

CHAPTER II

Development of Bibliographic Technique in the Seventeenth Century

MEDICAL bibliography has, of course, always been affected by the events around it. Although the seventeenth century was one "of bitter political dissensions, religious wars and ever-recurring turmoil of many kinds throughout Europe,"¹ it was also a century of great intellectual achievements; the age which produced the most mature works of Shakespeare; which gave us Milton's *Paradise Lost* and *Areopagitica* in literature, Lully and Purcell in music, Rembrandt and Breughel in art, and Boyle, Newton, and Wren in science. It was the seventeenth century which saw the Great Plague and the London Fire, the revocation of the Edict of Nantes, the beheading of Charles I of England and the restoration of his son to the throne, the political struggles of Richelieu and Mazarin, the excesses of both the Stuarts and the Puritans. Perhaps nothing is more typical of the confused character of the age than the traditional portrait of William Harvey, tutor to Charles II as well as discoverer of the circulation of the blood, reading a scientific treatise under

¹ Walsh, J. J. Seventeenth Century. (In: Encyclopedia Americana. N. Y., Encyclopedia Americana, 1925, v. 24: 613)

a tree while a battle between the Royalists and Roundheads rages nearby.

In medicine, also, the seventeenth century was a period both of turmoil and of great advances. In the hands of Leeuwenhoeck and Harvey, methods of experimentation began to be worked out; under Sydenham and Boerhaave clinical medicine again oriented itself toward the patient. Bedside teaching, chemistry, and pathological anatomy began to be a part of medical education. Coincidental with this change in medical education came an expansion of medical literature which resulted in more elaborate schemes of bibliography than had been published previously.

Of the many medical bibliographies printed in the seventeenth century, probably only three made important advances in the science of bibliography; these were the lists of Linden, Lipenius, and Beughem. All of them were better constructed than earlier works, but were in turn overshadowed by the work of the bibliographers of the next century.

J. A. VAN DER LINDEN

(1609-1664)

Joannes Antonides (Jean-Antonide, Johannes Antonides) van der Linden was the compiler of the most complete bibliography of medicine published up to his time. Born at Enkhuizen, Holland, on the shore of the Zuider Zee in 1609, the son of a well-known physician, theologian, litterateur, and rector of the University, Linden studied at Enkhuizen and at Leiden, from which place he received

his medical degree in 1629.² After practicing medicine with his father in Amsterdam for a few years, Linden accepted the position of professor of medicine at Franeker, where it is said he reorganized the botanical gardens and the medical library.³ Later he was offered posts at both the University of Utrecht and the University of Leiden; choosing the latter, he remained in Leiden until his death in 1664. While there, Linden published works on the circulation of the blood, plague, and human physiology, as well as preparing new editions of Celsus and Hippocrates.

Linden's bibliographic work, his *De scriptis medicis* (Amsterdam, Blaev, 1637), is a list of medical writings arranged alphabetically by the first name of the author, with indexes of surnames and subjects. The work passed through several editions while Linden was still alive,⁴ and it was reissued in an enlarged form by Georg Abraham Mercklin⁵ after Linden's death in a revision which corrected some of the errors of the earlier editions and added biographical sketches of a few of the authors listed. An innovation found in Mercklin's revision is the listing of a

² Hirsch, following G. C. B. Suringer (*Het geneeskundig Onderwijs van Albert Kyper en Johannes Antonides van der Linden. Bijdragen tot de Geschiednis van het geneeskundig Onderwijs aan de Leidsche Hoogeschool*, no. 6, Amsterdam, 1863), gives the date as 1630. See Hirsch, August, ed. *Biographisches Lexikon der hervorragenden Ärzte aller Zeiten und Völker*. 2. Aufl. Berlin, Urban, 1931, v. 3: 790.

³ Michaud, L. G., ed. *Biographie Universelle, Ancienne et Moderne* . . . Paris, Desplaces, 1819, v. 24: 509-511.

⁴ The three common editions are those of 1637, 1651, and 1662.

⁵ Mercklin, Georg Abraham. *Lindenius renovatus, sive . . . De scriptis medicis* . . . Nuremberg, Endterus, 1686.

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ber. In quo etiam affinium morborum selecta remedia extant. E
germanica in latinam linguam conversus à *Jacobo Sistro Passavensi*.
Passavia, apud Matthzum Nemmingerum, 1595, in 8.

BALTHASARIS EISLINGERI

De Peste curanda liber. in 4. loco & tempore impressionis
non expressis.

BALTHASARIS FABRICII

Opusculum Physiologum & Medicum, librisque tribus di-
stinctum; tractans accurate primo corporis humani temperamen-
ta, deinde compendiose sex res non naturales, Medicis ita dictas.
Cui ob materię cognitionem accessit appendicis loco Tracta-
tiuncula de literatorum tuenda, & restituenda valetudine. Amste-
lodami, apud Paul. Arn. à Raycsteyn, 1629, in 8.

BALTHASARIS HAN

Epistola ad Dan. Sennertum, miram veneficii historiam ex-
hibens. Extat cum lib. VI Practicę Medicinę ejusdem Sennerti.

BALTHASARIS ab HERDEN

Epistolę quardam Medicę extant cum Cista Medica Ioan-
nis Hornungi. Noribergę, apud Simonem Halbmayrum,
1625, in 4.

BALTHASARIS du HVAL

De Pestis curatione liber. Parisus, apud Claud. de Mon-
trocil, 1583, in 8.

BALTHASARIS PISANELLI

De Esculentorum potulentorumque facultatibus liber
unus, Italice scriptus, & latine conversus ab *Arnoldo Freitagio*. Her-
bornę, apud Christoph. Corvinum, 1593, in 8. Genevę, apud
Phil. Alberti, in 16.

BALTHASARIS KLEIN

Epistola de ligno in Armenium lapidem converso, habetur
lib. III Epistol. Matthioli, pag. 406.

BALTHASARIS SCHEIDERI

Consilia & Epistola insignis Medica extant eo in opere
quod Laurentius Scholzius edidit Francof. apud Andr. Wecheli
hæredes, 1598, in fol.

BALTHASARIS SCHULTII

Consilium Medicum, pro curanda valetudine. Witebergę,
apud Clementem Bergerum, 1606, in 12.

BALTHASARIS SIMONIS, *Smalcaldani*

De *Οργανοζεις Στοιχειων* Disputatio. Extat Decade VI Dispu-
tat. quas collegit & edidit Basileę, Ioa. Iac. Genathius, 1622, in 4.

BAPTISTÆ CODRONCHII, *Imolensis*

De Christiana & tuta medendi ratione libri duo, varia do-
ctrina referti. Cum tractatu de Baccis Orientalibus, & Antimo-
nio. Ferrarię, 1591, in 4. Bononiz, apud Clementem Ferronium,
1629, in 4.

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few articles from the publications of learned societies. Manget also included some of Linden's text in his work.⁶

In spite of the large number of references contained in this work, it has been criticised for what it omitted.⁷ It is, moreover, the first medical bibliography which resembles a modern work of similar content (see Figure 3). Authors' names are placed on a line separate from the rest of the citation and are printed in capitals with spaces between the letters. Both the given names and the surnames appear in the genitive case of the Latinized form, although occasionally a surname like Klein will defy any attempt to make a genitive of it. Where this occurs, the author has wisely allowed the original form of the name to remain. In this Linden is in advance of his times, for even later bibliographies resorted to Latinizing vernacular names as, for example, Lipenius, who lists Jacob Vogel as *Jacobus Aviensis*.

For each book Linden gives the full title, the place of publication, the publisher, the date of publication, and the size of the volume. In cases where there are different editions of the same work, the imprint of each is listed. The names of editors, translators, commentators, and the like are noted in italics in the body of the citation. Cross references are made from forms of names not used to forms that are used, and non-Roman alphabets (especially the

⁶ Manget, Johann Jacob. *Bibliotheca scriptorum medicorum, veterum et recentiorum* . . . Geneva, Perachon, 1731. 2v.

⁷ "C'est une bibliographie médicale très-incomplète, même pour le temps où elle a paru, et qui n'est point exempte d'erreurs. Mais elle n'en a pas moins été fort utile à ceux qui ont travaillé depuis sur le même sujet." Weiss. (In: Michaud. *Op. cit.*, 24: 551-552.)

Greek alphabet) are printed in the original form, not transliterated. Altogether, the *De scriptis medicis* shows a new grasp of the potentialities of the printing press not found in earlier bibliographies. This is especially noticeable in its methods for setting off important matter from the less important, by the use of different type faces, by leading between lines and spacing between letters, and by variations in form of type (bold-face and italics, for example). Because Linden considered important many of the things which we consider important today, the work has a decidedly modern look about it.

In purely bibliographic details, also, Linden's bibliography resembles modern ones. Linden was faced with the problem of indicating several things in one volume; especially 1) who was the author of a work, 2) what variations existed of an author's name, 3) what works had been published on a particular subject, and 4) all the information necessary to identify fully the particular title. He solved this problem in a way which bibliographers have been using ever since: he listed the titles in his bibliography under the name of the author (typographically the author's name is the most prominent feature of the *De scriptis medicis*), he provided an index of references from forms of names not used to forms that were used, he gave a second index of subjects covered, and he placed the imprint (place of publication, name of publisher, and date of publication) as a final unit.

In general this is the scheme still used today; the one major change is in the use of surnames instead of given names for alphabetization. This change is due, of course,

to the fact that Christian names have almost disappeared as identifying marks in our culture, as family names have become more stabilized. The problem of how to list authors is important in any bibliographic work and the method of entering authors in a list has changed from time to time with changes in the customs of naming people.

The use of family names became common in different parts of Europe at different times. Originally Roman names were made of three parts—the praenomen, the gens name (or nomen), and the cognomen—which might be compared loosely to the given name, the family name, and the designatory name. Sometimes an agnomen, or descriptive name of the individual, was also added. Examples of this are Fabius who was known as Cunctator, the Delayer, because of his tactics in the Second Punic War; or Scipio, whose agnomen, Africanus, celebrated his deeds in Africa. In more northerly, barbaric lands the usual form of the name was merely the given name. At a later date names designating descent (Johnson, the son of John), or place of origin (John of Gaddesden), or profession (Taylor, Smith), or personal attribute (Longfellow) were added to the given name to differentiate individuals with the same given name. The whole matter of names is further complicated by the practice of the Christian church of bestowing another name upon a person at baptism.

We are told that surnames were introduced into England by the Normans after the invasion, and this implies that they must have been known and used in Normandy before 1066. In England surnames became a distinguishing mark of the nobility and those attached to the conquerors,

from whom they were gradually taken over by the conquered.⁸ Isaac Taylor notes⁹ that surnames were common in the south of England in the twelfth century but were not in general use in some parts of Wales and Scotland until the nineteenth century. Although introduced 300 years earlier, it was not until the fourteenth century that surnames became family names handed down from father to son.¹⁰

Although presumably family names were used in Normandy before the time of the conquest of England and were common in England by the end of the fourteenth century (cf. Geoffrey Chaucer, Roger Bacon, Robert Grosseteste), they were not widespread or standardized; as a result, bibliographies up to the seventeenth century listed authors by given names. It is interesting to compare lists of names made at that time for other purposes—for example, lists of citizens for jury duty, taxable persons, army, navy, or church registers. Many of these lists probably were arranged geographically or chronologically because of their intricate nature,¹¹ but a certain percentage

⁸ Niel Steensen (Niel, the son of Steen Nielsen) in seventeenth century Denmark, for example, was not aristocratic enough to have a surname; he signed his works by the Latinized form of his name—Nicholaus Stenonis—from which he is now known as Steno.

⁹ Notes and Queries, 103: 98, 1901.

¹⁰ *Ibid.* 7: 489, 1853. A good discussion of this development appears, surprisingly enough, in the book by T. W. Peck and K. D. Wilkinson, *William Withering of Birmingham*. Bristol, Wright, 1950, p. 19-24.

¹¹ For example, the Domesday book, which is arranged geographically by hundreds, and church registers which are usually arranged chronologically.

must have had no such logic and they must have been listed by an artificial system, perhaps alphabetic. It seems reasonable to conjecture that the use of surnames for listing individuals probably spread gradually many years after the family names themselves had become an integral part of the name, since for a long period of time surnames for the same individual varied greatly,¹² and the Latin form of the Christian name was probably the only stable factor.

In the field of medical bibliography, the change to surnames occurred during the seventeenth century; the first bibliography of the century listed authors by Christian names with a separate index of surnames, while the later lists of the century arranged the authors alphabetically by family name, even though the names themselves were still printed with the given name first.¹³

¹² Compare, for example, Paracelsus (or Hohenheim), Schwarzerd (or Melanchthon), Estienne (or Stephanus), Sylvius (or Wood or Bosch).

¹³ See, however, A. Maunsell, who in his *First Part of the Catalogue of English Printed Bookes* . . . (London, Maunsell, 1595), speaks slightly of Gesner and Bale for alphabetizing according to the author's Christian name instead of his surname. Also compare Sir Thomas Bodley's injunction to James, his first librarian, "I did alwaies wishe that in the setting downe of an autor's title, you would place his surname first." The first catalog of the Bodleian library (1605), however, did not adopt this radical procedure, and it was not until the publication of the second catalog of that library in 1620 that any general library catalog was arranged in alphabetical order of the authors' surnames. A discussion of this point is found in D. M. Norris, *A History of Cataloging and Cataloging Methods, 1100-1850* . . . London, Grafton, 1939.

MARTINUS LIPENIUS

(1630-1692)

The first large, well-printed bibliography of medicine appeared in the seventeenth century with Martinus Lipenius (Martin Lipen) of Germany as compiler. Lipenius, like Linden, Brunfels, and Spach was a part of the academic world; like the other bibliographers—Spach, Gesner, and Beughem—he compiled a number of bibliographies on a wide range of subjects.

Lipenius was born in Wittemberg on November 11, 1630, and studied theology at the university there, becoming professor at an early age. He is said to have refused other posts with the statement that he preferred the academic atmosphere and a life of study, but in 1659 he was finally persuaded to leave the University of Wittemberg to become co-rector of the Gymnasium at Halle. Here he remained for another thirteen years before leaving Halle to take up his position as professor and rector at the Gymnasium at Stettin. A few years before his death, which occurred on November 6, 1692, he resigned from his duties at Stettin to go to Lubeck as co-rector. There he suffered a nervous breakdown and had to be confined to a hospital for some years.¹⁴

Lipenius' medical work *Bibliotheca realis medica*¹⁵ was

¹⁴ Michaud. *Op. cit.*, 24: 584-585. Also, Poggendorff, Johann Christian. Poggendorff's Biographisch-literarisches Handwörterbuch zur Geschichte der exacten Wissenschaften. Leipzig, Barth, 1863. 6. Bd.

¹⁵ Lipenius, Martinus. *Bibliotheca realis medica* . . . Frankfurt am Main, Friederic, 1679.

APO APP

APOSTEMATATA PESTIFERA,
vid. Bubo pestil.

APOTHECARIA, vid. Pharmacopœa.

Heftische Apotheker Ordnung. Bieffen f.
1670.

Quirin. de Augustis edidit Minus Lumen Apo-
thecariorum, quod recognitum *Nic.*
Mutonus unâ cum Majori & The-
fauro Aromatariorum divulgavit.
Venet. f. 1556.

Nic. Prapofiti Dispensatorium ad Aroma-
tarios, f. Introductiones in artem
Apothecariatus. *Parif. 4.* 1582.

APPARATUS MEDICUS.

Io. Bapt. Donatii Apparatus Medicus. *Lugd.*
8. 1566.

APPARATUS MEDICAMENTORUM.

Io. Lud. Bertaldi Apparatus Medicamento-
rum. *Taurini 4.* 1611. 1614.

Io. Georg. Macafii Promptuarium Materie Me-
dicæ f. Apparatus ad Praxin. *Fran-
cof.* 8. 1654. *Vlm.* 1676.

APPARATUS PLANTARIUS.

Pet. Laurebergii, Rostochiens. Apparatus
Plantarius in II. Lib. tribuus. *Fran-
cof.* 4. 1632. 1654.

APPETITUS.

Ioh. Bohm de Appetitu, Resp. *Ioan. Auguſt.
Hermanno.* *Lipf.* 4. 1668.

Jac. Ifraelis de Appetitu ejusq; variè affe-
cti Speciebus, Resp. *Io. Conr. Stettero.*
Heidelb. 4. 1668.

APPETITIVA FACULTAS.

Cof. Cremonini, Centenf. Itali Tract. III. I. de
Sensibus externis, 2. internis, 3. Fa-
cultate Appetitiva. *Venet.* 4. 1644.

APPETENTIA CANINA.

Alart. Heſſ Disp. de Appetentiâ caninâ. Ex-
tat. Decade 1. Diſſp. collect. & edit.
à *Io. Jac. Genathio.* *Bafil.* 4. 1619.

APP AQU

APPROBATIO MEDICORUM,
vid. Medicor. Approb.

AQUA.

Mafes Alatinus Interpretatus est Galeni Com-
ment. in Hippocr. & Aere Aquis &c.

Adr. Alemani Liber Hippocratis de Aère
Aquis & Locis, Commentariis 4. il-
lustratus. *Parif.* 8. 1557.

Excerpta de Aquis & Balneis ex Pro-
blematibus Aristotelis extant pag.
470. *Operis Vineti de Balneis.*

Baccii Baldini Commentaria in Librum
Hippocratis de Aquis, Aère & Lo-
cis. *Florent.* 4. 1586.

Gaſp. Barholini de Aquis Libb. II. *Rofchof.*
12. 1618.

Vinc. Bellovacensis de Aquæ Proprietatibus,
Differentiis, Notis, extat T. I. Spec.
Natur. *Duaci f.* 1624.

Robert. Boyle Paradoxa Hydroſtatica novis
Experimentis evicta. *Oxon.* 12. 1669.
Rotrod. 12. 1670. Ext. in Opp. *Gene-
ve.* 4. 1677.

Hieron. Cardani in Hippocr. de Aère, Aquis
& locis Commentarii. *Bafil.* f. 1570.

Car. Claromontii de Aère locis & Aquis
tertæ Angl. *Londin.* 12. 1672.

H. v. m. Conringii de Aquis, Resp. *Hermanno
Concrdingio.* *Helmaſt.* 4. 1639.

Ioh. Coſſei de Aqua fontana ext. in Diſſer-
tat. Miſcel. *Pata.* 12. 1658.

Pet. Ioh. Fabri Hydrographia Spagyrica. *Toſoſe*
8. 1639.

Camilli Flavii Paraphraſis in Hippocratis Li-
brum de Aère, Aquis & Locis. *Venet.*
4. 1596.

Hier. Gardinii in Hippocratis Opus de Aère,
Aquis & Locis Commentarii. *Bafil.*
f. 1570.

Io. Bapt. Helmontii Tr. de Aqua ext. in Phyſic.
Init. Inaud. *Lugd. Gall.* f. 1667.

P. m.

Fig. 4. Lipenius, Martinus. Bibliotheca Realis Medica . . . 1679.

one of a large series of bibliographies which he compiled on various subjects; together they formed the *Bibliotheca realis universalis omnium materiarum, rerum et titulorum, in theologia, jurisprudentia, medicina, et philosophia*, which appeared from 1679 to 1685. It is arranged by subjects with authors listed alphabetically by surname under the subjects, although printed with given names first. (See Figure 4.) There is an index of all the authors, commentators, interpreters, compilers, and disputants cited in the book. Occasionally Lipenius identified an author by birthplace or by including his position after his name (e.g., "Pisan Prof. . ."), and now and then he furnished cross references from forms of names not used to forms which were used (e.g., "Sylvius cf Franç. de la Boe"). In addition, there were comparatively large numbers of cross references from subject headings not used to those under which the topic was dealt with (e.g., "Abdominis Paracentesis, vid. Paracentesis."). Altogether about eight thousand subjects and about twenty thousand authors were listed.

The problems with which Lipenius had to deal were: 1) how to include as much literature as possible, 2) how to list the literature so that the bibliography could be easily used, 3) how to keep costs down without sacrificing utility or ease. On the first point Lipenius was more successful than Linden; as a result he was able to include approximately twice as many authors as his predecessor. He was still not comprehensive in his coverage, however; although he analyzed some composite *Opera omnia* (e.g., "Mart. Rulandus in Hydriatrica, Sectione I. Dillingae 8. 1568"), he had not grasped the importance of the serial

publications of the learned societies springing up around him. This is not surprising in view of the fact that these publications were just coming into being,¹⁶ but Lipenius' omission of them helps to point up the alertness of Mercklin who only seven years later saw the value of society transactions and included them in his revision of Linden's bibliography.

On the second point, the arrangement of his material, Lipenius went far beyond his predecessors. He used large quarto pages which he divided into two columns, he placed letter guides at the head of each column to show what was included in each column (e.g., APO-APP), he printed the subjects in the middle of the column in upper case type, and he set off the authors' names from the rest of the citation by the use of italics. Typographically this is a rich looking, perhaps paper-wasting, but very easily used bibliography.

In addition to the ease of use due to the typography, Lipenius' *Bibliotheca realis medica* is also easy to use because of its numerous cross references from names and terms likely to be sought after vainly to those under which the names and terms usually appear. The "copious index of authors," about which he was so proud that he noted it on the title page, also makes for ease of consultation of the main bibliography.

As the first medical bibliography to use cross references

¹⁶ Sprat, Thomas. History of the Royal-Society of London. London, Martyn, 1667. See also McKie, Douglas. Scientific Societies to the End of the Eighteenth Century. Phil. Mag., July 1948, p. 133-143, and also Ornstein, Martha. Role of the Scientific Societies in the Seventeenth Century. Chicago, University of Chicago Press, 1938.

extensively, Lipenius' work is an advance over that of earlier bibliographers. The fact that it was more complete in its coverage of the medical literature of the time than any previous work made it important as a bibliography when it was published; this wide coverage also makes it necessary for it to be consulted occasionally even today. This attempt to include as much of the literature in the bibliography as was possible was not a new idea. Spach and Gesner attempted the same thing and if they had been able to tap the resources of their field with Lipenius' ease, they probably would have compiled just as comprehensive works as he did. The difference in the ease of compilation was a result of the extra hundred years of printing available to Lipenius. By his time a large percentage of the medical writers (represented by manuscripts in Gesner's time) had been printed and were available in public and private libraries; in addition, most new works were now printed instead of being circulated in manuscript form. And finally, general and national bibliographies, coming into being during this hundred years, provided easier ways of learning of new publications than had been available in Spach's time.

In order to determine how well Lipenius covered the medical monographic literature published from the beginning of printing to approximately the date of his work, it would be necessary to learn, if possible, the total number of medical works published during that period. With this figure in mind, it would then be possible to compare the twenty thousand authors listed in Lipenius with the possible total number of authors to whom he might have referred.

This is not so simple as it would seem at first glance. As pointed out in a previous chapter, there have been many estimates of the number of printed volumes issued at different periods, the most frequently used method being that of Peignot¹⁷ which is taken over in theory by Iwinski.¹⁸ Peignot, who did not claim to have worked out the method himself, used the actual counts of incunabula (1436-1536) made by students of the subject up to his time.¹⁹ For the period 1736-1822 he used catalogs of large libraries, national bibliographies, lists in literary journals, and the like. The figures for the intervening centuries were arrived at by use of an arithmetical progression by quarter centuries, with allowances for any political, economic, or social events which might have changed the normal progression. By the use of this certainly inexact method, it has been estimated that approximately 40,000 editions of incunabula were printed,²⁰ and that at least 617,000 editions were printed from the end of the incunabula period to 1636.

If we consider that we have determined the total output

¹⁷ Peignot. *Op. cit.*, p. vi ff, and his *Manuel du Bibliophile* . . . Dijon, Lagier, 1823, v. 1: 2 ff.

¹⁸ Iwinski. *Op. cit.*, but see also the earliest such calculations: de la Sarna Santander. *Dictionnaire Bibliographique Choisi du Quinzième Siècle* . . . Brussels, Farte, 1805, as well as the spurt of publications on the subject of which Paul Otlet's work (*La Statistique Internationale des Imprimés*. Bull. Inst. Internat. Bibliog. 1: 300-319, 1896) is a representative sample.

¹⁹ Peignot preferred to consider 1536, rather than the usual 1501, as the end of the incunabula period. This is immaterial here.

²⁰ Von Rath, E. (In: *Gesamtkatalog der Wiegendrucke*. Leipzig, Hiersemann, 1925-1940; v. 7: v, 1938.)

of the printing press to Lipenius' time in a rough way, the next problem is, of course, to determine how much of the total output was in the field of medicine.²¹ The best and most complete discussion of this subject appears to be that of Wilson,²² who has brought together much of the scattered literature of the subject; his conclusions are that probably 2 per cent of all manuscripts were on medicine; somewhere between 2.15 per cent and 2.5 per cent of the fifteenth century books were devoted to medicine; and anywhere from 3 to 5 per cent of the sixteenth century publications were medical. If his figures are correct, then 966 incunabula and 24,750 editions printed from 1501 to 1636 were medical in nature, making a total of 25,716 possible volumes to be listed by Lipenius.²³

It may be assumed, therefore, that there were 25,000 medical books to which Lipenius could have referred. He actually listed 20,000 authors. It would be pleasant to be able to say that Lipenius therefore referred to 80 per cent of the available literature for this would be an enormously successful bibliography, and a feat for which Lipenius

²¹ Iwinski. *Op. cit.*, p. 38-55, gives figures for the number of books published in certain subject fields in a few countries, but unfortunately only for the years 1868-1906.

²² Wilson, W. J. *A Plan for a Comprehensive Medico-historical Library*. Wash., Army Medical Library, 1949. [mimeo.]

²³ While the number of medical incunabula calculated here is in fairly close agreement with the figures of Klebs in *Osiris*, 4: 2-359, 1938, and Steele in *Library*, n.s., 16: 337-354, 1903, and Russell in *Bull. Hist. Med.*, 21: 922-958, 1947, the number of sixteenth century medical works calculated seems high. For the purposes of this argument, however, erring on the side of giving too many is better than erring on the side of not giving a large enough count.

would deserve the greatest credit and admiration. As a matter of fact, however, we have no data on which to base any guess as to the number of authors represented in these 25,000 volumes; they may have represented any number of authors, and the 20,000 authors cited in Lipenius might just as logically have been in any number of works. It would seem reasonable, however, to assume that 25,000 volumes contained the works of at least 50,000 authors (considering as well that many authors were prolific writers, that some works were collections of shorter pieces—as for example, collections of theses—and that many titles were published in more than one edition).

If we accept this assumption—and it is put forth only tentatively for want of any better method of arriving at the facts—then Lipenius, referring to 20,000 authors out of a possible 50,000, cited approximately 40 per cent of the total literature. This is a far more comprehensive coverage of the literature than had ever appeared before this date, and it explains in part the high esteem with which this work was held in its day and ever since.

CORNELIUS À BEUGHEM

(1678-1710)

The third group of bibliographies of medicine published in the seventeenth century, which had an influence on the development of medical bibliography, were those of Cornelius à Beughem (Cornelius van Beughem, Corneille de Beughem). Beughem was librarian of Emmerich in Germany, on the border of the Low Countries, and in this

profession he distinguished himself for the many bibliographies he compiled²⁴ and for his introduction of the term "incunabula," which he invented for use with his *Incunabula typographiae*, the first bibliography of fifteenth century publications.²⁵

The two medical bibliographies by Beughem were the *Bibliographia medica et physica novissima . . .* (Amsterdam, Jansson-Waesberg, 1681) and the *Syllabus recens exploratorum in re medica, physica, et chymica in miscellaneis medico-physicis naturae curiosorum Germaniae, Galliae, Daniae et Belgii . . .* (Amsterdam, Jansson-Waesberg, 1696). The first list is an author catalog of medical books published from 1651 to 1681; the second is an index to the articles published in the journals of the various learned societies which were just then becoming important.

The *Bibliographia*, although containing only works published from 1651 to 1681, lists many of the older writers, since a fair number of the ancients were being reprinted during this period. It is arranged alphabetically by the last name of the author, with appendices (like those of Paschalis Gallus) which present the authors by language. A trend toward the vernacular can be observed in the number of publications in French, Dutch, German, Italian, Spanish, and English. The subjects being considered by physicians of the seventeenth century as reflected in

²⁴ "Plein du goût et de zèle pour sa profession, il a publié sur la bibliographie de nombreux ouvrages dont on fait peu de cas aujourd'hui." Michaud. *Op. cit.*, v. 4: 236.

²⁵ Beughem, Cornelius à. *Incunabula typographiae . . .* Amsterdam, Walters, 1688.

Beughem's list have been analyzed by Thorndike.²⁶ This is the first medical bibliography we have encountered which is limited by a specified time span (the thirty years prior to its publication). It shows that the medical literature pouring off the printing presses was becoming so voluminous that some limitation in the field to be listed had to be made. Beughem probably chose to limit his bibliography according to the demands made upon him as a librarian—in other words, to produce a list of the most recent works which would bring an earlier bibliography (that of Moronus²⁷) up to date. Although the Beughem bibliography has been criticized by Jourdan as a “production très médiocre, fort incomplète, et remplie d’erreurs,”²⁸ it is probably as complete (about 2,000 writers) and as accurate as was possible at that time. Its main importance is that it is the first work to break down the overwhelmingly large production of medical works into easily digested portions by a time span.

On the other hand, Beughem's other work, his *Syllabus recens exploratorum in re medica . . .*,²⁹ is valuable because

²⁶ Thorndike, Lynn. Another Glimpse of Medicine in the Seventeenth Century: Beughem's Bibliography. *Ann. Med. Hist.*, n.s., 6: 219-223, 1934.

²⁷ Moronus, Matthias. *Directorium medico-practicum; sive Praeternaturalium affectuum . . .* Lyons, Huguetau, 1647. This is a list of medical writers, emphasizing contemporaries, arranged by subjects and preceded by a list of authors and their publications. It was meant for practitioners and students of medicine who wished to keep up with the current literature.

²⁸ Jourdan, A. J. L., ed. *Biographie Médicale*. Paris, Panckoucke, 1820, v. 2: 222.

²⁹ Beughem, Cornelius à. *Syllabus recens exploratorum in re medica*,

it is the first substantial indication of the importance for medicine of periodical literature, especially the transactions of learned societies. Societies of scientists and "natural philosophers" had existed in Europe as early as the middle of the sixteenth century when the *Academia Secretorum Naturae* was established in Naples; but this particular society was short-lived, and it was not until 1603, with the foundation of the *Accademia dei Lincei* in Rome, that a viable European scientific society was formed.³⁰ The first scientific society founded by a physician was the *Collegium Naturae Curiosorum*, established in 1652, which received official protection and recognition from the Emperor Leopold in 1672, and in honor of that event changed its title to the *Academia Caesareo-Leopoldina Naturae Curiosorum*. This society was founded by Johann Lorenz Bausch, town physician of Schweinfurt,³¹

physica et chymica . . . Amsterdam, Jansson-Waesberg, 1696. It is interesting to compare this work with Reuss' *Repertorium* . . . of a century later. (*Repertorium commentationum a societatibus litterarii editarum* . . . (Reuss) Göttingen, Dieterich, 1801-1821. 16v). The latter work is a list of the papers submitted to the various learned societies, arranged in subject-classified groups. Each volume contains an author index, and for each citation Reuss prints the author's name (with the given name first), the title of the article, the name of the periodical in which it was published, the year, and the first page of the article. Although Beughem's work is not as complete as Reuss' six medical volumes, it was, nevertheless, far in advance of its times; indeed, Reuss may be said to be a direct descendant of Beughem, bibliographically speaking.

³⁰ Thornton. *Op. cit.*, p. 131-144. See also Ornstein. *Op. cit.* and McKie, Douglas. *Scientific Societies to the End of the Eighteenth Century. Op. cit.*

³¹ *Ibid.*

with the avowed purpose of investigating the scientific basis of medicine.

The increase in the number of individuals concerned with the new scientific experimentation at this time had made inadequate the older method of communicating new scientific information. That method had been the personal communication of the newest intelligence in the field of "natural philosophy" from one interested party to another; it usually took the form of long detailed letters, with answering comments, questions, and debates. In some instances collections of such correspondence have been published, presenting a picture of scientific interchange of the period.³² In addition, diaries of men prominent in the seventeenth and eighteenth centuries are useful indications of the state of science at a time when the differentiation between amateurs and professionals in the sciences had not yet appeared. Such personal methods of communication, however, are ill-suited to the advance of a subject which changes as rapidly as physics, chemistry, and medicine were changing in the seventeenth century. Too much time was needed to learn of experiments done in remote parts of Europe; and, as McKie has pointed out,³³ "Men write to their friends, and not always, or not so often, to those who dispute their facts and reject their theories."

Under these circumstances it is not surprising that a new method of communication was worked out; this took

³² See for example, Tannery, Mme. Paul, Waard, Cornelius de, and Pintard, René, eds. *Correspondence du P. Marin Mersenne*. Paris, Beauchesne, 1933-1937. 2 v.

³³ McKie, Douglas. *The Scientific Periodical from 1665 to 1798*. *Phil. Mag.*, July 1948, p. 122-131.

the form of a publication appearing periodically which went at the same time to a number of interested individuals. Almost simultaneously, in 1665, two such periodicals appeared: the *Journal des sçavans* and the *Philosophical Transactions of the Royal Society*. These two periodicals, representing differing groups and differing purposes, are the ancestors of two of the three principal types of scientific journals still being published today.

The *Journal des sçavans* was a weekly publication which appeared for the first time in Paris on Monday, January 5, 1665 under the editorship of Denis de Sallo, a lawyer, a dilettante "natural philosopher," and a friend of many influential politicians and courtiers. Ill health had caused de Sallo to retire from much of his normal work, and in his enforced leisure he interested himself in abstracting and compiling extracts from new works which later became the basis of the *Journal*.

In the prospectus for the *Journal des sçavans*, which appeared in the first number, a list of some of the topics to be dealt with in the ensuing issues was given. Not only were articles on the new developments in physics, chemistry, technology, mathematics, astronomy, medicine, and anatomy to be included, but also legal and ecclesiastical judgments, and indeed, anything that would interest "gens de lettres." This statement is an indication of both the state of science at that time and the people who were interested in scientific developments. Specialization was virtually unknown in science and a worker in the field of astronomy one day might on the next work in mathematics or architecture. Nor did a person necessarily devote his

whole attention to science; he might be interested in it merely as a matter differing from his normal routine—the law, the church, or managing his estates.

The *Journal* continued to be published for some months when it became involved in a controversy with the Jesuits; as a result, it was suspended on March 30, 1665, and did not resume publication until January 4, 1666, when it appeared with a new editor, the Abbé Gallois. It was then published without any legal or ecclesiastical information, and in this format it continued until 1792, when it was again suspended, this time because of the French Revolution.

As the first scientific periodical to be published in Europe, the *Journal des sçavans* had wide influence. It was reprinted in Paris and in Amsterdam, and was imitated in Italy (*Giornale de'letterati*), Holland (*Nouvelles de la république des lettres*), France (*Nouvelles descouvertes sur toutes les parties de la médecine*), and in other countries. Together with the *Philosophical Transactions of the Royal Society*, discussed below, it set the pace for periodical literature in the sciences.

The *Journal des sçavans* was aimed primarily at the amateur "if the . . . term may be applied to the productions of an age when the professional scientist had not yet appeared on the scene."³⁴ It soon became apparent that there existed also a need for a means of communication between practising scientists, as well as a journal of interesting and curious knowledge. After some discussion regarding the form and contents which such a publication

³⁴ *Ibid.*, p. 124.

should have, the Royal Society decided upon the publication of its *Philosophical Transactions*.³⁵ This journal, the first issue of which appeared on March 6, 1665, was to have no account of ecclesiastical or judicial affairs, but instead was to stress the experimental work done by its own members. The main difference from the earlier *Journal* was that it was meant for the publication of original work and new discoveries; unlike the *Journal* it published the work of the scientist as written by the scientist himself. In addition to the main articles, the *Philosophical Transactions* also printed book reviews and letters to the editor on the work undertaken by members of the Society. As an official organ of the Society it was published by the Society's secretary, the first editor being Henry Oldenburg; curiously enough, however, it was Oldenburg's private financial venture.

Just as the *Journal des sçavans*, publishing material of interest to all learned men, had many imitators, so the *Philosophical Transactions of the Royal Society* was followed by the publication of many other periodicals intended for scientists exclusively. Of these the Leipzig publication, the *Acta eruditorum*, the French *Comptes rendus de l'Académie des Sciences*, and, in succeeding centuries, the *Verhandelingen* of the Akademie van Wetenschappen and the *Transactions* of the American Philosophical Society are some of the better-known. Later on, as individual sciences split off from the main body of scientific learning, "spe-

³⁵ Brown, Harcourt. *Scientific Organizations in Seventeenth Century France*. Baltimore, Williams, 1934, p. 201; Thomson, T. *History of the Royal Society*. 3rd ed. London, Baldwin, 1812; Stimson, D. *Scientists and Amateurs*. N. Y., Schuman, 1949.

cialty" journals began to be published, each one limited to only one subject. As these specialized periodicals multiplied, it began to be difficult for a scientist to learn of all the publications pertinent to his work; for this reason, there grew up a group of indexing or abstracting journals, the purpose of which was to bring together periodically the articles printed in the many "Transactions" of learned societies and in the many general and specialized periodicals. This development will be discussed in more detail in a later chapter.

The establishment of scientific periodicals changed the picture of medical publication, and, as a result, the bibliography of medicine. Where earlier it had been necessary to publish only monographs, now shorter publications could be made available to interested workers. It seems reasonable to assume that scientists, faced with the necessity of publishing a whole book in order to present a new observation, would hesitate, would wait until further evidence had been discovered, or would even have their manuscripts returned to them by publishers for lengthening.³⁶ With the

³⁶ "Before the advent of periodicals in the 17th century scientific work was of necessity published either as an essay (*exercitatio*), or separate treatise (*tractatus*), despite the fact that the material contained therein might have consisted of a few pages only. For example, Harvey's *Exercitatio anatomica de motu cordis*, published in book form in 1628, might well have appeared as an article in a modern periodical, but lacking these vehicles for the propagation of research, separate publication was necessary. It is probable that much valuable material remained unpublished, the author not being able to find a publisher, or being unwilling to pay the cost of printing his own works, for in the early days of printing publishers must of necessity have carefully studied the material to be issued from their presses." Thornton, *Op. cit.*, p. 145.

appearance of scientific periodicals, however, it was possible for shorter communications to be published; and as a result preliminary observations, tentative conclusions, and individual discoveries not yet integrated into the framework of the entire science began to appear. This considerably increased the number of authors and individual publications. In addition, the practice of publication by national scientific societies tended to split up knowledge geographically more than the older methods of publication had done. This tendency, added to that of publication in the vernacular instead of in Latin, made it more difficult for the physician from the last half of the seventeenth century on to be aware of all the published advances in his field than for his predecessors. A full realization of this problem did not come, however, until the eighteenth century; and in the next chapter the work of Ploucquet will be discussed from this point of view.

CONCLUSIONS

The seventeenth century saw the culmination of medical bibliography predicated on the publication of medical works in monographic form and the first appearance of bibliographies taking into account publication of advances in medicine in periodicals. The problems which the medical bibliographers of the seventeenth century had to meet were:

1. The increase in the amount of publication. This was met by Lipenius by increasing the number of references included, and by Beughem by limiting his list to the works published within a certain period of time.

2. Methods of citing authors. In the seventeenth century the surname became standardized; as a result the practice of alphabetizing by Christian name was dropped and was never re-introduced. A Latinized form of the author's name continued to be used; however, this form was not followed so completely as had been the case earlier. Because of variations in names a more abundant use of cross references (from one form of a name to another) was used in this century.

3. Aids to the reader. As the material listed became greater, it was necessary to provide guides for the user of the bibliography. One such has just been mentioned: cross references from variant forms of names. Another aid was the use of large numbers of cross references from subjects not listed under certain terms to the terms under which they were listed. Alphabetical indexes to classified subject arrangements and details, such as the use of running heads to orient the reader, were also introduced.

4. Denoting exactly the titles listed. With the spread of printed works, it became necessary to give more complete citations than had been provided previously. We find that in the seventeenth century for the first time the imprint was given regularly and in the same form as we are accustomed to seeing it in bibliographies today: the place of publication, the publisher, and the date. Where several editions existed, each was noted separately.

Added to these problems, there appeared toward the end of the century the new problem of the periodical article. While not of great moment in the seventeenth century, this problem tended to overshadow and intensify

the others in the next centuries, as will be shown in the other chapters of this work. Only with the coming of the near-print publication of limited circulation, especially the government research report, does an entirely new problem arise in medical bibliography.³⁷

³⁷ The problem of the government research report has been discussed at a number of meetings and symposia in the past few years. See, for example, the two-day Institute devoted to the subject at the 1952 meeting of the Special Libraries Association, and the week-long workshop convened in April, 1953 at Catholic University, D. C. That this problem has two sides to it, however, is shown by a Short Communication to the Editor (Cobb, Mary M. Publication of Medical Research Reports in Scientific Journals. *Bull. M. Library A.*, 41: 154-155, 1953), on the one hand and Dwight E. Gray's article, *Is the Technical Report an Information Tomb?* in *Physics Today*, 5: 4, Dec., 1952.