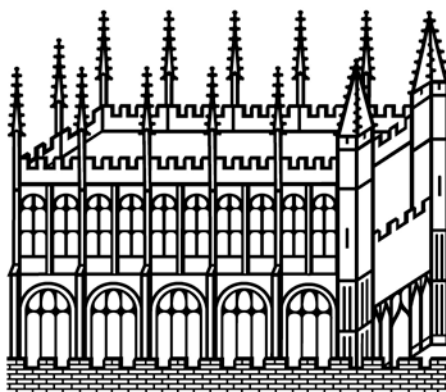




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T H E
G E N E R A L S T A T E
O F
E D U C A T I O N
I N T H E
U N I V E R S I T I E S :

With a particular View to the
P H I L O S O P H I C and M E D I C A L Education :

Set forth in

An E P I S T L E,

Inscribed to the Reverend Doctor H A L E S,
Clerk of the Closet to her Royal Highness the Princess of Wales.

Being I N T R O D U C T O R Y to

E S S A Y S on the B L O O D.

By R I C H A R D D A V I E S, M. D.

Late Fellow of Queen's College in C A M B R I D G E.

— *Ne quid veri non audeat.*

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A

PREFATORY EPISTLE,

INSCRIBED TO

The Rev. Dr. STEPHEN HALES,

Clerk of the Closet to her Royal Highness
the Princess of WALES.

Reverend Sir,

THE Qualifications necessary to
 constitute a perfect Physician,
 are so various, that they have
 probably seldom met together in one
 man. A compassionate temper, ca-
 pable of feeling the miseries of man-
 kind, and generously striving to remove
 them ; actuated rather by the * ho-
 nour

* Nulla enim re homines proprius accedunt ad
 Deos, quam salutem hominibus dando. CIC.

nour of the Profession, than the meaner views of private Interest; must form the basis of this Character: Which Character must be farther raised by a Genius endued with many innate qualities, and these improved by Education, to trace the silent steps of NATURE; from appearances to decypher her secret operations; and to carry on the longest chain of Reasoning from Effects to Causes. Those, who have been most hackneyed in the ways of men; who have been educated to make the most brilliant figure in the Eye of the World; are the least capable of excelling in this very different province. The minute observation of common objects, often offensive, never delightful; with patient meditation on them, must exercise and improve the Physician's capacity: Practice and attendance on the sick-bed must perfect it. For neither a previous Education alone, nor Practice alone,

alone, can complete the Physician :
Because men may grow old in practice,
without a capacity to form Experience :
Which, in the philosophic Sense, is the
knowledge of Truths established by
repeated Experiments.

Since then the skill as well as integrity of persons, who have the liberty to practise upon the health of mankind, is of so great importance to the public welfare ; one should expect, that a State, which values itself for promoting the welfare of its subjects ; which computes the number of the people as its real strength and riches ; would provide by Law and a well established Polity, that no Person should practise Physic, who was not duly qualified. After giving some public proof of a natural Genius, Students should be sent for instruction to the national Schools ; there to pass thro' all the discipline of a philosophic Education :

cation ; to be afterwards improved by due attendance at some public Hospital : Which ought to be the finishing School of the clinical Physician. Men should be taught their Professions under the practice of experienced Masters ; not be sent raw into the world, to form their own Experience, at the hazard of Men's Lives. But how little force there is left in any establishments of this kind in our nation, we have a notorious proof in every news-paper : Where the most audacious Quackery is display'd in every possible shape ; universal Remedies are puffed into reputation by extravagant, lying encomiums ; their virtues are attested by forged cases ; nor are persons wanting, who are ready to support the credit of nostrums by perjury. These abuses are not only tolerated by the civil Government ; but allow'd, but privileged ; under the Authority of Royal Patents.

Dreadful

Dreadful as this account is, I have a more serious complaint to make ; of an abuse that lies deeper in our Constitution ; and whose Remedy is more difficult to be found and applied. The Places, legally assigned for the Physician's Education, are not in a tolerable degree furnished with means and opportunities for passing through the requisite studies.

The two Universities were originally founded in the times of Monkish Superstition : By whose influence the several Founders of Colleges were generally actuated ; they did therefore require, that their Fellows should enter into Orders ; that they might contribute by Masses and Prayers, to deliver the Souls of their Founders from Purgatory. The permission of a single Lawyer and Physician in a College shews, they were intended for the private benefit of these Societies only.

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The Reformation, which expunged the useless offices for the dead, did not leave the Fellows more at liberty to accommodate their studies to the general wants of the Living: They must still be all finally determined to the study of Divinity, (*finaliter determinati ad Theologiam*). This at best confines the whole stream of University Preferment, to enrich that single quarter of Learning; from whence the Church receives its constant supplies. Now whatever Reason might appear for this particular destination in the times of the Reformation; there seems to be none at present, that would not be better answered, by a more liberal provision for general Knowledge.

Our two Universities did obtain, and have still preserved, an advantage; which I do not find to be possessed in an equal degree by any foreign
Seminary

Seminary of Learning: I mean, the Collegiate Discipline. Regular Calls to Chapel and to public Meals; the Gates shut, at stated hours; Officers appointed, whose duty it is to inspect the public Morals of the Youth; these Regulations must necessarily train them to a sober conduct. It cannot be supposed, that where many young men are brought together, and laid under no restraint, their course of life will be so regular and studious; as where they have particular Calls to their Duty. There is therefore the more cause to wonder at the Custom, which has of late years prevailed, of sending many of our noble youth to foreign Universities for their Education. It is a great national inconvenience to weaken the Affection, which in the course of Education is riveted to our native Soil; and to trust to Virtues of a foreign growth for the support of the British Constitution.

I fear the noble Families have not found their private account in it : And it highly concerns both the Public and our own Universities themselves, to supply the defects, or remove the prejudices, that have driven our youth abroad in quest of any species of useful Learning or polite Manners. Let us endeavour to distinguish our Universities as places where Liberty, Knowledge and Virtue best unite their social Graces ; that Foreigners may rather chuse to trust the discipline of their youth to us, than that we should be obliged to them for their care of our own. We need only to enquire, in what particulars any foreign Academies may be supposed to excel ours, and by applying our strength to rival, we shall soon be able to surpass them. For as the Regulations of Discipline in our Universities hardly need to be amended ; so their Revenues in the aggregate are large,
and

and scarce want any improvement or addition, to answer all the noblest purposes of Learning. They are like two Rivers, abundantly supplied from fountains of wealth ; which our ancestors liberally poured upon the Learning of those times. But with concern I speak it, they have been too much permitted to creep on in the same lazy channel, which was marked out for them in the days of Gothic ignorance and superstition : While nothing is wanting but a power to give their waters new directions, in order to fertilize every quarter of useful knowlege.

The advantages, which foreign Universities have enjoyed above our own, have been chiefly owing to the number of their Professors ; to the care their magistrates have taken, to fill their Chairs with the ablest men ; and thereby to perpetuate the reputation

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tion

tion of their Colleges, as they are called ; that is, the courses of Lectures read in different branches of Science : But they chiefly excel in those of Medicine. The Youth that come there to study, finding themselves engaged in a series of employment, sufficient to occupy all their time ; are secured from idleness, the parent of temptations ; and therefore restraints of another kind have not been greatly wanting. Whereas in our own Universities all the Regulations of Discipline are often found too weak to controul the high spirits of young men ; who are permitted too soon and at once to think and act for themselves. They are just freed from the constraints of a School ; and have not yet arrived at a maturity of Judgment, sufficient to value their time by any other measure, than that of present gratification. These persons should be led along the pleasant paths of Science :

Science : Their Genius should be tried in a variety of studies, or other employments : Something will probably be found suitable to their Taste, and capable of engaging their attention. A capacity of fixing the Attention upon a single Object is one of the most valuable acquirements of Education ; and will make every person's Talents of some use both to themselves and the public. Whereas the modern course of Education, instead of fixing youth in a series of studies in any established Seminary of Learning, is thought to be completed by making a Tour through Europe : Which, by introducing a variety of objects, is better calculated to scatter and diffuse the rays of the mind, than to collect their force and improve their vigour. Hence the manners of the present Age have been too much distinguished and characterized by a dissipation of Thought : Which has very
B 2 ingeniously

ingeniously introduced a perpetual round of amusements in the room of all the serious and rational employments of Life.

Our own Universities were never possessed of a sufficient number of Professorships to complete the circle of Science. For I cannot forbear to wish, that every species of real Knowledge, which might be useful or ornamental in society, were established there. It may seem partial, to complain of the want of Professors in particular Sciences; when, in the present scheme of Education, the use of those that have been established, altho' not a few, is almost wholly laid aside. By what course of events this has happened, I cannot fully explain: But certain it is, that of late, the chief employment they undertake, is to give an air of Dignity to the most exceptionable part of University Education;

cation ; I mean, the Disputations : Which are very apt to give a polemic turn of thought ; in common life to raise every discourse into a debate, thereby stamping the Scholar with the unfashionable name of Pedant. Besides, a disputatious Philosophy does not lead men forward in the discovery of Truth ; and least of all, of religious Truth ; or in the love and habit of religious manners : Whose springs like those of Life are destroy'd by being dissected, or too eagerly disputed upon. Divines, whose minds have been sharpened by the file of Disputation ; when they come abroad into the world, are not the best qualified to preserve and cherish that peace and harmony, which they should seem principally intended to propagate.

'Tis probable, that the Lectures at first established to be read from the Professorial Chairs were in some future period

period found to be rather ostentatious than useful, and therefore became equally neglected by Hearers and Teachers. But we have some instances, that demonstrate the advantage of Lectures; where a plan is laid, that comports with their mutual interest. Professor *Dickins* taught the Civil Law, and Professor *Saunderson* the Mathematics, to numerous Classes of Scholars in private Lectures annually. These Gentlemen were then esteemed the brightest ornaments of the University. One of them lived long to enjoy in his old age the fair Reputation he had acquired by his learned and assiduous labours. The præmature death of the other was felt in the University, as a very sensible loss. For altho' Mathematics are now more commonly understood, than in his time; and many excellent Books have rendered their study more easy and expeditious; yet by his peculiar
felicity

felicity in teaching he laid the subject so open and familiar to the mind of Learners, that their capacities were daily more expanded and enlarged, to receive a comprehensive view of Things : The display he made of the several methods of Reasoning for the improvement of the Mind : The application of Mathematics to natural Philosophy, by the investigation of the real Measures of Things and Qualities : Above all, a reverential regard for TRUTH, as the great Law of the God of TRUTH : These were the peculiar excellencies of that just Taste for Mathematic Learning, with which he endeavoured to inspire his Scholars : And without these intentions in view the study of the Mathematics themselves was, in the opinion of so able a Judge, a merely dry and unprofitable Labour.

Purpureos spargam flores, animamque magistri

His saltem accumulem donis, et fungar inani

Munere.

VIRG.

Indeed

Indeed I ardently wish to see the several Branches of Science honourably endowed in our Universities : Professed and taught there upon a Plan, which by uniting the emolument of the Master with the improvement of the Scholar, best promises to be perpetual. At present an universal Rust has spread over the Institutions of both ancient and modern times. No additions can now be made, but what would soon become equally nominal Dignities. By the liberality of his late Majesty, under the counsel of an able Statesman, a Professorial Chair was most amply endowed in both Universities, for teaching the modern Languages and modern History ; and Subtutors were provided. Yet this useful Institution was permitted to degenerate into nothing ; almost during the reign of that Prince.

The

The most sanguine advocates for our Universities cannot be so partial to their defects ; as not to acknowledge, they stand in need of many improvements : While their Enemies have said, these two Eyes of the Nation are become so far obscured,

*A Drop serene has quench'd their Orbs,
Or dim Suffusion veil'd.*

In truth, their state, though bad, is not desperate. A remedy will be found ; whenever the age applies itself with suitable vigour to the necessary work of Reformation. A former age has distinguished itself through all future annals by this glorious appellation. The design ought never to have been dropt. For Mankind should always aim at greater advancement in Science and true political Wisdom ; if they mean only to keep their station, and prevent being carried
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down the rapid stream of Corruption into the Gulph of Sloth, Ignorance and Barbarism. For it must be remembered, that all human Institutions are like Buildings liable to constant decay ; and if they receive not from time to time some necessary Reparations and Improvements, they must gradually become inconvenient and useless ; and at length wholly fall to ruin.

To prove that the Universities have wanted some enlargement in their plan of Education ; some emancipation from established forms ; I may observe, that every Scholar, 'till lately, was at taking the first degree in Arts sworn to have pursued a particular course of studies : *Primus annus Rhetoricam docabit, secundus Dialecticam, tertius & quartus adjunget Philosophiam.* And then blending a solemn attestation with a trifling prevarication,
it

it ends thus, *Iurabis quod hæc omnia observasti, et observabis; nisi tecum aliter dispensatum fuerit. Ita te Deus adjuvet!* But to the honour of the present Governors, I must take notice, that this and many other illiberal Oaths enjoined by the ancient statutes to be administered to the Candidates for the several degrees, have lately received a general Reform.

I shall next observe, that even in this age, indulgent as it is to conscientious Liberty, no person is yet permitted to take the lowest degree in the study of *Arts*, or in those of *Music, Law or Physic, as well as Divinity*, unless he will subscribe to the thirty-nine Articles of the Church of England. This Polity was introduced by *James the first*, (a King just arrived among us from a Presbyterian Nation) upon motives that are obvious to be conjectured. Nor are we at a

loss to account, from the genius of those times, for the eager reception of this Ordinance by the Universities. But since the Star of Liberty has so long shone upon this kingdom, that the Universities have not yet discharged themselves of so illiberal a bondage, shews how tamely mankind can submit to bear any yoke which Custom has once imposed upon their necks.

I have before taken notice, that almost all Fellows are obliged at a certain period to enter into Orders: And, if I am not mistaken, in some Colleges are obliged at their admission to their Fellowships previously to swear, that they will, or at least design to do so. I need not observe upon the bad tendency of such a solemn engagement, in an ingenuous youth, newly initiated into the Schools of Philosophy; not having entered upon the study of Divinity, and being
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as yet a very imperfect Judge of his own Talents or Genius, or the bent of his Passions. I need not remark, with how violent a bias necessity may hereafter draw him; not to quit hold of his only subsistence: And thus the Soldier of Christ, instead of coming in as a Volunteer, is entered a pressed man into the Service. And can we wonder, that such sometimes act unworthy of their Calling? Besides, how ill-timed a restraint is this on persons who are after to give a solemn attestation at the *Altar of Ordination*, to the internal motive, to the call of the Holy Spirit; in obedience to which they profess to take upon them that divine Office?

It must also be taken into the account, that the humour of giving establishment in the Universities to Clergymen only, has forced into the world many men of a speculative turn
and

and freedom of thought ; who did not like to confine themselves to the beaten tracks of any Profession ; but would have chosen rather to shun the world. Such Geniuses might have best exercised themselves in a Collegiate retirement, where they might have given birth to several useful Inventions ; and have risen up Teachers in many branches of speculative Science. That the Disciples of such Schools, of how retired and speculative a nature soever, might be qualified therein to shine in the most active spheres of life, we may collect from the success of *Socrates's* Institutions : In whose school *Alcibiades* and *Xenophon* were educated, two of the greatest Commanders which that or any other age whatever has produced. And this may be readily accounted for ; because the Science of Morals is the true foundation of all mental accomplishments : It exalts every Virtue, and gives them a right direction. The

The next restraint I shall touch upon, is the appropriation of Fellowships and Scholarships to certain Schools, Counties or Kindreds ; or certain Exclusions, as that which allows but one or two Fellows at a time of each County ; to the exclusion of many deserving persons, and to the necessary admission of their inferiors in other Qualifications. A right to a Fellowship induces a sort of petulant demand of it ; not a modest, meritorious conduct. Its chief value lies in nourishing an expectation, as the premium of Learning and Virtue. The right of Nomination in a private person is highly injurious to the good Government of the Society ; which must chiefly depend on the harmony of all its members. Some of these entails, where they are of a more general nature, may not be very unreasonable or detrimental to the society : Others after this length of time
may

may well deserve to be cut off, by an equitable determination. Founders Kindred must now be very numerous indeed: Yet the preference designed them will frequently become a bar to their preferment; since few can prove their own Genealogies so far back.

Now were all these restraining clauses removed, and every Preferment contended for in the fair and open field of Merit; how noble a race of Geniuses should we train up, thus invigorated by Emulation, and spurred on by Reward? How different a figure would such a College, or such an University, make in the eye of mankind, from one (if such there be) which requires no other Letters in their Candidates, but Letters of Recommendation; no other Virtues but those of good Fellowship, and steady attachment to their parties; whether in Church or State? I must do justice
to

menial Servants of the Fellows ; and performed the meanest offices for them ; altho' they might soon after themselves arrive at the same seat of honour. A man bred a Slave is educated to become a Tyrant ; when power devolves to him. The transition is necessary and sudden ; and admits of no intermediate state of natural, popular freedom. Hence the fastus of the Fellow, and the obsequious carriage of the Servitor must have made in former times, as striking a Contrast, as any to be met with in Comedy or in real Life.

By late and slow degrees have Colleges relaxed in the severity of their servile discipline. Many considerable traces remained to our own times ; long after the manners of the world had refined into a more polite and rational behaviour : I mean, in this respect only. For as changes have
been

been rather made by time, riches and an enlarged intercourse among mankind, than by a settled prudence formed upon observations on human nature; hence Luxury, Licence and Misrule have been introduced in the train of Liberty. The old Establishments have mouldered away, because they were formed of base materials; while no prudent Legislator has stepped forth to supply the loss by Ordinances more suitable to the present age. Thus the transition has been made from one extremum to another; from a rigid, austere Government, to one in some material respects too lax and indulgent.

Having pointed out the principal defects, which deform these Seminaries of Learning; it may best become me to leave it to the wisdom of the Legislature, to find out and apply suitable remedies to these corroding Evils; which have already deeply infected the

vitals of our constitution. Sure I am, that no object is more deserving of their serious regard : And that a Parliament will highly merit of Posterity, which shall carry on to its full execution a Plan of Reformation and Improvement for those places of Education ; whose course of discipline must greatly influence the Morals and Character of succeeding ages.

But what public wisdom only can enact, private information may in some degree suggest ; and I trust, Sir, that you will be pleased to see, and that the public will candidly receive, upon this important subject, the thoughts of a private person ; who was once well acquainted with the state of one University : I ingenuously confess myself so partial, as to think it in several respects the best ; and out of the same partiality should desire it might precede all others in Reformation, and in its approaches

approaches to the perfection of human polity. So far am I from thinking, that such a visitation should be dreaded; that it should rather be courted and embraced by all the true friends of Virtue and Learning.

I shall beg leave then to consider the whole Emoluments of the Universities, as Funds destined to the support of Learning and Learned Men: *First*, for the support and encouragement of Students during the course of their own private studies, 'till they are fitted to pass off into their several stations in the world: *Secondly*, for the raising up the great pillars of Learning, for the support and ornament of the University itself; for maintaining Masters, Governors, Tutors, Lecturers and Professors; to preserve order and discipline; to regulate the morals; to teach and instruct the Youth in every valuable Science.

Keeping

Keeping this great Object in view, I would endeavour to approach it in the directest line; regardless of the trespass I must make upon the private enclosures, which fond partiality had laid out to some less general purposes. Let none think these liberties are not equitably to be taken, I mean, by public authority and for the public good: The emoluments and establishments of the Universities have been gradually amassed by private donation; and therefore, tho' generously destined to promote the public utility, cannot be so properly designed in the several parts, as by laying out a general plan from a comprehensive view of the whole.

First, then, I should wish, that the Masters and Fellows of Colleges were relieved from the necessity of engaging in Orders. When every Study is left open, Mankind will fort themselves in
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the juſteſt proportion to the occaſions of the times : And the Church as well as the State can never want a proper ſupply. The Fellows alſo, whether in Orders or out, ought to have equal advantages and ſtipends : Save from ſuch emoluments as belong to each particular profeſſion.

Secondly, As Fellowſhips are deſigned to answer the double intention of ſupporting the Students, as well as providing Teachers ; they ought not to be perpetual, but limited : To ceaſe, ſuppoſe, at the tenth year from taking the Bachelor of Arts degree. This is a ſufficient time to finiſh any courſe of Study ; and men will then, if ever, be fitted to enter into the world : For which they will be better prepared, by being kept in this ſtate of dependence and probation. This ordinance will alſo ſupport the credit of the Univerſity : For though all
Elections

Elections were to be made with the greatest regard to Qualifications, yet sometimes a false judgment will be made; and some Geniuses will afterwards be buried in Sloth, or drowned in Intemperance. Such are now commonly found to linger out their full period in the University; 'till they are late sent into the world, (for which they are equally unfit) to a College Living. Happy is the society, which has not three or four such at the head of it; lying as a dead weight upon Learning: Who being in possession of the key of Knowledge, have not themselves entered in; and will ever be disposed to hinder others.

Thirdly, This last Ordinance will greatly quicken the succession. A considerable number, therefore, of the Fellowships may be retrenched, consistent with the present natural expectations of Candidates; as well as with
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the much greater purpose, the preservation of order and discipline. For this end the number of Fellowships at present is certainly too great, especially in the larger Colleges; and often proves detrimental, as being too powerful for the controul of the Master. And some, who are useless to discipline, may hope to find their account, by humouring the follies and extravagancies of Students of rank and condition.

Fourthly, Two or three of these sequestered Fellowships may be coalesced into one stipend of a superior Order to be again succeeded to by a free Election. These should be all *public Lecturers and Professors* in some Art or Science: They should be perpetual; be allowed to marry and to reside at large in the University, and to make profit of their Lecture. Many ingenious men will naturally
E fall

fall into this way of Life ; polite as it will be and honourable : A Rivalship will here be supported, and the spirit of Emulation be made to operate higher ; both among the Fellows, as Candidates for Professorships ; and among the Professors themselves, as Rivals for the fame and profits of well attended Lectures. Thus the Colleges will never be destitute of Men of experience and approved abilities at their head : The Universities will be ornamented by real Dignities, and every wheel of Science be at once prepared for motion.

Fifthly, This Plan will admit of great variety in adjusting the number of Professorships and their destinations. Less than fifty will not suffice for each University : For no principal Science must be maimed in any of its branches ; be left to depend on the abilities of a single person ; or be put to a stand
by

by their age and infirmities. Their number may be gradually encreased, as they are found wanting. And I should think it best to leave the Colleges at liberty to supply what Professions they please ; and from time to time to alter and vary them. Thus every age will be left to itself in the free choice and direction of its own studies : And probably Learning will by this means advance in all its branches, in a more general and true proportion ; than under any particular restrictions and limitations.

Sixthly, Still there must be found a Weight to impell, and a Power to regulate, the whole. These powers must be placed in the Masters of Colleges acting in a collected body. And to preserve their authority entire, it is obvious to see, that they must enjoy no Professorships ; that being liable to no duty of that kind themselves,

selfes, they may be exact and severe in seeing all the Schools regularly supplied.

These are the principal Regulations that I should wish to see gradually brought into effect : That, when things are put into a right train, Time may be the continual improver. But after what I have designed for the improvement of the future age, I must remind those, who are now pursuing their course of studies, that Teachers can only serve to open the mind of youth, and enter them more easily into the paths, in which they must afterwards travel on by their own strength and judgment : And that it is no small advantage which they now enjoy, to be able to pick up Companions who are pursuing the same road. Young men, who are engaged in the same studies, may mutually assist each other. The advantages of
Society

Society are not more conspicuous in the commercial schemes of Interest, than in those of Science. Different men see objects in different points of view : And as Things are said to cast light upon, and illustrate each other, so may minds be enabled to strike out Knowledge by a collision of Sentiments. One man may observe a faint trace of some important Truth ; but being unable alone to pursue its course, it dies away into the mass of opinions, which are of little account or value. But if many are ready to engage in the chace, to try the ground in every direction, they may be able to unravel the complicate windings of Nature, and discover her most secret recesses. Hence it has been observed, that great Geniuses seldom appear alone ; but being grouped together form a noble Constellation, and dignify the age in which they arise. This observation shews, that Nature has not been so sparing

sparing in the Talents necessary to great designs ; but that they are seldom exerted in their full force, or in the best direction. Men are often called aside, by allurements of Riches or Honour ; from pursuing the Paths, along which Truths of the most important kind would lead them. The immortal *Harvey* complains, that he lost a great part of the business of his Profession, by the publication of his discovery of the Blood's Circulation. The Catalogue of renowned names is not large ; who, regardless of the world's present estimation, have purposely employed their time in pursuit of Inventions for the public use and emolument. Many Discoveries, which the world is in possession of, have been the offspring of Chance or Necessity. But there are many noble calls to awaken Ambition ; Fame will rouse it ; and Emulation by doubling the ardor will double also the strength of Competitors.

Competitors. Every art should therefore be employed to invigorate Youth with this noble principle. In Universities, where Youth are brought together, the properest means should be used to form into Classes those who are engaged in similar courses of study. Schools should be opened for their assemblies ; and not only Books but Instruments be provided, to carry on every species of Enquiry : And the most ingenious Youths be distinguished by honorary rewards. It is the general fault of Scholars, to read Books too much, and Nature too little. By the one we can only keep possession of the Truths discovered by our predecessors ; by the other we are continually making new acquisitions : And by our knowledge extending the empire of Man over Nature. Each province both of Learning and Knowledge, should be regularly supplied ; nor can any expence be too great for the
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the support of such adventurers : Since to their labours is owing the principal difference and distinction, between a polite and learned Nation and the savage Inhabitants of the American Woods.

The Universities have amassed together prodigious quantities of Books; but the apparatus of Instruments for carrying on experimental knowlege in the several Sciences, as Mechanics, Optics, practical Astronomy, &c. is very defective. The Arts subservient to Medicine have no appointments to encourage Teachers in them. Anatomy, Botany, Chemistry, and Pharmacy have been but occasionally taught ; when some person of superior Talents has sprung up, and has honoured the University by his first display of them there, before his passage into the world. I speak particularly of the University, where I was myself educated ;

educated ; though the state of the other may not be widely different. *Oxford* indeed has long enjoyed a Botanic Garden, which since the time of Mr. *Sherard*'s donations has been properly supported. There has also been lately erected there a magnificent pile of Building by the donation of a celebrated Physician of the last age : But it has not proved a real enlargement of the School of Science. What immense Sums have been expended in designs rather ostentatious than useful, while so many real wants are absolutely unprovided for ? In short, if we consider the difficulties, the discouragements, that attend the study of Physic in both our Universities ; it must be matter of surprise, that our Physicians have arrived at that respect and dignity of Character, which they have long maintained in the world. It is a point of great national concern to support their title

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to

to this distinction ; by supplying them with the properest means of acquiring all the knowlege of Nature, which Philosophy can by any methods discover : That their minds may thereby be opened to take in the most comprehensive view of their Profession.

The knowlege of Nature, as it is distinguished from human Learning, is of far superior excellence ; and is scarce to be acquired without a very wide and expensive course of study. It is therefore peculiarly necessary, that a part of the ample Revenues of Universities should be applied to support these expences : Since for want of this many an excellent Genius must have been lost to the world. The great *Roger Bacon* informs us, that in the space of twenty years he had spent two thousand pounds in books and instruments : An immense sum in those days. And we know, that almost

most in our own times Sir *Isaac Newton* prosecuted his discoveries by methods, that must have been attended with great expences. *Roger Cotes*, animated with a desire of pursuing the study of Nature in the same steps, soon involved himself in a debt, which his modesty permitted to prey upon his health ; and which put an end to that valuable life at the age of thirty-four. A Person, renowned for his great skill in classic literature, then presided in the College ; a spectator of *Cotes's* distress : Into which he had been plunged, upon expectations or promises, that the expences should be born by that opulent College. But the only regard paid him, was by an Epitaph composed in classic elegance ; which is inscribed on his monument in Trinity College Chapel. After death every Virtue is sure to meet its reward.

I know also, Sir, that you had your private Elaboratory in Bennet College; where you plan'd those Statical Enquiries, which have opened a new road into Nature. I had the happiness to be ripe from those Researches, when your Books came abroad; and applied myself seriously to the study of them. They contributed to form my Taste for natural Enquiries, and to open my views of that Philosophy, into which it were to be wished that all Physicians were well initiated. The Plan is wide and noble, and all Gentlemen who study with a liberal view might delight to be engaged in some parts of it. To encourage the forming private Societies in the University for the promotion of natural knowlege, I will observe, that though some courses of Experiments are very expensive, yet others, which may lead to valuable Truths, are made with little cost: That the knowlege we
gain

gain by these means is more our own, makes a deeper impression on the understanding, and more enlarges the mind, than any other : That at this time of life we are most vacant and ripe for these researches.

In the study of Nature we must first learn the general properties of unorganised bodies, as far as they are discoverable by every method of experimental enquiry. We are next to trace in Vegetables the properties attending upon a vascular structure ; and the Laws that regulate Accretion. By tracing Nature in these steps, she will herself assist our studies ; while her Powers are distinctly viewed, as laid open by the most easy method of Analysis. For in the order of Creation, every superior species is subject to all the Laws of the inferior kinds : Altho' its superadded excellence is derived from a Law peculiarly given to itself.

itself. Thus we shall pursue our Enquiries through Subjects that are the least intricate: And shall at last find every property we have observed and explained in inferior natures, exemplified in the Animal Structure.

Philosophy had scarce carried her Researches into the Animal Nature, far enough to be entitled to its empire, before the last age; which was enobled by *Harvey's* discovery of *the Circulation of the Blood*. Those, who depreciate that divine discovery, by asserting that it has been of no use to mankind in the study or practice of Physic; should be sent back to enquire with *Galen*, *whether Blood is naturally to be found in the arteries or not; of what use the Pulse was; whether it was a kind of general Respiration to the whole Body*. Before the æra of the Circulation, there is scarce a medical writer, who is not made
obscure

obscure by jargon, which has now given place to a language that generally serves to convey natural sense and meaning. Besides, many improvements in practice might be fairly traced up to that original. But it must be confessed, that the discovery of the Circulation has not been followed by so great advancement in the Science of Medicine ; as was naturally to have been expected from it. The reason of which is, that our Theory has not yet advanced much in the knowledge which is naturally founded upon this grand Principle, *the Circulation*. It has not yet explained the Epicycles, as I may be allowed to call the partial Systems, and various relations of parts, both fluid and solid, on which the Anomalies of the Body, the Nature of Diseases, and Operations of Medicines, must depend. Had *Newton* only discovered the general operation of Gravity upon all matter ;
and

and barely hinted, that the motion of the Planets must depend on it ; Philosophers had then understood the System of the World nearly as well, as we do now the System of the Body.

But *Harvey* was not content with this discovery : He endeavoured farther to trace the Animal Powers from their Principles in the Embryo ; where they appear more developed and distinct, than in the perfect Animal. And he has left a noble instance of his sagacity in his excellent Treatise *de Generatione Animalium*. The French Authors, who have brought to perfection the method of hatching the Chick by an artificial heat ; might have applied it to far nobler purposes than any they aimed at ; had they taken his work as their Guide. It must be confessed, that this latter Treatise is not written in so free and open a manner, as his former *de motu Cordis*.

Cordis. Here we see a candid Enquirer, with Truth and Nature constantly in his view, proceeding directly to the discovery. But the controversies he was thereby engaged in, by men tenacious of former prejudices; had now taught him more caution. So that in his second work, it gives himself and his Readers more trouble to keep clear of Objections from the favourers of the Systems of *Aristotle* and *Fabricius*, than to collect the Truth from Nature herself. In this same Treatise (*de Generatione*) the admirable author has left no obscure Traces of his future designs: Which were at last directed to investigate the properties of the *Blood* itself: In which he had discovered the principal moving powers of the Animal Machine must reside. The Sentiments concerning the Blood, which he has occasionally inserted in this Tract, are just and noble, being truly worthy of the

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Subject.

Subject. I shall have occasion hereafter to lay them before the Reader : Who will be sensible how great a Treasure the World has lost, in being deprived of the Work itself ; or even the Materials, which this sagacious Observer must have collected : And which I should think myself peculiarly happy in the perusal of, if they are yet preserved.

Mr. *Boyle* was also engaged in an experimental History of the Blood. But his principal papers were destroyed by a fire ; and the memoirs, that now remain to us on that subject, were taken, as himself informs us, from an imperfect copy ; or on recollection of what he had formerly written in a more accurate manner. ‘ He accuses
‘ Anatomists, as being too sedulous
‘ about the Solid parts of the Body ;
‘ while they overlook enquiries into
‘ the Fluids, especially the *Blood*. This
‘ Procedure

‘ Procedure he thinks little less im-
‘ proper in a Physician; than it would
‘ be in a Vintner, to be very sollicitous
‘ about the structure of his cask, and
‘ neglect the consideration of the Wine
‘ contained in it.’ This allusion is
very just, though coarse: And I the
rather take notice of it, because I
think it the only Sentiment deserving
attention through the whole Tract:
Which is long, being divided into
four parts, with many subordinate
Titles in each. This noble author
has greatly enriched the store of human
knowledge, by his accurate Experi-
ments on many parts of Nature:
But he unfortunately mistook the way
to real discoveries on this subject,
which he professedly acknowledges to
have deeply studied. For though the
principal papers were destroyed, yet
some traces of any considerable dis-
covery must have remained upon his
memory.

When I first laid down the plan of my general studies, I observed, that the step to be next taken in the scale of medical Knowledge was the Investigation of the properties of the *Blood*: Which has not yet been prosecuted in a manner suitable to its importance; nor at all proportionable to the progress made in the Anatomy of the Solids; nor to what the present state of experimental Philosophy would encourage one to expect. I therefore chose to direct my own principal enquiries to this point. And how small soever the progress I have made may be, I have reason to be satisfied with my aim: Since from full experience in practice I am convinced of the truth of *Harvey's* position, that the principal moving powers of Animals are resident in the Blood. And that this must be the Physician's key to the knowledge of many Distempers and of their Cure.

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The Essay I now offer to the public is intended only as a Foundation ; the principal Lines of which were drawn full twenty-five years ago : And as a cautious builder I now leave it to settle on the Minds of men, and to receive the correction of able Judges ; before I venture to lay any further weight upon it. The Structure must be farther advanced, before its various uses can be explained, or proper Decorations adjusted to their respective places.

To give a farther reason for the publication of so small a portion. Having now rendered this, nearly as perfect as I am able, and laid down the Plan for farther discoveries ; I hope hereby to engage younger Eyes and younger Minds, which are now ripening into these studies, to employ their early thoughts on the same design. This Path you well know, Sir, must
open

open into a wide field of Experimental enquiry. And though I have found means of fatisfying myself in some Truths of great import ; I have never yet enjoyed time and conveniencies for making fuch a courfe of Experiments, as would give a demonstrative evidence of thefe Truths to the World. And to add a greater weight to my own request, I muft beg leave to clofe this addrefs with fome words taken from the preface to your excellent Statical Effays.

‘ I hope, the publication of this
‘ Specimen will put others upon the
‘ fame purfuits ; there being in fo
‘ large a field, and among fuch an in-
‘ numerable variety of Subjects, abun-
‘ dant room for many heads and hands
‘ to be employed in the work. For
‘ the wonderful and fecret operations
‘ of Nature are fo involved and intri-
‘ cate ; fo far out of the reach of our
‘ fenfes,

‘ senses, as they present themselves to
‘ us in their natural order ; that ’tis
‘ impossible for the most sagacious
‘ and penetrating Genius to pry into
‘ them, unless he will be at the pains
‘ of analysing Nature by a numerous
‘ and regular series of Experiments,
‘ which are the only solid foundation,
‘ where we may reasonably expect to
‘ make any advance in the real know-
‘ lege of the nature of Things.’

The several Organs of an Animal body form a grand Hydraulic Machine ; wherein the powers of inferior Natures are all combined and adjusted with admirable Wisdom. At the same time the Fluids are agitated in a subtile Chemical process ; which may either fall short of the point of Animal perfection, or be too highly exalted into a poisonous acrimony. Whatever discoveries therefore Man can make in the general Analysis of Nature, he
may

may apply to the knowlege of his own Frame : And learn thereby how to protract life and encrease happiness in a most essential point. Indeed the Author of Nature has not left the way easy to these sublime discoveries.

*Pauci quos æquus amavit
Jupiter, aut ardens evexit ad æthera virtus,
Dis geniti potuere.*

On the other hand, it does not appear that He has set any limits to them. And if we consider in what manner a great part of mankind are usually employed, we must confess how very short we fall of a right application of our time and abilities.

The World has generally acted as if they thought, that Princes were stationed by Providence, not to unite the force of their States in conjunction with the whole of mankind in the general pursuit of public Good, and to exalt human
Nature

Nature towards its genuine perfection ; but to watch and to restrain the rising grandeur of every neighbouring Nation : And when their Blood runs high, to pour it forth on some glorious field of Slaughter. But you, Sir, who have been no less conspicuous for your Apostolic than your Philosophic qualities ; must have formed a secret Hope, that Mankind will in some future period have its powers directed, on a more benevolent System : To lay open the Treasures of Nature in every quarter, that it may enjoy itself in the fruition of inexhaustible Abundance. Here is a noble Scene for the display of Ambition : A Contention in which the Antients feigned their Gods to be engaged ; who should bestow on mankind the most beneficent Present. You, Sir, are sensible, that this God-like Virtue may inhabit the human breast, and actuate our pursuits to the latest period of Life : And must feel
with

inward transport, that in this generous labour, the meanest endeavour shall not lose its reward.

I hereby present you the tribute of my warmest praise, as part of the great Due which the whole AGE is paying to your splendid Character. Permit me therefore among the number of your admirers to profess myself, with the greatest esteem,

Reverend Sir,

Your most respectful

And devoted Servant,

RICHARD DAVIES.

B A T H,

1 March, 1759.

P. S.

The first Essay is now in the press.

E R R A T A.

Page 18. Line 20. *docabit*, read, *docebit*.

45.

9. *organishd*, r. *organized*.