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WILLIAM CULLEN: HIS CALIBRE AS A TEACHER, AND AN UNPUBLISHED INTRODUCTION TO HIS *A TREATISE OF THE MATERIA MEDICA*, LONDON, 1773.

WHILE THE main purpose of this paper is to make readily available Cullen's introduction to his first (1761) Edinburgh materia medica course, some characteristics of Cullen's teaching, which was possibly the most significant in eighteenth-century British medical education, will also be considered.

Cullen's 1761 materia medica course—omitting the introduction—was published in the early 1770s, initially without Cullen's sanction, as *Lectures on the Materia Medica*.¹ That Cullen's greatly enlarged and monumental *Treatise of the Materia Medica* (Edinburgh, 1789) was an entirely rewritten version of the *Lectures* is perhaps the best testimony to his feelings of the inadequacy of the pirated version. Unfortunately, however, the rewritten 1789 *Treatise* had little of the spontaneity of the *Lectures*, which, in turn, lacked some of the sparkle characteristic of many manuscripts of students' notes.

The main value of the unpublished introduction (see pp. 84–87) is that it sets out in detail Cullen's plan and aims for his course. In contrast, the printed *Lectures* merely list the four headings under which Cullen considered each drug, with a comment that knowledge of the subject is of two kinds (the study of the natural history and of the crude, dried drug) and brief critical remarks on theories for discovering the therapeutic properties of drugs (e.g., the doctrine of signatures).

All these points are amplified and made clear in the unpublished introduction. For instance, one learns of Cullen's attitudes to Linnaeus' classification and how far he intended to use it. Cullen emphasized, too, the difficulties of establishing a generally accepted scheme of classification and drew attention to writings 'best calculated for assisting the student, tho' each follow a different method'. Apart from Linnaeus' botanical scheme he referred to Lewis's alphabetical arrangement,² Geoffroy's grouping into mineral, vegetable, and animal,³ Cartheuser's classification based on sensory characteristics,⁴ and Chomel's pharmacological classification.⁵ Additionally, the introduction includes strong and trenchant criticisms of the views and opinions of various authors on the therapeutic properties of medicines, as well as Cullen's own thoughts on the value of chemistry.

But the unpublished introduction does more than give a clear understanding of

¹ Much information on the furore over the publication can be found in J. Thomson, *An Account of the Life, Lectures, and Writings of William Cullen, M.D.*, Edinburgh, 1859, especially vol. 1, pp. 144 and 611–18. Although it is possible that the lectures were first published in 1771 (cf. Thomson, *ibid.*, p. 526), the earliest versions that have been located are dated 1772. Some of these include Cullen's long list of addenda, and an explanatory preface, as do all the 1773 versions which also have a different title-page. The latter bear the statement 'printed from a correct copy, which has been compared with others by the editors'. An additional preface also suggests that the first 'sheet' of the lectures was reprinted, but no 1772 copies have been found to bear this out.

² This was in the *New Dispensatory*, London, 1753, which was in fact published anonymously. The 1781 edition revealed the name of Lewis on the title-page for the first time. F. W. Gibbs, 'William Lewis, M.B., F.R.S.', *Ann. Sci.*, 1952, 8, 122–51 (p. 128), notes that the *Dispensatory* was widely recommended by Cullen (and also by Black, Cullen's successor, in 1766, to the chair of chemistry).

³ Geoffroy's *Tractatus de Materia Medica*, was first published in Paris in 1741.

⁴ *Fundamenta Materiae Medicae*, first appeared from Frankfort-on-Oder in 1749–50.

⁵ E.g., *Catalogus plantarum officinalium*, Paris, 1730.

Cullen's approach to his materia medica course: it also emphasizes his sharply critical outlook and the care he took in tailoring his course to the needs and the capabilities of his students. For example, he admitted that 'to fix a regular plan for these lectures is extremely difficult' and that the extent to which a physician should carry his 'knowledge of natural history is hard to determine. To enter into the minutest is incompatible with his Profession . . . students are generally deterred from [materia medica] by the embarrassment of uncouth terms, yet in fact they are easily understood from having constantly the idea of some particular property in the subject annex'd to them.'

A sympathetic awareness of students' needs characterizes all Cullen's lectures, yet in assessments of his influence this has received little attention, despite his fame as a system builder.⁶ Just what led Cullen to systematize and generalize to the extent that he did merits detailed study in the context of eighteenth-century medicine, science, and philosophy. However, as background to the introductory materia medica lecture it is relevant to comment on his chemistry lectures, for these were his main preoccupation when he was called upon, at short notice, to give his 1761 materia medica course. (He was professor of chemistry at Edinburgh from 1756 to 1766.)⁷ Furthermore the chemistry lectures were not published and have received little consideration.⁸

Another point of interest is that a considerable number of manuscripts of chemistry lectures delivered by Cullen's contemporaries and predecessors are available for comparison. These make it quite clear that Cullen's trenchant critical outlook, and hopes for drawing generalizations from a mass of miscellaneous information, were not novel. In the lectures of both of his eighteenth-century Edinburgh predecessors in chemistry, James Crawford and Alexander Plummer, there is the idea of constructing a 'new science' of chemistry, with firm emphasis on experimental results and in formulating rules wherever possible. For instance, in 1713 Crawford stated that: 'Therefore [so] that I can free y^e art (as much as possibly I can) from its obscurity and confusion I shall both give a full and clear account of y^e prinlls upon which I judge a solid and useful system of chymie may be founded.'⁹

At first glance much of Crawford's lectures appear to be of the seventeenth-century recipe-style chemistry—a list of methods for preparing medicinal substances—but this is misleading, for Crawford chose 142 experiments to demonstrate various tenets of chemistry through the 'corollaries' drawn from them. Crawford clearly had a horror of the 'infinite heap of experiments scattered through a number of authors'.¹⁰ Plummer's lectures (c. 1726–1756) demonstrate that he also put great care into planning the experimental part of his course and in finding rules whenever possible. In 1741 he commented: 'I shall lay down 3 rules w^{ch} if duly observ'd will produce a

⁶ Cullen's fame as a systematist is based largely on his contributions to nosology. Cf., for instance, a useful introduction by L. S. King, *Eighteenth-century Medicine*, Chicago, 1958. Cf. also Thomson, *op. cit.* (fn. 1).

⁷ Cullen in fact lectured on materia medica at Glasgow in the late 1740s, but there is no evidence that this lasted for very long. On Alston's death in 1760, Cullen was asked by students to continue the materia medica course (Thomson, *op. cit.* (fn. 1), p. 141).

⁸ Cullen's reputation as a chemistry lecturer is, however, becoming more widely appreciated since W. P. D. Wightman's 'William Cullen and the teaching of chemistry', *Ann. Sci.*, 1955, 11, 154–65; 1956, 12, 192–205.

⁹ See notes taken by John Fullerton, dated June 1713. Wellcome Institute of the History of Medicine MS. 1091, section entitled 'A course of chymie', f.2.

¹⁰ *Ibid.*, f.4.

good system of chymical experiments. The first rule is y^t each kindom of bodies should be considered distinctly & treated separately . . . The 2nd rule is y^t we begin our experiments on y^e general class w^{ch} can be sufficiently known without other bodies . . . The neglect [as by Lemery] of this 2nd rule renders chymistry very foolish . . .¹¹

It is probable that both Crawford and Plummer were influenced by Boerhaave, whose teaching showed the same critical, questioning outlook.¹² Boerhaave, however, was not the only influence in British chemistry teaching in the first half of the eighteenth century, as is demonstrated by the lectures at Oxford and Cambridge universities. There, from around 1700 to 1760, a number of apparently excellent courses were given, although there is no evidence that they were given regularly.¹³ The first available information on teaching at Cambridge after the severely practical recipe-style lectures of John Francis Vigani¹⁴ is in connection with John Mickleburgh, Professor of Chemistry from 1718 to 1756.¹⁵ Although Mickleburgh may have given his course only five times it seems to have been well worth while, for he enthusiastically supported the application of Newtonian natural philosophy to rationalize chemical processes.¹⁶ He repeatedly referred to the work of Freind and wrote the encomium¹⁷ that: 'the first who applied S^r. Isaac Newton's philosophy to chemistry was Dr. Freind & how happy & successful he hath been in this application who hath or will but read his Cheymical Lectures will be able to judge. His way of reasoning in this book is founded upon some few postulations w^{ch} are either strict mathematical truths or else propositions which may be sufficiently evinced by clear and undeniable experiments.'

The lectures of Mickleburgh's successor, John Hadley were markedly different through relying heavily on Macquer's textbook *Elémens de Chymie* (1758).¹⁸ Hadley's own notes for his lectures indicate, perhaps more than Mickleburgh's, a conscientious

¹¹ Wellcome Institute of the History of Medicine MS. 119, entitled 'Notes taken from Dr. Plummer's chymical lectures, Edinburgh 1746', ff. 82–83.

¹² Crawford and Plummer were both students at Leyden while Boerhaave was there, though Crawford's stay was only five weeks (see G. A. Lindeboom, *Herman Boerhaave*, London, 1968, p. 356).

Lindeboom's book indicates Boerhaave's general critical outlook, but the following quotation suitably captures Boerhaave's attitudes to generalizing in chemistry, so characteristic of Crawford and Plummer: '[Theory] is built on general laws; which must originally have been deduced from a multitude of common incontestable facts, always happening in the same manner, so as to authorise the enacting them into general rules' (quoted from Peter Shaw's translation of Boerhaave's *Elementa Chymiae: A New Method of Chemistry*, London, 1741, vol. 1, p. 2).

¹³ It should be added that there is some doubt as to how many lectures were given at Edinburgh. For instance, no evidence has been found to indicate that Crawford's course was given regularly. Alexander Monro *primus*' statement that he attended a course of chemistry, which 'Crawford sometimes gave' suggests that it was not. (Cf. Monro's manuscript autobiography produced in H. D. Erlam, 'Alexander Monro *primus*', *Univ. Edin. J.*, 1954 (Summer), 77–105).

¹⁴ This opinion of Vigani's lectures is based on L. J. M. Coleby's paper 'John Francis Vigani, first professor of chemistry in the University of Cambridge', *Ann. Sci.*, 1952, 8, 46–60, and a study of the MSS mentioned in the paper. A further manuscript not noted by Coleby is 'A course of chymistry A.D. 1704 operated by Seigr Vigani' (Royal College of Physicians of London MS 327).

¹⁵ See L. J. M. Coleby, 'John Mickleburgh Professor of Chemistry in the University of Cambridge 1718–56', *Ann. Sci.*, 1952, 8, 165–74.

¹⁶ Mickleburgh seems to have written down his class list five times only, suggesting that his course was not delivered frequently. His numbers were 18 (in 1726), 23 (in 1728), 13 (in 1731), 14 (in 1733), and 10 (in 1741). The information is in Caius College Library MS. 619/342, comprising two separate courses of chemistry written in Mickleburgh's own hand. (This MS. provides much evidence for Mickleburgh's Newtonian leanings.) The lists of students can be consulted conveniently in R. T. Gunther, *Early Science in Cambridge*, Oxford, 1937, pp. 468–71.

¹⁷ Caius College Library MS. 619/342, day 2, 1st course (Nov. 12th).

¹⁸ See Trinity College MS. R.I. 50–51, entitled 'An introduction to chemistry being the substance of a course of lectures read two years successively in the laboratory at Cambridge' (c. 1759). For some

concern with the presentation of material. For instance: 'I have always thought that in the instruction of others nothing is so troublesome as teaching the exceptions to general rules, as this, before the learner is well acquainted with the subject, is sure to introduce great confusion. For this reason I may appear too general in any assertions in the beginning of the lectures, but I chose to fix facts of consequence firmly in the mind at first, and afterwards to set to right any little inaccuracies.'¹⁹ And again: 'The order in which I have treated the subject is that which I thought best calculated to assist the memory.'²⁰

In the 1740s and '50s lectures by Nathan Alcock²¹ and his successor John Smith,²² which were just as thorough as Hadley's, were being delivered at Oxford. In some ways Alcock's course was an interesting step away from the overt medical emphasis of the recipe-style chemistry.²³ It still contained a considerable amount of medical information, but cognisance of Newtonian theory and of the growing applications of chemistry were by no means forgotten. Alcock's critical faculties were also much in evidence, such as when he criticized existing definitions of chemistry.

Such characteristics can also be seen in the lectures of John Smith.²⁴ Helpful comments on the arrangement of his course demonstrate Smith's concern with teaching. For instance, the introduction to his section on mineral waters opened with the details on the manuscript see L. J. M. Coleby, 'John Hadley, fourth Professor of Chemistry in the University of Cambridge', *Ann. Sci.*, 1952, 8, 293–301. It is particularly interesting that Hadley should emphasize Macquer's work, for an English translation appeared in 1758. However, because of the scope of Hadley's lectures and the fact that they were first given fairly early in 1758, it is likely that he used the French version for compiling his lectures.

An outline of Hadley's course can be conveniently seen from his *A Plan of a Course of Chemical Lectures*, Cambridge, 1758.

¹⁹ Trinity College MS. R.I. 50–51, f.10.

²⁰ *Ibid.*, f.11.

²¹ Cf. *Some Memoirs of the Life of Dr. Nathan Alcock Lately Deceased*, [by Thomas Alcock], London, 1780.

It is of interest that Alcock had difficulties in commencing teaching in Oxford, apparently because he only possessed a Leyden M.D. The opposition was such that it led to rival lectures being delivered in chemistry by a Dr. Hughes. These, however, were reported to be 'wall-lectures, read mostly to naked walls as few attended' (cf. *ibid.*, pp. 9–13).

Alcock's predecessor as chemistry lecturer was probably Richard Frewin, but the only surviving information on this appears to be the comment made in 1710 by Zacharias Uffenbach that the 'present Professor of Chemistry, Richard Frewin, troubles himself very little about [the Laboratory]' (see W. H. Quarrell, and W. J. C. Quarrell, 'Oxford in 1710' from the *Travels of Zacharias Conrad von Uffenbach*, Oxford, 1928, p. 38).

This same Frewin led the opposition to Alcock and was generally antagonistic to physicians with Continental degrees, for on one occasion he entered into an agreement with three other doctors 'not to consult with any of the profession who have not taken a degree either at Oxford or Cambridge'. (See R. Russel, *A Letter to Mr. Thomas Bigg, Late Surgeon of St. Bartholomew's Hospital*, London, 1751, p. 24).

²² For evidence that Smith followed Alcock see Alcock, *op. cit.* (fn. 21), pp. 28–29.

²³ Unfortunately, no copy of Alcock's lectures bearing his name has been recorded, but one set of notes of 41 lectures, 'begun May 21st 1750', can be assumed to be taken from Alcock. The notes are entitled ('A course of lectures in chemistry' and bear the name and address, 'I. Wickham, CCC Oxon' (Wellcome Institute of the History of Medicine MS. 939).

Internal evidence in the lectures (such as the discussion of Oxford mineral waters designated 'in this place') makes it clear that they were delivered in Oxford while Alcock was lecturing. That they follow the same pattern as lectures by Alcock's student and successor, Dr. Smith, is further suggestive evidence that they were delivered by Alcock.

A second Wellcome Institute MS. (no. 140) is apparently a shorter version of Alcock's lectures, probably taken from another course.

²⁴ See Bodleian Library MSS. Add. A 302–304. The chemistry lectures follow on after a course of anatomy lectures delivered by Smith, the MS. being entitled, 'Anatomical lectures just as they were taken at a course read by Dr. Smith of St. Mary Hall, Oxford, in the laboratory there 1759'. The MS. also bears the name and address 'Geo Wingfield Coll. Mert. Oxon'.

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remark: 'in the first part of this course we gave an account of water in general, we now proceed to mineral waters, which have been deferred till we were acquainted with the ingredients of which they were composed'.²⁵

Only by a thorough reading of the manuscript lecture notes mentioned above can the conscientiousness of the lecturers be fully appreciated, though a good indication is the large number of practical demonstrations generally included in the course. For instance, Crawford had 142, Hadley over 500, and Smith 49, plus 41 others entitled 'curious chemical experiments'.

WILLIAM CULLEN'S TEACHING

Bearing in mind the above courses, Cullen's sharply critical mind and thoughtful system-building lose much of their impact. However, what pinpoints Cullen's originality is his much sharper criticism and, especially, the much greater thought devoted to the arrangement of his material. This is shown by many novel features.

The bulk of his chemistry course was the long section on 'the chemical history of bodies'. Substances were considered according to their sensory and physical characters and not divided into the traditional groups of animal, vegetable and fossil, largely because such a classification did not provide memory aids: 'the [three] tribes do not illustrate each other at all. Thus the fossil kingdom has no connection with the animal, nor are we able to draw any conclusions in the fossil from what we have observed in the animal kingdom, and indeed the chemists seem to have been aware of this, some of them begin with one tribe, some with another. Thus Macquiere [Macquer] has absurdly begun with the fossil kingdom, which is the most difficult of all the three as being the least understood'.²⁶

The other main section of Cullen's course was a general one on the 'operations and instruments of chemistry'. This also provides novel features, underlining his radical thoughts on organizing material. Particularly interesting is the way he grouped a large number of chemical and pharmaceutical processes—maceration, infusion, decoction, digestion, circulation, deliquescence, fusion, evaporation, ustulation, distillation and sublimation—under three headings, namely, solution, fusion and evaporation (or exhalation as he was calling it in the 1760s). He wrote: 'All chemical writers have refer'd the changes of the qualities of bodies to combination and separation. They commonly proceed to divide their operations as belonging to one or other of these heads, but they have done this from effect, w^{ch} is by no means convenient to our purpose, as we want to learn the different modes or enchoiosis [methods of manipulation] of chemistry, as well as to show what operations are to be refer'd to combination and what to separation'.²⁷

²⁵ *Ibid.*, Add. A 304, f.118.

²⁶ Quoted from a manuscript in the possession of Dr. W. A. Smeaton, f.160. This is a copy of original student notes, and almost identical copies are available in public collections (e.g., Wellcome Institute of the History of Medicine MSS. 3456, 3731, and 4674). The manuscripts are of lectures which can be dated c. 1757. Reasons include the fact that the French version of Macquer's *Elémens de Chymie* is referred to (the English version appeared in 1758), that Wellcome MS. 4674 also includes notes from Cullen's lectures on fevers dated 1757, and that the manuscripts are similar to one in the Royal College of Physicians of Edinburgh (MS. Cc 9.9), dated 1757–58.

²⁷ London Medical Society MS. 79A, f.86. This manuscript of Cullen's lectures is exceptionally complete, containing details not found in any other manuscript examined. It is probably post-1760, for it contains a section on aerial bodies found only in manuscripts of the 1760s, e.g. London Medical Society MS. 49, dated 15 November 1762.

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Cullen rationalized his arrangement on the grounds that the three operations brought about a fluid state—the only situation under which attraction could take place. Cullen utilized the Newtonian idea of attraction in the hope of rationalizing (and bringing order) to chemistry, though he realized its limitations.²⁸ He seems to have been happier when dealing with practical aspects of chemistry and in this he did not forget the practical needs of his medical-student audiences. For instance, he coined a useful phrase ‘imperfect solution’ to cover, as he put it, instances when the ‘assistances of solution such as heat [and] agitation’ have to be avoided. As examples he chose bitter infusions, where continued heat could make ‘harsh and disagreeable’ preparations.²⁹

A particularly conspicuous feature of Cullen’s lectures was biting criticism, often based on his own experience. For instance, he examined La Garaye’s researches suggesting that agitation was as effective an extraction process as hot solvents. La Garaye claimed that he could prepare first-class tinctures by means of a specially constructed agitating machine, which Cullen said resembled a chocolate mill. Cullen however, supported Geoffroy’s view that no advantage was to be gained from this method: ‘from my own experiments [Cullen said] I find we have no advantages accruing from this machine, w^{ch} are worth its being introduced into the chemical apparatus’.³⁰

Cullen placed tremendous stress on experiment and observation, and his remarks in the introductory materia medica lecture (see below) on the need to handle drugs frequently are sensible and very much in keeping with his general outlook. In fact, looking at his materia medica lectures in the light of his considerable experience in teaching chemistry, one sees that they reflect the same characteristics of vigour and thoughtful planning. Because of this it is readily understandable why a pirated version of the materia medica lectures should appear. Equally, the unsatisfactory nature of the pirated edition—not least the gross condensation of the explanatory introduction—makes it regrettable that Cullen did not bring out his own edition of the lectures during the 1760s. He was aged seventy-nine when the *Treatise of the Materia Medica* appeared, and there were many comments critical of its style and language.³¹ Thus the following introduction is not only valuable preliminary reading to the published lectures, but provides a valuable reminder of Cullen’s fame as a teacher.

CULLEN’S INTRODUCTION TO HIS 1761 MATERIA MEDICA COURSE

The following introduction is taken from London Medical Society MS. 22A (now deposited in the Wellcome Institute), entitled ‘A Course of Lectures on the Materia Medica by Doctor William Cullen, P.M./ in the/ University of Edinburgh/ taken, and/ Reduced to order by/ Edward Low, A.B.T.C.D./ Begun VII January MDCCLXI’. Full details of the manuscript can be found in W. R. Dawson, *Manuscripta Medica*, London, 1932, pp. 31–33.

²⁸ Cf. London Medical Society MS. 79A, ff. 70–111.

²⁹ Smeaton MS. op. cit. (fn. 26), f. 75.

³⁰ London Medical Society MS. 79A, f.135. Comte de la Garaye published his work in *Chymie Hydraulique*, Paris, 1746.

³¹ Cf. Thomson, op. cit. (fn. 1), vol. II, pp. 529–32.

The introduction is reproduced verbatim.

Materia Medica is defin'd a Treatise of the Properties of the particular subjects that enter into diet or medicine, which may be reduced to three heads viz. Dietetic, Churgic and Pharmaceutic, but this is not universal as the subject of one frequently enters another, I design therefore to deliver it under four heads

- 1st. What relates to the particular knowledge of the subject.
- 2^y. Its virtue in diet and medicine.
- 3^{ly}. The Foundation as far as we know of their medical and chymical properties.
- 4^{ly}. What relates to fitting them for medical uses, and the variety under which they appear.

First these subjects are twofold, Native and Artificial. The knowledge of the native is to be had from natural history. The canon which Lynaus [Linnaeus] prefixes to his *materia medica*, on account of its use is universally established. To distinguish bodies it is necessary to have a frequent acquaintance with, and handling of them, but even this is insufficient without an accurate description. The description however must be defective as it requires a knowledge of all the Productions of nature, which no person can arrive at—on this account writers are induced to class these subjects into genera and species, as the only method of arriving at a distinct knowledge of them. The extent to which a Physician should carry his knowledge of natural history is hard to determine. To enter into the minutest is incompatible with his Profession. A knowledge of the method here follow'd, with the characteristics and names is absolutely necessary, and affords great entertainment to Travelers, as by being acquainted with the name they are enabled to know, by the class, its properties, and are thus enabled to form a *materia medica* to themselves. Students are generally deterr'd from this study by the embarrassment of uncouth terms, yet in fact they are easily understood from having constantly the Idea of some particular property in the subject annex'd to them. To the knowledge of plants it is necessary to be acquainted with the name most universally allowed, that which Caspar Bohine [Bauhin] gives is preferable, because it is a Key to all the rest, who generally refer you to the best system as Tournefort, by whom you are directed to John Bohine who best described it, and to the best Paintings and Copper-plates. Lynaus has observ'd nearly the same method which I design to follow, except where the subjects are mention'd in the London Dispensatory. A further discussion whether any particular plant was known to the Ancients by the modern name is altogether superfluous, as a perfect knowledge in Botany, which my hearers are not suppos'd to have, is required for this purpose. I shall therefore consider them in their recent state, and as collected by the Apothecary.

Secondly I shall speak of them in their artificial state and the changes they undergo both in collecting and preserving, which is best proven by a frequent viewing and handling of them. Under this head I shall also speak of the method of detecting their corruptions and adulterations. Under my second general head I shall speak of their particular Virtues in Diet and medicine, which is the most important part of our Plan, and which has been treated of by authors in two different ways, viz. as adapted to particular Indications or as remedies to particular diseases, viz. as Astringents, Emollients &c. which is attended with Fallacy and uncertainty, as the particular Indications to which they are adapted are not mention'd, as Antihysterics &c. If this method is allowable it is only in specifics where the manner of their operating is unknown, with this restriction that the Indications requiring their application be specified. This is illustrated by a story of Cappifactius who acquir'd great Fame in Germany by his suppos'd knowledge of secret Remedies, and who undeceived those that solicited him for his secret by saying 'Si teneas methodum habebas mea secreta'. Dr. Pitcairn in one of his Treatises lays it down as a maxim 'Dato morbo invenies Remedium'. This observation was well founded, yet is not to be us'd in so extensive a sense as it was by the Doctor. Writers generally give you the Indications to which the several Subjects are suited. This Lynaus does under the head of Vires, but by using Specific Indications they are subject to Fallacy, such are Vuln'. Narcotic, &c. for depending on our theoretical Pathology, which is still imperfect, this too must be uncertain. I mean to obviate the Fallacys that proceed therefrom, and explain the difficulties that may arise.

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To fix a regular Plan for these lectures is extremely difficult, on account of the variety of methods with which different authors have treated this subject. There are four Books which seem best calculated for assisting the student, tho' each follows a different method. The first is the Dispensatory published by Lewis who classes the subjects according to alphabetical order, on which account it is impossible to retain an accurate notion of their Properties. The second is published by Geoffroy who, more methodically divides the subject into three Kingdoms as the Mineral, Vegetable, and Animal, then proceeds to a subdivision of them into Exotics &c. which are succeeded by further subdivisions into particular Plants and parts us'd in medicine, as Gumms, Inspissated Juices, Barks &c. which is attended with the same inconveniency as the Former. The Third is Lynaus's *materia medica* in which he has followed the Botanical order, because Plants of the same order in his book have often the same medical virtues. The Fourth is Carthusia which is in many aspects the best Book, being vastly more instructive on account of his reducing them into such classes that their Qualities mutually illustrate one another, yet even this is defective for the sensible Properties do not allways correspond with the medical: This method is also followed by Lewis in his commentary on Newman [Neuman]. But Showel [Chomel] a French writer is to be followed, because he classes the subjects according to the particular Indication, and by him we are instructed in the Plan which we intend to follow.

We now come to our second head, i.e. the Virtues of Medicines, and in order to be acquainted with this if we have recourse to the Writers on this subject we find them extremely fallacious, their writings being nothing but compilations from bad sources, generally indeed from the ancients, in whose favour we are apt to be too much prejudiced from a superstitious Veneration, as it were, and fondness for antiquity. In matters of genius they may perhaps have equat'd if not excelled the moderns; in matters where judgment is necessary they must fall short, not having the experience and number of Facts which the moderns have to direct them. In some parts of Learning, such as Oratory and Poetry they may be allowed their Excellence. As we freely condemn those who wrote on this subject 200 years ago why may we not with greater Freedom condemn those who wrote 2,000 years ago, & the more so as their notions of the *materia medica* turn'd upon Trifling Theorys such as their classing medicines according to their cardinal Qualities as hot or cold, in the first, second, third Degree &c. and besides this with respect to their notions of antidotes, in which our Knowledge is very shallow and uncertain, hence appears their too great credulity. Their Ignorance sufficiently appears from the great number of useless medicines which enter their compositions, for 'Qui longa medicamentorum Formâ uti tue aut Dolo aut Ignorantiâ peccat'.

Their ignorance of the true virtues of the medicines they prescrib'd, and our Inability to ascertain what they were, prevent us from drawing any thing usefull out of their compilations, nor are they safely to be trusted because of the crafts and Frauds they introduc'd into the Practice of medicine. To them we are abliged for the Talismanes amicolets, and even since the restauration of Letters we have been greatly deceiv'd by the Doctrine of Signatures, when John Batista Piorta [Porta], a man of reputation in his age wrote a whole Treatise consisting of little else than the Signatures, i.e. the reference of Plants to particular parts of the Body on account of their shape or colour, some of his Remedies are to this day retain'd in our *materia medica*, the Orach and satyrion, from their shape being like the Privities of the human body, are esteem'd great excitors to Venery. And so the Carcuma [Curcuma] and Crocus from their colour are esteemed in the Jaundice. Astrology likewise bore a part in this Deception, for imagining that a Plant from its flourishing during the sun's continuing in any particular house acquir'd a particular virtue in curing Diseases of that part of the Body over which the sign had its astrological Influence. Soon after the Restauration of Letters Chymistry allso appear'd but the Folly and obstinacy of its first Professors prevented those advantages which might be expected from it. They pushed the medic[ines] which they discover'd to most extravagant Lengths, and with a most obstinate Prejudice condemned the simple medicines of their predecessors, so that to this day it is hard to determine which they recommended from experience, and which from Prejudice and Fraud. It is certainly difficult to investigate the Qualities of substances a priori, hence it is that Virtues built only on Theory

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must tend to Fallacy, Experience which shou'd seem the surest guide is allmost equally deficient, for each writer, from a desire of pushing a favourite Position does not hesitate to recite a false history. It is further unsafe to rely on these writers as a guide, both on account of the Ignorance of the Practitioners and the application of the medicines, for by mistaking the Disease, such as a flatulent stitch for a Pleurisy, or the real cause to which the cure was to be attributed, never considering external circumstances such as Air, Diet, Season of the year, or the assistance of Nature, for it is a maxim in Logic 'Fallacia causa pro non causa'.

As an Instance of this, How many and how great things were attributed to medicines which we find to be inert in the human constitution, and some of which we are still superstitiously tenacious of. Is it not surprising that the Academy of Bologna should continue to dispute for these last twenty years about the Existence of medical virtues in precious Stones, and even amongst us Crude Mercury, from the Recommendation of Dr. Dover, was universally exhibited, notwithstanding it appears incapable of producing any change in that state. Tarr Water, if we were to credit the Testimony of numbers in favour of it, we shou'd esteem a Panacea, of which however we shall shew it falls vastly short, which we may infer from it being now rejected allmost universally from Practice. Collections of cases, however instructive they may appear, are apt to deceive. Sydenham condemn'd their use, and avoided this Inconveniency by giving only the general result, and sometimes his own observations. Many such cases have not been founded on Facts and to my knowledge have been written merely to obtain reputation, and this too by men of Eminence, whom prejudice for maintaining a favourite Error has induced to persist against their judgment. Hence it appears that compilations in the materia medica from these sources are apt to laid us astray, of which, in the course of these Lectures I shall give you frequent Instances, to the end that you may read with proper caution, and I hope I shall be excused if on this account I compile less and give more on my own experience, which I am inclin'd to do for 'Melius panca scire quam mutta opinari'.

I shall now proceed to our third head, the consideration of Qualities. To investigate the knowledge of these Qualities a priori is practicable only in a very few substances, in some however we may proceed to certain lengths taking the sensible Qualities for our guide. This was first attempted by Sir John Floyer of Litchfield in his *Pharmacologia Basiliensis* or *Lapis Lydius*, in which work many excellent hints are to be met with notwithstanding his many prejudices. After him Lynaus deserves to be most attended to, who attempts a system and is only faulty in endeavouring to extend it too far. The sensible Qualities alone are not to be trusted, the colour is fallacious, the smell more to be depended on, The Taste more certain but less extensive. We shall consider their sensible Qualities and along with them give their Chymical Analysis, but not in the ordinary way, which is to little Purpose, but such an analysis as separates the parts without altering the Qualities, and gives those separate in which the medical virtues are suppos'd to reside, such as the Gums, Resins &c. The End of our operations on these substances is to gain their more efficacious parts, and to reject such as are useless and Poisonous. Under the fourth general head I am to mention the Pharmaceutical Treatment of these Substances, in doing which I shall in a great measure follow the system of Lynous who delivers it under four Distinct heads, First the knowledge of the Substance. Secondly its Qualities. Thirdly its virtues as suited to particular Indications, and Fourthly its uses, that is the Disease to which it is adapted. But under this 4th Head I shall deliver the pharmaceutical Treatment, tho' I cannot here properly enter upon it, as it is inseparably connected with Chymistry, yet I shall mention to you, in treating of each subject, the composition of the Shops into which it enters, and as a further Illustration, I shall mention how and why this substance makes a part of extemporaneous prescription, I shall besides give you the *Methodus prescribendi* with the general Rules for Composition and Doses.

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