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The Accademia dei Lincei

Modern scientific societies owe many of their important traditions to the Lincean Academy, founded in 1603.

Stillman Drake

It would be hard to imagine modern science without scientific societies. The progress of scientific ideas is heavily dependent upon communication; hence the need for a particular kind of organization and a special class of publication. Scientific societies, by the selection of persons with highly specialized interests, greatly reduce the hazard that avenues of useful communication will be cluttered up with rubbish or damaged by false or misleading announcements in their fields. They also provide an important means for the organized defense of the interests of their members against interference with free research and communication and other disturbances from outside which occur from time to time.

Yet if it is hard to imagine modern science without scientific societies, from an a priori standpoint it would certainly seem that there must have been a time when science had to get along without those beneficial—I might say essential—organizations. Logically, there should have been a time when a few scattered scientists had begun the modern scientific revolution in thought, without any special society to act as a center of communication or to defend them from the onslaughts of their foes—and science has never existed without powerful enemies. One might reasonably expect the first scientific society to have been founded by scientists as they awakened to the need for mutual communication and mutual defense of their interests. And being reasonable people, you might therefore expect to hear from me the story of an early scientific society which came into being in that way. Instead, it is a story that seems (to me at least) rather improbable from an a priori standpoint—too improbable to be good fiction, as is the case with rather few events known to scientists, but with many known to historians.

Consider the probability that 6 or 7 years before the first startling discoveries and theories of modern science were published by Galileo and Kepler, and a dozen years before the first onslaught of established authority against

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freedom of scientific research and publication, a society prepared to further science and protect its interests was founded by four nonscientists. If you find that not improbable, say on grounds that social conditions favorable to the rise of modern science must have prevailed at that time, then I should think you would expect such a society to have had rather an easy time getting under way. Instead, from its very foundation it was subjected to relentless persecution. Nor did it survive by virtue of its size or the prestige of its members. During the 7 years it existed before it attracted to membership a widely recognized scientist, it consisted of but four members. The founder was a young nobleman not quite 18 years of age; his three associates, each 26 years old, lacked even social prestige. Six months after its founding at Rome, only one member remained there; the other three were dispersed over a wide area. On any reasonable grounds, the Lincean Academy should have collapsed. Yet it survived to carry out the essential purposes of a scientific society, at a crucial period which saw the birth of modern science and its initial battle for survival. Add the fact that this pioneer scientific society was founded in the very city in which that battle was destined to be centered, and I think we may call the whole affair, if not a miracle, at least a very curious set of historical coincidences.

Academia Secretorum Naturae

George Sarton never tired of cautioning historians of science against the perils of supposing that they know any human phenomenon in its truly first occurrence. In deference to his warning, I shall call the Lincean Academy only a forerunner of modern scientific societies, and not the first such society. But for comparison, let me briefly describe to you its only rival for the title of "first" among scientific academies which is deemed worthy of mention in the 11th edition of the *Encyclopaedia Britannica.*

Giambattista della Porta, author of a celebrated, often published and widely translated book on *Natural Magic*, founded at Naples some time before 1589 (the Britannica asserts that the year was 1560) an *Academia Secretorum Naturae* which used to meet at his house to investigate and experiment concerning curiosities of nature. No one was admitted to the group who had not offered some remarkable and little-known information useful either to the health of the body or to the science of mechanics. Porta's academicians called themselves the *Otiosi*, or idle men, after a pleasant custom then prevalent in Italy of selecting humorously derogatory names for societies engaged in the pursuit of various studies. Thus, for example, one famous academy bore the name of *Umidi*, or the moistures, which Edward Rosen prefers to interpret as meaning the "all-wet"; another academy in which I am presently interested was the *Scomposti*, which may mean the disorganized, the confused, or the abashed men; and the very learned academy at Florence which in 1612 gave Italy and the world its first compendious dictionary of a vernacular speech was (and still is) called the *Accademia della Crusca*, or academy of chaff.

Of the actual accomplishments of Porta's *Otiosi* there is no record apart from occasional allusions to it in his books. It was dissolved on order of Pope Paul V, after Porta had been called to Rome to answer charges of the practice of magic, including divination and the making of poisons, despite the fact that Porta was personally exonerated from these charges. Porta's academy at Naples was strictly local in membership, sponsored no publications, and appears to have had no other distinguished member than Porta. It was devoted essentially to satisfying the curiosity of its own members, and was thus a private society to the extent of being virtually a secret society. In that respect it differed markedly from the *Accademia dei Lincei*, founded at Rome in 1603, which at the outset declared its intention not merely of studying the phenomena of nature but of attempting new discoveries and publishing them to the world. Its fundamental aspirations are to be found in its *Praescriptiones*, or declaration of principles, drafted in 1604–1605 and published in 1624:

> The Lincean Academy desires as its members philosophers who are eager for real knowledge, and who will give themselves to the study of nature, and especially to mathematics; at the same time, it will not neglect the ornaments of elegant literature and philology, which, like graceful garments, adorn the whole body of science. . . . It is not within the Lincean plan to find leisure for recitations and debates; meetings will be neither frequent nor lengthy, and chiefly for the transaction of necessary business of the academy; but those who wish to enjoy such exercises will not be hindered in any way, so long as they perform them as incidental studies, decently and quietly, and not as vain promises and professions of how much they are about to accomplish. For there is ample philosophical employment for everyone by himself, particularly if pains are taken in the observation of natural phenomena and the book of nature which is always at hand; this is, the heavens and the earth. . . . Let members add to their names the title of Lincean, which has been chosen as a caution and a constant stimulus, especially when they write on any literary subject, or in their private letters to associates, and in general when any work is wisely and well performed. . . . The Linceans will pass over in silence all political controversies and every kind of quarrels and wordy disputes, especially gratuitous ones which give occasion to deceit, unfriendliness and hatred, as men who desire peace and seek to preserve their studies from molestation and would avoid any sort of disturbance. And if anyone by command of his superiors or some other requirement shall be reduced to the handling of such questions, let those be printed without the name of Lincean, since they are alien to physical and mathematical science and hence to the objects of the Academy.

These principles alone would establish the Lincean Academy as the forerunner of modern scientific societies, many of which have adopted strikingly similar rules for their conduct and that of their members. At the same time, the very modernity and wisdom of the objectives stated must give rise to a question—how these can have been incorporated by a youth of 18 into the constitution of the very first organization of its kind (as I am inclined privately to regard the Lincei). In reply it may be said first that the founder was obviously no ordinary youth, and second, that although there was indeed no predecessor scientific academy from which he could draw the wisdom embodied in his principles, he had around him plenty of examples of literary, artistic, humanistic, and forensic academies, some of which were conspicuously given to florid declamation and empty debate—to what Galileo later called the "lovely flowers of rhetoric that are followed by no fruit at all." The Lincean academicians, with their precocious interest in the physical and mathematical sciences, had no wish to emulate such examples.

The First Four Linceans

Though the Lincean Academy at the time of its founding took quite seriously the lofty principles of its constitution, it also had many human foibles to be expected in a group of young men who were close personal friends.

It adopted, for example, much of the paraphernalia associated with romantically conceived organizations such as those founded for patriotic causes. Each original member took a secret name, a symbolic emblem, and a motto; all were sworn to brotherhood; the society had an emblem and a patron saint; it gave a diploma and a ring evidencing membership, and it had a secret cipher for the transmission of information about activities of the society and personal news of its members.

The founder of the Lincean Academy and its leading spirit at all times was Federico Cesi, second marquis of Monticelli. His special name in the society was *Celivago*, or heaven-wanderer, and his emblem was an eagle illuminated by the sun and holding in its claws a terrestrial globe. Cesi was official head of the academy from its founding until his death in 1630; he was also its sole source of financial support and its undaunted preserver during many years of persecution and adversity.

Most colorful of the charter members was a Dutch physician, Johannes Eck, who was known in the Academy as *l'Illuminato* or the enlightened one. His emblem was that of the moon at quarter, illuminated by a triangle from the sun. Eck was the most learned member of the society, from whom the others expected to receive instruction; he was also the member whose presence nearly brought about the early dissolution of the organization, as will be explained presently.

Third of the founding members was Francesco Stelluti who was known as *Tardigrado* or the slow one; his emblem was the planet Saturn, slowest moving of the planets known at the time. This was not intended as a reflection on his intellect but as a symbol of the idea that the surest way to knowledge is that of a slow and measured tread. Stelluti's special talent lay in the direction of editing, criticizing, and commenting on the works of others.

Anastasio de Filiis completed the original group. He was known as *l'Eclissato*, the eclipsed one—his emblem being that of the moon darkened by the interposed earth hiding it from the sun. In his case, the symbol was literally intended, for de Filiis was the least educated of the members, lacking even a knowledge of Latin. That was a real handicap at the time, especially in astronomy and mathematics, before Galileo defied tradition and began writing his scientific works in the common language. De Filiis, who died in 1608, was dependent on his colleagues for scientific information; when he despaired of progress, Cesi encouraged him by pointing out in his letters that close observation of the things about him, especially plants and animals, would open to him more real knowledge than could be found in any book.

By the time the Academy added its first new member, in 1610, it had abandoned the mystical notion of sworn brotherhood and the romantic idea of assigning special names and symbolic emblems to its members. The emblem of the society itself was retained; this was a lynx, destroying with its claws the infernal Cerberus while turning its eyes to the sky, representing the crushing of ignorance by true knowledge. The name of the lynx was adopted by the society because of the fabled acuteness of vision of that animal, then still to be found in parts of Italy. It is worth noting that the emblem adopted by the society was used on the title page of the Neapolitan edition of an expanded version of Porta's *Natural Magic* published in 1589, despite the fact that there is no evidence of any acquaintance between Cesi and Porta until the year after the Lincean Academy was founded.

The Academy was formally established on 17 August 1603 and held its meetings at the palace of the Cesi family in Rome. Two cardinal principles adopted at once were that each member should give instruction to the others in some science, and that each must hold some active office in the society. Eck was first assigned to teach astronomy and the philosophy of Plato; later, to propound experiments relating to natural history and medicine. Cesi was assigned another course in philosophy, presumably Aristotelian, and was made responsible for providing books, instruments, and equipment needed by the Academy. Stelluti was appointed to give a course in geometry and to explain the uses of mathematical instruments and mechanical devices, as well as to give practical meaning to Eck's theoretical instruction by making astronomical observations and calculations. De Filiis was to lecture on history and was made secretary of the society. Five lectures were to be given on each of 3 days of the week, two lectures by Eck and one each by the other members. But this rigorous program, begun late in October of 1603, was doomed to be soon abandoned.

Early Tribulations

Eck, who had come to Italy from Daventer in Holland, studied medicine at the University of Perugia and began his practice in Italy. In June 1603 he was imprisoned as the result of the death of a pharmacist whom he had reprimanded on several occasions and who in turn had waylaid and assaulted him. The evidence shows clearly that Eck's mortal wounding of the pharmacist was entirely in self-defense. Nevertheless Eck, being a friendless foreigner in Rome, was still languishing in prison when the matter came to the attention of young Cesi. Eck was released through the mediation of Cesi and Stelluti, after which he was invited to live for a time with Cesi. It appears that the presence of this well-educated physician, who also had a good knowledge of astronomy and a deep interest in botany, inspired in Cesi the idea of a mutual-instruction society which promptly became the *Accademia dei Lincei*. For the first few years of its existence, an elaborate record was kept of its activities and tribulations; this record, entitled *Linceografia*, is preserved in manuscript and provides the source for much of what follows.

Cesi's father was hostile to the Academy from the very beginning, perhaps partly because he considered intensive study a most inappropriate form of behavior for a young nobleman in Rome at the epoch, but principally out of distrust and fear of Johannes Eck, whom he regarded as little better than a pardoned murderer. As a physician, Eck would know how to make poisons, a subject on which the elder Cesi tried twice to draw him out, and one which was calculated to make any Italian aristocrat apprehensive at that time. The marquis was also disturbed by the general air of secrecy, sworn brotherhood, and mystery which prevailed among his young son and the three older associates who began to frequent his palace. No doubt Cesi's father associated these things with some nefarious political plot, and one may imagine that he would consider patently absurd the pretense that only the study of science concerned the young men. In any event, after an unsuccessful attempt to persuade his son to break off with Eck, the father attempted to have the Dutch physician imprisoned again, first by civil and then by ecclesiastical authorities. Though all these maneuvers failed, the situation had become so unpleasant that

at the beginning of May 1604 Eck left Rome in the custody of two escorts provided by Cesi's father. Shortly thereafter, Stelluti returned to his home in Fabriano and de Filiis left Rome for his home in Terni. Stelluti appears from the correspondence to have had a series of personal troubles, probably financial, and de Filiis despaired of ever acquiring the kind of knowledge that was expected of members, now that he was isolated from the others.

At this point, the odds against continuance of the Lincean Academy were enormous. But neither Cesi nor Eck would abandon the project of creating a significant scientific society. Eck proceeded from Rome to Siena, Florence, Milan, and Turin, in each city meeting with scholars and telling them of the Academy. To Cesi at Rome he forwarded accounts of his travels, his meetings, and the observations he had made of the flora and fauna of the Italian provinces and the other lands through which he passed, which included France, England, Scotland, and Ireland. When he finally arrived back in Holland, he became involved in a religious controversy, upholding the Catholic side, and for this he was exiled. After a sojourn in Norway, Sweden, and Denmark, he was allowed to return to Daventer, but stayed only a short time and then journeyed on to Germany, Poland, and Austria. At the court of Rudolf II in Prague, he met Johannes Kepler and Francis Tengnagel, to whom he spoke of the Lincean Academy. He wrote to Cesi recommending that they be elected members, but nothing came of it; it is probable that Cesi hesitated to admit any Protestants to his society, which was having trouble enough at Rome already. Eck observed the nova of 1604 and sent to Cesi a short treatise on it, which Cesi published at Rome in 1605; this was the first publication sponsored by the Lincean Academy. Eck also sent or described several other books he had composed, some of which survive in manuscript in the archives of the Academy.

Meanwhile Cesi, left alone at Rome, steadfastly refused to enter into the social life of the city as his father demanded. Instead, he held the Academy together by correspondence and composed further plans for its organization and expansion. He visited Naples for a few months, where he met Porta. Porta was then a very old man, but he took a great interest in Cesi and dedicated to him his next two books. Some correspondence between Porta and Cesi from this period survives; one letter of particular interest will be mentioned in a moment. At Naples, Cesi also met Ferrante Imperato, a distinguished botanist, in whose possession he saw a manuscript copy of a very important work on the natural history of Mexico, plans for the publication of which occupied the Academy intermittently over a long period of years.

Early in 1606, Eck returned to Italy and even ventured to come to Rome despite Cesi's warnings of possible trouble. For a time all went well, and Cesi began to hope that the period of persecution of the Academy had ended. But it soon began again from the same quarter, and Eck resumed his peregrinations, writing from Madrid in June 1608 and proceeding from there through France, England, and Belgium. Eck returned to Rome for the last time in 1614, but by that time his many struggles had unbalanced his mind, and he did not long continue his activity in the Lincean Academy.

The First New Member

Membership in the society had declined to three in 1608 as the result of the death of de Filiis at Naples. In 1610 the first new member was added, and this was none other than Porta himself. Cesi had long before drawn up an elaborate plan for the establishment of houses of study by the Lincean Academy in various cities of the world, a plan similar to the project proposed a few years later in England by Francis Bacon. Negotiations were undertaken to establish the first of these branch academies at Naples, and Cesi hoped that Porta might be induced to contribute to it his valuable library. This scheme did not materialize, though Naples became in the ensuing years a principal center of Lincean activity.

The Academy now had four members again: two in Rome, one in Naples, and the other abroad. Cesi was in frequent correspondence with all the others, and in 1609, shortly before Galileo produced his first telescope at Padua and took it to Venice, Cesi had heard rumors of the Dutch invention and wrote to Porta about it. Cesi's letter is lost, but Porta's answer survives; in it, he told Cesi that the instrument was a mere toy which he himself had long known about, and of which he drew a rough illustration in his letter. Galileo is not mentioned in any of the surviving correspondence on the Lincean Academy up to this time, and there is no reason to think that any of its members ever heard of him until after the publication of his first telescopic discoveries early in 1610. It is interesting that in September of that year, Stelluti wrote to his brother as follows:

> I believe by now you have seen Galileo, that is, his *Sidereus Nuncius*, and the great things he says. But now Kepler, a pupil of Tycho's, has written against him, and there has come from Venice one of his books for Father Clavius, saying that he (Galileo) claims to be the author of the instrument, whereas more than thirty years ago Giovanni Battista della Porta wrote about it in his *Natural Magic*, and hinted at it also in his book on *Optical Refraction*. So poor old Galileo is cut down; but meanwhile the Grand Duke has given him 800 piasters, and the Venetian government has increased his salary.

The interest of this first mention of Galileo by a member of the Lincean Academy lies in its unfriendly tone, circulating as it did a somewhat confused version of the facts. Kepler's book, the *Conversation with the Sidereal Messenger*, was anything but hostile to Galileo. The Grand Duke had indeed employed Galileo, who had moved to Florence, but that contradicted the idea that he was still employed by the Venetian government at the University of Padua. Moreover, Galileo had not claimed the invention of the telescope, which he attributed to a Belgian. Stelluti's letter is dated from Rome; it is clear that he had not himself seen Kepler's book, which he believed to have been published at Venice, but that his first instinct was to support the implied priority of the fellow Lincean to this important invention.

In the spring of 1611, after his prodigious success with the improvement and the astronomical application of the telescope, Galileo journeyed to Rome to exhibit his discoveries and to secure support, if possible, from the Jesuits there against a number of professional astronomers and university professors who declared his claimed discoveries to be a fraud or an illusion of the lenses of his instrument. His visit was an enormous success, and while he was there, on 14 April 1611, Cesi held a banquet in his honor. Among those present were Johann Faber, Antonio Persio, John Demisiani, and Johann Schreck (or Terrentius), all of whom were elected members of the Lincean Academy within a short time

thereafter. At this banquet the name "telescope" was given to Galileo's instrument, probably at the suggestion of the Greek scholar Demisiani, but possibly at Cesi's instigation. On 25 April Galileo was elected a member of the Lincean Academy, becoming its fifth living member and the second member who enjoyed a wide scientific reputation at the time, Porta having been the first.

Galileo's Membership

Here let us pause to speculate on the question of what attraction Galileo found in the Lincean Academy. He had personally met but a single member, Cesi, and the Academy as such was not yet widely known. On the other hand, Galileo himself was already a celebrity, having risen to international fame with the publication of his *Starry Messenger* only a year before. At Rome he had been feted by the Jesuit mathematicians of the Collegio Romano, entertained by cardinals, and received by the Pope himself (the same Pope Paul V who had closed Porta's academy at Naples and who was later to order a ban on the Copernican theory). Galileo was a distinguished figure at the Tuscan court as well as having a wide acquaintance and high reputation in the universities of Pisa and of Padua. Now it is not immediately apparent why a man of such prominence was so quick to lend his name to a small and struggling academy at Rome; and it is still less obvious, at least on the surface, why it was that from that time forth Galileo took great pride in the title of Lincean, employing it in his correspondence and on the title pages of most of his books. Because the Lincean Academy later became very famous, because it subsequently elected to membership several men distinguished in science, and because it is closely associated in the minds of historians with the name of Galileo, his original association with the Academy seems always to be taken for granted as a natural occurrence. It seems to me, however, that this involves a sort of circular reasoning, for it was only after Galileo's election that the Lincean Academy became large and prominent. Nor can it be said that Galileo was a joiner by nature; if he had been seeking honor by membership, there were several more distinguished academies at Florence, for example the Crusca and the Florentine Academy, that would have been more appropriate for that purpose. Galileo's alacrity in joining the Lincean Academy might, of course, be accounted for by the charm of Cesi's personality, but that alone seems to me an insufficient reason. Perhaps a clue to an adequate explanation may be found in something I have already mentioned—namely, that four other persons present at the banquet in Galileo's honor given by Cesi were shortly afterwards elected to membership. Now, when one considers that in the 8 years of the Academy's troubled existence, only one new member had been added before Galileo, whereas five were added in 1611 and ten more in 1612, then it begins to appear that the famous banquet at Rome marked a turning point in the policies of Cesi, who was always in complete control of the Academy's affairs. But if that is so, it can only have been because of his conversations with Galileo during the visit to Rome, for the other men mentioned were by no means newcomers to Cesi's acquaintance.

In the summer of 1610 Galileo had left the universities, after 20 years as a professor, to accept a court position. It is not improbable that in 1611 he was already feeling the effects of the break in communication with other scholars which resulted from his departure from the University of Padua. He was also experiencing directly the hostility of the official scholarly world to the reception of his discoveries and ideas. Hence he was probably not anxious to reestablish communication with his former associates at the universities, even if that had been practicable; and yet he was aware of the need for some avenue of communication with men who were truly interested in new scientific ideas and who had no commitment to the official doctrines of professional educators. The banquet placed him in the company not only of Cesi, a truly extraordinary organizer of marked intelligence and genuine interest in science, but also of a group of congenial scholars outside the universities. Persio was attached to the retinue of Cardinal Cesi; Faber was a physician of German origin; Demisiani, a Greek, was mathematician to Cardinal Gonzaga; and Schreck was a Fleming of great scientific ability, then unattached but soon to go into the service of the Jesuit missionaries to the Far East. These are the very men who were elected to the Academy soon after Galileo. In striking support of my assumption that university channels at the time were useless to the new science, I may mention that the only two university professors known to have been present at the banquet were the only two guests never elected to the Academy. They were Francesco Pifferi, mathematician at the University of Siena and author of a commentary on Sacrobosco's *Sphere*, and Julius Caesar La Galla, professsor of logic at the Sapienza in Rome, leader of the peripatetic philosophers of the city, and author in 1612 of a wretched book on lunar astronomy which consisted chiefly in the deprecation of Galileo's discoveries, and has the sole redeeming feature of being the first printed book to use the word "telescope."

I conjecture, then, in the absence of contrary evidence, that either at the banquet of 14 April 1611 or in subsequent conversations, Cesi recounted to Galileo and to some or all of the others, the principles of and his plans for the Academy; and that, in reply, Galileo not only gave his endorsement but added some suggestions that would strengthen the Academy in the interests of the new science as he saw it. It is only a conjecture, but it seems to fit in rather well with what is known. As I have said, five members including Galileo were added in 1611, doubling the society; ten more were added in 1612, doubling it again. Among the new members, other than those I have already mentioned, were the Roman mathematician Luca Valerio, with whom Galileo had been in correspondence for some time, and whom he later referred to as "the Archimedes of our age"; Mark Welser, an influential amateur of science; and Fabio Colonna, a naturalist of the first rank. Another indication of the accelerated activity of the Academy is that the entire surviving correspondence of the Linceans up to the evening of Cesi's banquet for Galileo consists of 60 letters written over a period of 7 or 8 years, from July 1603 to February 1611; from the single year from April 1611 to April 1612, 55 letters survive, of which 22 were either to or from Galileo. By the end of 1615, a total of 422 letters concerning the Academy and its affairs had been written, counting only those which still survive.

Communications

The speed, scope, and effectiveness of the Academy as a means of transmitting scientific news may be illustrated by a single example. Four days after

the banquet, Mark Welser wrote from Augsburg to Johann Faber thanking him for a description of that event. In May 1611, writing to Paolo Gualdo, an old friend of Galileo's at Padua, Welser in turn supplied information about the banquet to him, Gualdo having meanwhile sent other information to Welser concerning the honors received by Galileo on his Roman visit. Thus the news of the meeting was transmitted from Rome to Padua via Augsburg within a month.

Galileo commenced an active correspondence with Cesi immediately upon his return to Florence. Galileo's first letter is lost, but Cesi's reply, dated 23 July 1611, asks for a copy of Galileo's long letter written at the request of Cardinal Joyeuse in defense of his account of the lunar mountains, and tells Galileo that Cesi has urged La Galla to show him his treatise on the same subject. He reports that Porta has read and ridiculed Francesco Sizzi's attack on Galileo, the first to introduce theological arguments. Thus news and gossip of scientific interest began immediately to flow through Cesi to and from leaders of science. In August 1611, Cesi reports to Galileo on the arguments to be brought against him by the peripatetics and urges him to publish a supplement to his *Starry Messenger*, mentioning the phases of Venus and the appearances of Saturn, in order to protect his scientific priority. In September he tells Galileo that the Academy's publication of the book on Mexican plants has been begun; Galileo had seen the manuscripts at Cesi's house in Rome. In Cesi's next letter he mentions the phenomenon of light storage and reemission in a species of pyrites known as Bolognese stone, long of interest to Galileo, and gives further news of attacks being prepared against him. And so the correspondence grew, month after month, between Rome, Florence, Augsburg, Naples, and Acquasparta, Cesi's country home.

Meanwhile, Galileo had become involved in a dispute at Florence against the Aristotelians over the nature of floating bodies. To Cesi he sent, in May 1612, a copy of his book on hydrostatics which had grown out of that controversy. Earlier in the year, Mark Welser had sent to Johann Faber at Rome a copy of the letters on sunspots which Welser had published for the Jesuit Christopher Scheiner, and expressed his desire to hear Galileo's comments on them. These eventually reached Galileo, who replied to them at great length in three letters written during 1612. Though the letters were addressed to Welser, copies were sent to Cesi, and Cesi undertook to publish them under the auspices of the Academy at Rome in 1613. The dissemination of Galileo's views on sunspots by Academy publication was not an unmixed blessing, because the Academy prefixed an introduction by Angelo de Filiis, brother of Anastasio, in which Galileo's claim to priority in the discovery of sunspots was strongly upheld. This led ultimately to a very serious dispute between Scheiner and Galileo which had disastrous consequences. It should also be mentioned that as the sunspot letters were being edited for publication, Galileo corresponded with Cesi concerning corrections and revisions and sought his assistance in clearing certain touchy philosophical and theological points with authorities at Rome.

Opposition to Galileo

Brushing by a multitude of interesting letters which show the intense activity of the Academy in the years 1612–1614, we come to the period in which Galileo and his followers were first subjected to serious opposition in Church quarters. Up to that time, Galileo's noisy opponents had been chiefly professors, whose contentions he had been more than able to combat by himself. Trouble from the Church, however, was a different matter, and Galileo quickly availed himself of his Lincean colleagues at Rome, as well as other friends there, to assess the extent of the threat. When Cesi, ill in Acquasparta, heard that an open attack on Galileo had been made from the pulpit in Florence, he wrote at once to commiserate with Galileo, saying that

> These enemies of knowledge who take it upon themselves to distract you from your heroic and useful inventions and works are of that group of perfidious and rabid men that are never to be quieted, nor is there in fact any better way to defeat them than by ignoring them.

He went on to counsel caution on Galileo's part, saying that in his opinion, if Copernicus had had to consult the Congregation of the Index, his great book would never have gotten published. He gave Galileo a good deal of specific advice on the handling of the matter both at Florence and at Rome, where Cesi was well acquainted with the officials and with procedures.

Two months later, in March 1615, Cesi wrote from Rome to tell Galileo that a Carmelite friar had published a book reconciling Copernicus with the Bible. In the same letter Cesi remarked that "The writer reputes all of us to be Copernicians, which is not so, as we profess ourselves at one only in the freedom to philosophize about physical matters." The Academy officially took that position a little later, when the subject was still more dangerous as a result of the Church's edict suppressing the Copernican theory. This came about in 1616, when Galileo was at Rome and had been instructed to desist from holding or defending the Copernican system. Luca Valerio then protested to the Academy against the activities and beliefs of his illustrious colleague, but the Linceans promptly took formal action to censure Valerio and to declare their support of freedom in scientific thought. This is not the place to enlarge on the events surrounding what has been called "the first trial of Galileo," but the loyalty of the Academy to him in his battle for freedom from authority was unflinching and extremely helpful.

While at Rome in 1616, Galileo debated the Copernican theory publicly at the home of Virginio Cesarini, a young man of letters who subsequently became a member of the Academy. After the Church edict, Galileo had to lie low for several years, but in 1619 he became involved in a dispute about comets, first indirectly and then openly, taking sides against the mathematician of the Jesuit college in Rome. His most famous polemic, called *The Assayer* (*Il Saggiatore*), was written in the form of a letter to Cesarini and was published at Rome in 1623 under the auspices of the Lincean Academy. This was a ticklish undertaking, and there is no doubt that Galileo benefited greatly from the careful reading and editing of his sarcastic masterpiece by his fellow Linceans at Rome. Indeed, the book would probably not have been written at all had it not been for the fact that these colleagues advised him not to leave unanswered an attack published by his Jesuit adversary under an assumed name. Since *The Assayer* contains in effect an outline of Galileo's ideas of scientific method, the only scientific matter he could safely discuss at the time, we have this pioneer scientific academy to thank for the existence of at least one important work of Galileo's.

During these years the Academy had

no fixed seat, though its meetings were generally held in Cesi's palace at Rome or in the homes of other officers of the society resident in Rome. There were no regular publications by the Academy, though several other books, like Galileo's *Letters on Sunspots* and his *Assayer* were published by and at the expense of the society; among them were Eck's pamphlet on the nova of 1604; Porta's book on meteorology; Stelluti's translation of the *Satires* of Persius, which is scientifically important as the first published book to contain illustrations of microscopic observations; an earlier broadside called the *Apiarum*, which has similar illustrations and of which only two copies are known to survive; and, of course, the *Praescriptiones* of the Academy. Cesi projected at least one book on an astronomical topic, but it was never published. Many of the members published books in their own names, followed by the title "Lincean." A grand project of the society was the publication of the previously mentioned work on the natural history of Mexico, which was indeed completed after many years of toil, but it was not issued by reason of the death of Cesi and the confusion which arose concerning the disposal of his effects and those of the Academy. His heirs were unwilling to undergo the final expense of publication, but it was eventually done in 1651 by Cassiano dal Pozzo.

Journal publication of scientific discoveries still lay far in the future, but an appropriate equivalent was carried out by the Linceans in the form of correspondence such as I have described. Cesi's home became an effective clearinghouse for news in science, and it was not merely national in scope. I do not know whether any previous academy, scientific or otherwise, had ever been an international affair, but one of the four original Linceans was of foreign origin, and later members included four Germans, a Fleming, and a Greek. Among other foreigners who were proposed but not elected were Johannes Kepler, Francis Bacon, and Nicholas de Pieresc.

Decline and Rebirth

Cesi's death in 1630, at the age of 45, put an end to the Academy's plan to publish Galileo's *Dialogue on the Two Chief World Systems*. Had the plan been carried out, a good deal of scientific history might have been changed, for Francesco Cardinal Barberini was a member of the Lincean Academy, and his uncle, Pope Urban VIII, was favorably inclined to it, having appointed more than one member to posts at the papal court. Publication of the *Dialogue* at Rome under the license secured there—not without difficulty—would have eliminated one of the technical grounds on which Galileo was summoned to trial, for the Roman license was not valid at Florence, though it was used in the printing of the book there in 1632 as an adjunct of the Florentine license.

By the time of Cesi's death, the 32 elected members of the original Academy had dwindled to eight living members, of whom five resided in Rome. One of these was Cassiano dal Pozzo, elected in 1622, who bought virtually the entire library of Cesi and the manuscripts of the Academy conserved by him, in March 1633, after some of the books had already been acquired by Cardinal Barberini. In April 1633, dal Pozzo was successful in buying also the mathematical instruments that had belonged to Cesi and the Academy. This was precisely the month in which Galileo was standing trial in Rome before the inquisition. In the face of so many adversities, no real attempt was made to continue the work of the Academy. Its library and records, acquired by dal Pozzo, were preserved by his heirs until 1703, and in 1714 they passed into the Albani library. In the disorders of 1798, following the proclamation of Napoleonic domination in northern Italy, the Albani library was sold at auction and dispersed. The gradual reassembly of most of the manuscripts and correspondence by the modern *Accademia dei Lincei* has been a task of gigantic proportions.

The original *Accademia dei Lincei* had an existence of less than 27 years, and a truly active and influential period of less than 20 years, from 1611 to 1630. In retrospect, I think you will agree that uncanny coincidences were involved in the existence of this organization of young men, just when it was needed to build and defend the new sciences, and in just the appropriate place.

After cessation of activity by the original Lincean Academy, no recognized scientific society existed in Italy, or elsewhere, until 1651. In that year a group of scientists at Florence, followers of the spirit of Galileo, who had died in 1641, commenced to work together under the sponsorship of a prince of the house of Medici. In 1657, their organization was formalized in the *Accademia del Cimento*, or the ordeal, of which the motto was *provando e riprovando*; that is, testing and retesting. The *Cimento* survived but 10 years, at the end of which it published the first great collection of scientific experiments to be carried out by a scientific society. Meanwhile the torch of science had passed to England, where in 1660, shortly after the restoration of Charles II, the Royal Society was chartered. Other early scientific societies were founded at Paris in 1666, at Berlin in 1700, and at Vienna in 1705.

The leading scientific society in Italy today is again the *Accademia dei Lincei*. After abandonment of the original organization in 1630, no revival was attempted until 1745, when for a brief period the Academy was reconstituted at Rimini. In 1801 it was again reestablished at Rome, with 24 members. When the troops of Napoleon occupied Rome in 1808, the French government continued the New Lincean Academy and gave it a small annual stipend, chiefly for use in the distribution of medals of honor. After Napoleon's defeat in 1814, the Linceans had to get along without government subsidy. The abbot, Feliciano Scarpellini, who had led in the reestablishment of the Academy in 1801, died in 1840 without having found a successor willing to carry on the struggle, and again the society lapsed. Finally, in 1847, Pope Pius IX founded the Pontifical Academy of the New Lincei, and a period of active work and regular publications quickly followed. In 1875 the Lincean Academy was given state sponsorship. Under an edict of King Victor Emmanuel I, it was to consist of 40 regular members in the natural sciences and 30 in the moral sciences; 20 foreign members; and up to 60 correspondent members in each of the two classes of membership.

It is interesting to note that the innovation of memberships in the moral sciences was justified under a clause in the *Praescriptiones* of 1624, which provided that "the ornaments of literature and philology, which adorn the whole body of science," were not to be neglected. Thus the *Accademia dei Lincei*, in expanding to include sciences not dreamt of in 1603, still remained faithful to the farsighted precepts set forth by its great founder, Federico Cesi.