evans, 169.
5. Thomson, Cullen, annex to II, 12.
Among those who present dissertations to the Society were Robert Jameson who in 1796 read a paper entitled - "Is the Huttonian Theory of the Earth consistent with fact?"; Henry Holland who in 1810, made "An Inquiry into the Nature and Origins of Passions in their Relation to the Intellect and Bodily Economy of Man"; Richard Bright, who in 1813 was speaking "On Gangrene" and Marshall Hall, who in the same year spoke "On the Dispersive and Refractive Powers of the Human Eye and on some Motions of the Iris". 1 Apart from debates and dissertations, the Society

1. Dissertations by Eminent Members of the Royal Medical Society, (Edinburgh, 1892), 32-39; 40-63; 64-83; 84-94.
awarded an Annual Prize for an essay on a medical experiment. The award began in 1784 and lasted until 1796. It was renewed in 1801 and lasted until 1839.¹

Many other medical societies are lost in obscurity: it has been seen that the Hibernian Medical was united with the Royal Physical. The Chirurgo-Physical, founded in 1788, suffered a similar fate in 1796 but not before the explorer, Mungo Park, had delivered two papers on taenia and scurvy in 1790.² A Chirurgo-Obstetrical Society is mentioned in the College Minutes in 1790; the Senatus agreed on July 5th to incorporate it into a legal body.³ The Select Forensic Society which lasted from 1813-1833, had similar objects to many of the literary societies.⁴

The societies as a whole reflect much of the life of Edinburgh and her University from 1790-1826. Educationally, the student societies provided an extra-curricular opportunity for the undergraduate to practise and implement further what they had learned in the classroom. The societies also gave an opportunity for developing the talents needed in research and public life, from which many students may have benefitted. The professors had a learned body in the Edinburgh Royal Society in which to test their research and benefit from public exposure of their views. Their audience would have been more experienced than that to be found in their classrooms. The Royal Society of Edinburgh was both a stimulus

². Finlayson, 16.
³. College Minutes, I, 419-420.
The professional and student societies together give further evidence of the active, intellectual condition of Edinburgh at the time.

Certain professors appreciated the value of student societies to the "community of inquisitive students". Walker, Playfair and Jameson were instrumental either in founding or aiding new societies. In general, the professors also helped the societies by stimulating enthusiasm for particular subjects in their classrooms. Philosophy, current affairs and economics lay behind many literary societies, at a time when Dugald Stewart was elaborating his ideas on social ethics. The Academy of Physics became interested in political economy at the same time as Stewart began to lecture on the subject. Many societies took up discussion of the geological theories - a debate in which Edinburgh professors played such a prominent part. The Wernerian Society flagged with the doctrines of the man after whom it was named. As the Chemistry class provided no opportunity to undertake experiments, interested students made their own arrangements.

If the professors wittingly or unwittingly provided a basis for the many and varied activities of the student societies, it must also be remembered that their influence was put to work on a particular body of students. Active in many societies, for example, were the Edinburgh Reviewers. Some societies were dependent on the presence of individuals: when Prichard and Mill left, for example, their societies died. The Royal Medical Society had a particularly gifted membership at this time. The professors had been able in the classroom to channel enthusiasm and capabilities in particular directions, to provide a basis for the future work of their students. Many professors who were not to live in their pupils' heyday, would have been able to see the early fruits of their teaching in the activities of the student societies.
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