been built in the Middle Ages; and above this a curious hillock, with an artificial rock-platform, called el 'Oreimeh, "the little knoll." Immediately to the north-east a precipice projects to the lake, and the aqueduct from the Tâbghah spring is led to an ancient rock-cut channel, which seems to have been once intended for a road in the face of the cliff. In the 17th century Quaresmius speaks of this place, Minyeh, as the site of Capernaum. In the 14th Isaac Chelo was apparently shown the same site as containing the tomb of Nahum, and as being the "city of the Minai." The "Minai," or "sorcerers," are mentioned in the Talmud, and by this title the Jews stigmatized the early Christians; and these "Minai" are called in one passage of the Talmud "sons of Capernaum." There is thus a close connexion between this Minyeh—named from the Minai—and the town of Capernaum. The position of the site is also suitable for that of Capernaum, being in the plain of Gennesareth, two miles from the "round spring," or fountain of Capharnaüm. No other site of any importance exists in the plain of Gennesareth. See Capernaum.

South of the plain of Gennesareth is the undisputed site of the New Testament town of Magdala. A few lotus trees and some rock-cut tombs are here found beside a miserable mud hamlet on the hill slope, with a modern tomb-house or *kubbeh*. Passing beneath rugged cliffs a recess in the hills is next reached, where stands Tabarîya, the ancient Tiberias or Rakkath, containing 3000 inhabitants, more than half of whom are Jews. The walls, flanked with round towers, and now partly destroyed by the earthquake of 1837, were built by Dhahr el 'Amr, as was the serai or court-house. The two mosques, now partly ruinous, were erected by his sons. There are remains of a crusading church, and the tomb of the celebrated Maimonides is shown in the town, while Rabbi Akiba and Rabbi Meir lie buried outside. The ruins of the ancient city, including granite columns and traces of a sea-wall with towers, stretch southwards a mile beyond the modern town. An aqueduct in the cliff once brought water a distance of 9 miles from the south.

Kerak, at the south end of the lake, is an important site on a peninsula surrounded by the water of the lake, by the Jordan, and by a broad water ditch, while on the north-west a narrow neck of land remains. The plateau thus enclosed is partly artificial, and banked up 50 or 60 feet above the water. A ruined citadel remains on the north-west, and on the east was a bridge over the Jordan; broken pottery and fragments of sculptured stone strew the site. The ruin of Kerak answers to the description given by Josephus of the city of Tarichеæ, which lay 30 stadia from Tiberias, the hot baths being between the two cities. Taricheæ was situated, as is Kerak, on the shore below the cliffs, and partly surrounded by water, while before the city was a plain (the Ghôr). Pliny further informs us that Taricheæ was at the south end of the Sea of Galilee. Sinnabreh, a ruin on a spur of the hills close to the last-mentioned site, is undoubtedly the ancient Sinnabris, where Vespasian (Joseph., *B. J.*, iii. 9, 7) fixed his camp, advancing from Scythopolis (Beisân) on Taricheæ and Tiberias. Sinnabris was 30 stadia from Tiberias, or about the distance of the ruin now existing.

The eastern shores of the Sea of Galilee have been less fully explored than the western, and the sites are not so perfectly recovered. The town of Hippos, one of the cities of Decapolis, was situated 30 stadia from Tiberias, and 60 stadia from Gadara (Umm Keis). It is conjectured that the town Susitha, mentioned in the Talmud, is the same place, and the name Susyeh seems to have existed east of the Sea of Galilee at a late period. Susitha from "sus," meaning "horse," is, etymologically at least, suggestive of the Greek "hippos." The site is at present unknown. Kalat el Hosn ("castle of the stronghold") is a ruin on a rocky spur opposite Tiberias. Two large ruined buildings remain, with traces of an old street and fallen columns and capitals. A strong wall once surrounded the town; a narrow neck of land exists on the east where the rock has been scarped. Rugged valleys enclose the site on the north and south; broken sarcophagi and rock-cut tombs are found beneath the ruin. This site answers to the description Josephus gives of Gamala, an important fortress besieged by Vespasian (*Bell. Jud.*, iv. 1, 1). Gersa, an insignificant ruin north of the last, is thought to represent the Gerasa or Gergesa of the 4th century, situated east of the lake; and the projecting spur of hill south of this ruin is conjectured to be the place where the swine "ran violently down a steep place" (Matt. viii. 32). The site of Bethsaida Julias, east of Jordan, is also unknown. It has been supposed (and the theory is supported by even so important an authority as Reland) that two separate places named Bethsaida are mentioned in the New Testament. The grounds for this conclusion are, however, very insufficient; and only one Bethsaida is mentioned by Josephus. It was near the Jordan inlet, on the east side of the river, and under its later Greek name of Julias, it is mentioned, with Hippos, by Pliny. The site usually pointed out is the ruin of et Tell, north of the Batîhah plain; the remains are, however, modern and insignificant. Just south of the same plain is a ruined village called Mes'aidîyeh, the name of which approaches Bethsaida in sound but not in meaning. This is the site pointed out by Vandevelde, and it is possible that the course of Jordan has shifted westwards, and that the old mouth is marked by the two creeks running into the shore on the east, in which case the site of Mes'aidîyeh might be accepted as the Bethsaida of the gospels, which appears to have been east of Jordan.

Literature.—The most important works on the subject of Galilee and the Sea of Galilee are the following:—Robinson's *Biblical Researches*; Stanley's *Sinai and Palestine*; Tristram's *Land of Israel*; Warren and Wilson's *Recovery of Jerusalem*; Conder's *Tent Work in Palestine*; and the *Memoirs of the Survey of Palestine* (sheets 1–6, 8, 9). (C. R. C.)

GALILEO. Galileo Galilei (1564–1642), one of the earliest and greatest of experimental philosophers, was born at Pisa, February 18, 1564. His father, Vincenzo, was an impoverished descendant of a noble Florentine house, which had exchanged the surname of Bonajuti for that of Galilei, on the election, in 1343, of one of its members, Galileo de' Bonajuti, to the college of the twelve Buonuomini. The family, which was fifteen times represented in the signoria, and in 1445 gave a gonfalonier to Florence, flourished with the republic and declined with its fall. Vincenzo Galilei was a man of better parts than fortune. He was a competent mathematician, wrote with considerable ability on the theory and practice of music, and was especially distinguished amongst his contemporaries for the grace and skill of his performance upon the lute. By his wife, Giulia de' Ammannati of Pistoja, he had two sons, Galileo and Michelangiolo, and two daughters, Virginia and Livia. From his earliest childhood Galileo was remarkable for intellectual aptitude, as well as for mechanical invention. His favourite pastime was the construction of toy-machines, not the less original and ingenious that their successful working was usually much hindered by the scarcity of suitable materials. His application to literary studies was equally conspicuous. In the monastery of Vallombrosa, near Florence, where his education was principally conducted, he not only made himself acquainted with the best Latin authors, but acquired a fair command of the Greek tongue, thus laying the foundation of the brilliant and elegant style for which his writings were afterwards distinguished. From one of the monks he also received instruction in logic, according to the system then in vogue; but the futilities of the science revolted, while its subtleties

failed to interest his understanding, and he was soon permitted to abandon a study so distasteful to him. A document published by M. Selmi in 1864 proves that he was at this time so far attracted towards a religious life as to have joined the novitiate of the order; but his father, who had other designs for him, seized the opportunity of an attack of ophthalmia to withdraw him permanently from the care of the monks. Having had personal experience of the unremunerative character both of music and of mathematics, he desired that his son should apply himself to the more profitable study of medicine, and, not without some straining of his slender resources, placed him, before he had completed his eighteenth year, at the university of Pisa. He accordingly matriculated, November 5, 1581, and immediately entered upon attendance at the lectures of the celebrated physician and botanist, Andrea Cesalpino.

The natural gifts of the young student, not less multifarious than those of an earlier Tuscan prodigy, Leonardo da Vinci, seemed at this time equally ready to develop in any direction towards which choice or hazard might incline them. In musical skill and invention be already vied with the best professors of the art in Italy; his personal taste would have led him to choose painting as his profession, and one of the most eminent artists of his day, Lodovico Cigoli, owned that to his judgment and counsel he was mainly indebted for the success of his works; his wit and eloquence gave promise that he would one day add to the literary glories of his country; while his mathematical and mechanical genius only awaited a suitable opportunity for full display and development. In 1583, while watching the vibrations of the great bronze lamp still to be seen swinging from the roof of the cathedral of Pisa, he observed that, whatever the range of its oscillations, they were invariably executed in equal times. The experimental verification of this fact led him to the important discovery of the isochronism of the pendulum. He at first applied the new principle to pulse-measurement, and more than fifty years later turned it to account in the construction of an astronomical clock. Up to this time he was entirely ignorant of mathematics, his father having carefully held him aloof from a study which he rightly apprehended would lead to his total alienation from that of medicine. Accident, however, frustrated this purpose. A lesson in geometry, given by Ostilio Ricci to the pages of the grand-ducal court, then temporarily resident at Pisa, chanced to have Galileo for an unseen listener; his attention was riveted, his dormant genius was roused, and he threw all his energies into the new pursuit thus unexpectedly presented to him. With Ricci's assistance, he rapidly mastered the elements of the science, and eventually extorted his father's reluctant permission to exchange Hippocrates and Galen for Euclid and Archimedes. In 1586 he was withdrawn from the university, through lack of means, before he had taken a degree, and returned to Florence, where his family habitually resided. We next hear of him as lecturing before the Florentine Academy on the site and dimensions of Dante's *Inferno*; and he shortly afterwards published an essay descriptive of his invention of the hydrostatical balance, which rapidly made his name known throughout Italy. His first patron was the Marchese Guidubaldo del Monte of Pesaro, a man eminent for his scientific attainments, as well as influential by his family connexions. At his request he wrote, in 1588, a treatise on the centre of gravity in solids, which obtained for him, together with the title of "the Archimedes of his time," the honourable though not lucrative post of mathematical lecturer at the Pisan university. During the ensuing two years (1589–91) he carried on that remarkable series of experiments, by which he established the first principles of dynamical science, and by which he earned for himself the undying hostility of the bigoted Aristotelians of that day. From the leaning tower of Pisa he afforded to all the professors and students of the university ocular demonstration of the falsehood of the Peripatetic dictum that heavy bodies fall with velocities proportional to their weights, and with unanswerable logic demolished all the time-honoured maxims of the schools regarding the motion of projectiles, and elemental weight or levity. But while he convinced, he failed to conciliate his adversaries. The keen sarcasm of his polished rhetoric was not calculated to soothe the susceptibilities of men already smarting under the deprivation of their most cherished illusions. He seems, in addition, to have compromised his position with the grand-ducal family by the imprudent candour with which he condemned a machine for clearing the port of Leghorn, invented by Giovanni de' Medici, an illegitimate son of Cosmo I. Princely favour being withdrawn, private rancour was free to show itself. He was publicly hissed at his lecture, and found it prudent to resign his professorship and withdraw to Florence in 1591. Through the death of his father in July of that year family cares and responsibilities devolved upon him as eldest son, and thus his nomination to the chair of mathematics at the university of Padua, secured by the influence of the Marchese Guidubaldo with the Venetian senate, was welcome, as affording a relief from pecuniary embarrassment, no less than as opening a field for scientific distinction.

His residence at Padua, which extended over a period of eighteen years, from 1592 to 1610, was a course of uninterrupted prosperity. His appointment was three times renewed, on each occasion with expressions of the highest esteem on the part of the governing body, and his yearly salary was progressively raised from 180 to 1000 florins. His lectures were attended by persons of the highest distinction from all parts of Europe, and such was the charm of his demonstrations that a hall capable of containing 2000 people had eventually to be assigned for the accommodation of the overflowing audiences which they attracted. His ingenious invention of the proportional compasses—an instrument still used in geometrical drawing—dates from 1597; and about the same time he constructed the first thermometer, consisting of a bulb and tube filled with air and water, and terminating in a vessel of water. In this instrument, the results of varying atmospheric pressure were not distinguishable from the expansive and contractive effects of heat and cold, and it became an efficient measure of temperature only when Rinieri, in 1646, introduced the improvement of hermetically sealing the liquid in glass. The substitution, in 1670, of mercury for water completed the modern thermometer.

Galileo seems, at an early period of his life, to have adopted the Copernican theory of the solar system, and was deterred from avowing his opinions—as is proved by his letter to Kepler of August 4, 1597—by the fear of ridicule rather than of persecution. The appearance, in September 1604, of a new star in the constellation Serpentarius, afforded him indeed an opportunity, of which he eagerly availed himself, for making an onslaught upon the Aristotelian axiom of the incorruptibility of the heavens; but he continued to conform his public teachings in the main to Ptolemaic principles, until the discovery of a novel and potent implement of research placed at his command startling and hitherto unsuspected evidence as to the constitution and mutual relations of the heavenly bodies. Galileo was not the original inventor of the telescope.[1] That

[1] The word *telescope*, from τῆλε, far, σκοπέω, to view, was invented by Demiscianus, an eminent Greek scholar, at the request of Prince Cesi, president of the Lyncean Academy. It was used by Galileo as early as 1612, but was not introduced into English until much later. In 1655 the word *telescope* was inserted in Bagwell's *Mysteries of Astronomy*, as a term requiring explanation, *trunk* or *cylinder* being commonly used instead.

honour must be assigned to Hans Lippershey, an obscure optician of Middleburg, who, on the 21st of October 1608, offered to the states of Holland three instruments by which the apparent size of remote objects was increased. But here his glory ends, and that of Galileo begins. The rumour of the new invention, which reached Venice in April or May 1609, was sufficient to set the Italian philosopher on the track; and after one night's profound meditation on the principles of refraction, he succeeded in producing a telescope of threefold magnifying power. Upon this first attempt he rapidly improved, until he attained to a power of thirty-two, and his instruments, of which he manufactured hundreds with his own hands, were soon in request in every part of Europe. Two lenses only—a plano-convex and a plano-concave—were needed for the composition of each, and this simple principle is that still employed in the construction of opera-glasses. Galileo's direction of his new instrument to the heavens formed an era in the history of astronomy. Discoveries followed upon it with astounding rapidity and in bewildering variety. The *Sidereus Nuncius*, published at Venice in the early part of 1610, contained the first-fruits of the new mode of investigation, which were sufficient to startle and surprise the learned on both sides of the Alps. The mountainous configuration of the moon's surface was there first described, and the so-called "phosphorescence" of the dark portion of our satellite attributed to its true cause—namely, illumination by sun-light reflected from the earth.[1] All the time-worn fables and conjectures regarding the composition of the Milky Way were at once dissipated by the simple statement that to the eye, reinforced by the telescope, it appeared as a congeries of lesser stars, while the great nebulæ were equally declared to be resolvable into similar elements. But the discovery which was at once perceived to be most important in itself, and most revolutionary in its effects, was that of Jupiter's satellites, first seen by Galileo January 7, 1610, and by him named *Sidera Medicea*, in honour of the grand-duke of Tuscany, Cosmo II., who had been his pupil, and was about to become his employer. An illustration is, with the general run of mankind, more powerful to convince than an argument; and the cogency of the visible plea for the Copernican theory offered by the miniature system, then for the first time disclosed to view, was recognizable in the triumph of its advocates, as well as in the increased acrimony of its opponents.

In September 1610 Galileo finally abandoned Padua for Florence. His researches with the telescope had been rewarded by the Venetian senate with the appointment for life to his professorship, at an unprecedentedly high salary. His discovery of the "Medicean Stars" was acknowledged by his nomination (July 12, 1610) as philosopher and mathematician extraordinary to the grand-duke of Tuscany. The emoluments of this office, which involved no duties save that of continuing his scientific labours, were fixed at 1000 scudi; and it was the desire of increased leisure, rather than the promptings of local patriotism, which induced him to accept an offer, the first suggestion of which had indeed come from himself. Before the close of 1610 the memorable cycle of discoveries begun in the previous year was completed by the observation of the ansated or, as it appeared to Galileo, triple form of Saturn (the ring-formation was first recognized by Huygens in 1655), of the phases of Venus, and of the spots upon the sun. Although his priority in several of these discoveries has been contested, inquiry has in each case proved favourable to his claims. In the spring of 1611 he visited Rome, and exhibited in the gardens of the Quirinal Palace the telescopic wonders of the heavens to the most eminent personages at the pontifical court. Encouraged by the flattering reception accorded to him, he ventured, in his *Letters on the Solar Spots*, printed at Rome in 1613, to take up a more decided position towards that doctrine on the establishment of which, as he avowed in a letter to Belisario Vinta, secretary to the grand-duke, "all his life and being henceforward depended." Even in the time of Copernicus some well-meaning persons had suspected a discrepancy between the new view of the solar system and certain passages of Scripture—a suspicion strengthened by the anti-Christian inferences drawn from it by Giordano Bruno; but the question was never formally debated until Galileo's brilliant discoveries, enhanced by his formidable dialectic and enthusiastic zeal, irresistibly challenged for it the attention of the authorities. Although he earnestly deprecated the raising of the theological issue, and desired nothing better than permission to pursue unmolested his physical demonstrations, it must be admitted that, the discussion once set on foot, he threw himself into it with characteristic impetuosity, and thus helped to precipitate a decision which it was his ardent wish to avert. In December 1613 a Benedictine monk named Benedetto Castelli, at that time professor of mathematics at the university of Pisa, wrote to inform Galileo of a recent discussion at the grand-ducal table, in which he had been called upon to defend the Copernican doctrine against theological objections. This task Castelli, who was a steady friend and disciple of the Tuscan astronomer, seems to have discharged with moderation and success. Galileo's answer, written, as he said himself, *currente calamo*, was an exposition of a formal theory as to the relations of physical science to Holy Writ, still further developed in an elaborate apology addressed by him in the following year (1614) to Christina of Lorraine, dowager grand-duchess of Tuscany. Not satisfied with explaining adverse texts, he met his opponents with unwise audacity on their own ground, and endeavoured to produce scriptural confirmation of a system which to the ignorant many seemed an incredible paradox, and to the scientific few was a beautiful but daring innovation. The rising agitation on the subject which, originating probably with the sincere upholders of the integrity of Scripture, was fomented for their own purposes by the rabid Aristotelians of the schools, was heightened rather than allayed by these manifestoes, and on the fourth Sunday of the following Advent found a voice in the pulpit of Santa Maria Novella. Padre Caccini's denunciation of the new astronomy was indeed disavowed and strongly condemned by his superiors; nevertheless, on the 5th of February 1615, another Dominican monk named Lorini laid Galileo's letter to Castelli before the Inquisition.

Cardinal Robert Bellarmine was at that time by far the most influential member of the Sacred College. He was a man of vast learning and upright piety, but, although personally friendly to Galileo, there is no doubt that he saw in his scientific teachings a danger to religion. The year 1615 seems, however, to have been a period of suspense. Galileo received, as the result of a conference between Cardinals Bellarmine and Del Monte, a semi-official warning to avoid theology, and limit himself to physical reasoning. "Write freely," he was told by Monsignor Dini, "but keep outside the sacristy." Unfortunately, he had already committed himself to dangerous ground. In December he repaired personally to Rome, full of confidence that the weight of his arguments and the vivacity of his eloquence could not fail to convert the entire pontifical court to his views. He was cordially received, and eagerly listened to, but his imprudent ardour served but to injure his cause. On the 24th of February 1616 the consulting theologians of the Holy Office characterized the two propositions—that the sun

[1] Leonardo da Vinci, more than a hundred years earlier, had come to the same conclusion.

is immovable in the centre of the world, and that the earth has a diurnal motion of rotation—the first as "absurd in philosophy, and formally heretical, because expressly contrary to Holy Scripture," and the second as "open to the same censure in philosophy, and at least erroneous as to faith." Two days later Galileo was, by command of the pope (Paul V.), summoned to the palace of Cardinal Bellarmine, and there officially admonished not thenceforward to "hold, teach, or defend" the condemned doctrine. This injunction he promised to obey. On the 5th of March the Congregation of the Index issued a decree reiterating, with the omission of the word "heretical," the censure of the theologians, suspending, *usque corrigatur*, the great work of Copernicus, *De Revolutionibus orbium cœlestium*, and absolutely prohibiting a treatise by a Carmelite monk named Foscarini, which treated the same subject from a theological point of view. At the same time it was given to be understood that the new theory of the solar system might be held *ex hypothesi*, and the trivial verbal alterations introduced into the Polish astronomer's book in 1620, when the work of revision was completed by Cardinal Gaetani, confirmed this interpretation. This edict, it is essential to observe, of which the responsibility rests with a disciplinary congregation in no sense representing the church, was never confirmed by the pope, and was virtually repealed in 1757 under Benedict XIV.

Galileo returned to Florence three months later, not ill-pleased, as his letters testify, with the result of his visit to Rome. He brought with him, for the refutation of calumnious reports circulated by his enemies, a written certificate from Cardinal Bellarmine, to the effect that no abjuration had been required of or penance imposed upon him. During a prolonged audience, he had received from the pope assurances of private esteem and personal protection; and he trusted to his dialectical ingenuity to find the means of presenting his scientific convictions under the transparent veil of an hypothesis. Although a sincere Catholic, he seems to have laid but little stress on the secret admonition of the Holy Office, which his sanguine temperament encouraged him gradually to dismiss from his mind. He preserved no written memorandum of its terms, and it was represented to him, according to his own deposition in 1633, solely by Cardinal Bellarmine's certificate, in which, for obvious reasons, it was glossed over rather than expressly recorded. For seven years, however, during which he led a life of studious retirement in the Villa Segni at Bellosguardo, near Florence, he maintained an almost unbroken silence. At the end of that time he appeared in public with his *Saggiatore*, a polemical treatise written in reply to the *Libra Astronomica* of Padre Grassi (under the pseudonym of Lotario Sarsi), the Jesuit astronomer of the Collegio Romano. The subject in debate was the nature of comets, the conspicuous appearance of three of which bodies in the year 1618 furnished the occasion of the controversy. Galileo's views, although erroneous, since he held comets to be mere atmospheric emanations reflecting sunlight after the evanescent fashion of a halo or a rainbow, were expressed with such triumphant vigour, and embellished with such telling sarcasms, that his opponent did not venture upon a reply. The *Saggiatore* was printed at Rome in October 1623, by the Academy of the Lincei, of which Galileo was a member, with a dedication to the new pope, Urban VIII., and notwithstanding some passages containing a covert defence of Copernican opinions, was received with acclamation by the ecclesiastical, no less than by the scientific authorities. Everything seemed now to promise a close of unbroken prosperity to Galileo's career. Maffeo Barberini, his warmest friend and admirer in the Sacred College, was, by the election of August 8, 1623, seated on the pontifical throne; and the marked distinction with which he was received on his visit of congratulation to Rome in 1624 encouraged him to hope for the realization of his utmost wishes. He received every mark of private favour. The pope admitted him to six long audiences in the course of two months, wrote an enthusiastic letter to the grand-duke praising the great astronomer, not only for his distinguished learning, but also for his exemplary piety, and granted a pension to his son Vincenzo, which was afterwards transferred to himself, and paid, with some irregularities, to the end of his life. But on the subject of the decree of 1616, the revocation of which Galileo had hoped to obtain through his personal influence, he found him inexorable. Nevertheless, the sanguine philosopher trusted, not without reason, that it would at least be interpreted in a liberal spirit, and his friends encouraged his imprudent confidence by eagerly retailing to him every papal utterance which it was possible to construe in a favourable sense. To Cardinal Hohenzollern Urban was reported to have said that the theory of the earth's motion had not been and could not be condemned as heretical, but only as rash; and in 1630 the learned Dominican monk Campanella wrote to Galileo that the pope had expressed to him in conversation his disapproval of the prohibitory decree. Thus, in the full anticipation of added renown, and without any misgiving as to ulterior consequences, Galileo set himself, on his return to Florence, to complete his famous but ill-starred work, the *Dialogo dei due Massimi Sistemi del Mondo*. Finished in 1630, it was not until January 1632 that it emerged from the presses of Landini at Florence. The book was orginally intended to appear in Rome, but unexpected obstacles interposed. The Lyncean Academy collapsed with the death of Prince Federigo Cesi, its founder and president; an outbreak of plague impeded communication between the various Italian cities; and the *imprimatur* was finally extorted, rather than accorded, under the pressure of private friendship and powerful interest. A tumult of applause from every part of Europe followed its publication; and it would be difficult to find in any language a book in which animation and elegance of style are so happily combined with strength and clearness of scientific exposition. Three interlocutors, named respectively Salviati, Sagredo, and Simplicio, take part in the four dialogues of which the work is composed. The first-named expounds the views of the author; the second is an eager and intelligent listener; the third represents a well-meaning but obtuse Peripatetic, whom the others treat at times with undisguised contempt. Salviati and Sagredo took their names from two of Galileo's early friends, the former a learned Florentine, the latter a distinguished Venetian gentleman; Simplicio ostensibly derived his from the Cilician commentator of Aristotle, but the choice was doubtless instigated by a sarcastic regard to the double meaning of the word. There were not wanting those who insinuated that Galileo intended to depict the pope himself in the guise of the simpleton of the party; this charge, however, was not only preposterous in itself, but wholly unsupported by intrinsic evidence, and Urban was far too sagacious to give any permanent credit to it.

It was at once evident that the whole tenor of this remarkable work was in flagrant contradiction with the edict passed sixteen years before its publication, as well as with the author's personal pledge of conformity to it. The ironical submission with which it opened, and the assumed indetermination with which it closed, were hardly intended to mask the vigorous assertion of Copernican principles which formed its substance. It is a singular circumstance, however, that the argument upon which Galileo mainly relied as furnishing a physical demonstration of the truth of the new theory rested on a misconception. The ebb and flow of the tides, he asserted. were a visible effect of the terrestrial double movement, since they resulted from the inequality of the absolute velocities through' space of the various parts of the earth's surface, produced by the motion of rotation. To this notion, which took its rise in a confusion of thought, he attached capital importance, and he treated with scorn Kepler's suggestion that a certain occult attraction of the moon was in some way concerned in the phenomenon. The theological censures which the book did not fail to incur were not slow in making themselves felt. Towards the end of August the sale was prohibited; on the 1st of October the author was cited to Rome by the Inquisition. He pleaded his age, now close upon seventy years, his infirm health, and the obstacles to travel caused by quarantine regulations; but the pope was sternly indignant at what he held to be his ingratitude and insubordination, and no excuse was admitted. At length, on the 13th of February 1633, he arrived at the residence of Niccolini, the Tuscan ambassador to the pontifical court, and there abode in deep dejection for two months. From the 12th to the 30th of April he was detained in the palace of the Inquisition, where he occupied the apartments of the fiscal, and was treated with unexampled indulgence. On the 30th he was restored to the hospitality of Niccolini, his warm and generous partisan. The accusation against him was that he had written in contravention of the decree of 1616, and in defiance of the command of the Holy Office communicated to him by Cardinal Bellarmine; and his defence consisted mainly in a disavowal of his opinions, and an appeal to his good intentions. On the 21st of June he was finally examined under menace of torture; but he continued to maintain his assertion that, after its condemnation by the Congregation of the Index, he had never held the Copernican theory. Since the publication of the documents relating to this memorable trial, there can no longer be any doubt, not only that the threat of torture was not carried into execution, but that it was never intended that it should be. On the 22d of June, in the church of Santa Maria sopra Minerva, Galileo read his recantation, and received his sentence. He was condemned, as "vehemently suspected of heresy," to incarceration at the pleasure of the tribunal, and by way of penance was enjoined to recite once a week for three years the seven penitential psalms. This sentence was signed by seven cardinals, but did not receive the customary papal ratification. The legend according to which Galileo, rising from his knees after repeating the formula of abjuration, stamped on the ground, and exclaimed, "*E pur si muove!*" is, as may readily be supposed, entirely apocryphal. The earliest ascertained authority for it is the seventh edition of an *Historical Dictionary*, published at Caen in 1789. It seems probable that Galileo remained in the custody of the Inquisition from the 21st to the 24th of June, on which day he was relegated to the Villa Medici on the Trinità de' Monti. Thence, on the 6th of July, he was permitted to depart for Siena, where he spent several months in the house of the archbishop, Ascanio Piccolomini, one of his numerous and trusty friends. It was not until December that his earnest desire of returning to Florence was realized, and there, in the Villa Martellini at Arcetri, he spent the remaining eight years of his life in the strict retirement which was the prescribed condition of his comparative freedom.

Domestic afflictions combined with numerous and painful infirmities to embitter his old age. His sister-in-law and her whole family, who came to live with him on his return from Rome, perished shortly afterwards of the plague; and on the 1st of April 1634 died, to the inexpressible grief of her father, his eldest and best-beloved daughter, a nun in the convent of San Matteo at Arcetri. Galileo was never married but by a Venetian woman named Marina Gamba he had three children—a son who married and left descendants, and two daughters who took the veil at an early age. Notwithstanding this stain on the morality of his early life, which was in some degree compensated by the regularity of his subsequent conduct, Galileo's general character was one which commanded the respect of all who approached him. His prodigious mental activity continued undiminished to the last, nor were his latter years the least profitable to science of his long and eventful career. In 1636 he completed his *Dialoghi delle Nuove Scienze*, in which he recapitulated the results of his early experiments and mature meditations on the principles of mechanics. This, in many respects his most valuable work, was printed by the Elzevirs at Leyden in 1638, and excited admiration equally universal and more lasting than that accorded to his astronomical treatises. His last telescopic discovery—that of the moon's diurnal and monthly librations—was made in 1637, only a few months before his eyes were for ever closed in hopeless blindness. It was in this condition that Milton found him when he visited him at Arcetri in 1638. But the fire of his genius was not even yet extinct. He continued his scientific correspondence with unbroken interest and undiminished logical acumen; he thought out the application of the pendulum to the regulation of clockwork, which Huygens successfully realized seventeen years later; and he was engaged in dictating to his disciples, Viviani and Torricelli, his latest ideas on the theory of impact when he was seized with the slow fever which in two months brought him to the grave. On the 8th January 1642 he closed his long life of triumph and humiliation, and the coincidence of the day of his birth with that of Michelangelo's death was paralleled by the coincidence of the year of his death with that of the birth of Isaac Newton.

The direct services which Galileo rendered to astronomy are virtually summed up in his telescopic discoveries. To the theoretical perfection of the science he contributed little or nothing. He pointed out indeed that the so-called "third motion," introduced by Copernicus to account for the constant parallelism of the earth's axis, was a superfluous complication. But he substituted the equally unnecessary hypothesis of a magnetic attraction, and failed to perceive that the phenomenon to be explained was, in relation to absolute space, not a movement, but the absence of movement. The circumstance, however, which most seriously detracts from his scientific reputation is his neglect of the discoveries made during his life-time by the greatest of his contemporaries. Kepler's first and second laws were published in 1609, and his third ten years later. By these momentous inductions the geometrical theory of the solar system was perfected, and a hitherto unimagined symmetry was perceived to regulate the mutual relations of its members. But by Galileo they were passed over in silence. In his *Dialogo dei Massimi Sistemi*, printed not less than thirteen years after the last of the three laws had been given to the world, the epicycles by which Copernicus, adhering to the ancient postulate of uniform circular motion, had endeavoured to reduce to theory the irregularities of the planetary movements were neither expressly adopted nor expressly rejected; and, after exhausting all the apologies offered, the conclusion seems inevitable that this grave defection from the cause of progress had no other motive than the reluctance of the Florentine astronomer to accept discoveries which he had not originated,—this not through vulgar jealousy, of which he was incapable, but through a certain unconscious intellectual egotism, not always unknown to the greatest minds. His name, however, is justly associated with that vast extension of the bounds of the visible universe which has rendered modern astronomy the most sublime of sciences, and his telescopic observations

are not less remarkable for the sagacity which directed, than for the inspiration which prompted them. With the sure instinct of genius, he seized the characteristic features of the phenomena presented to his attention, and his inferences, except when distorted by polemical exigencies, have been strikingly confirmed by modern investigations. Of his two capital errors, regarding respectively the theory of the tides and the nature of comets, the first was insidiously recommended to him by his passionate desire to find a physical confirmation of the earth's double motion; the second was adopted for the purpose of rebutting an anti-Copernican argument founded on the planetary analogies of those erratic subjects of the sun. Within two years of their first discovery, he had constructed approximately accurate tables of the revolutions of Jupiter's satellites, and he proposed their frequent eclipses as a means of determining longitudes, not only on land, but at sea. This method, on which he laid great stress, and for the facilitation of which he invented a binocular glass, and devised some skilful mechanical contrivances, was offered by him in 1616 to the Spanish Government, and afterwards to that of Tuscany, but in each case unsuccessfully; and the close of his life was occupied with prolonged but fruitless negotiations on the same subject with the states-general of Holland. The idea, though ingenious, has been found of little practical utility at sea, where the method founded on the observed distance of the moon from a known star is that usually employed.

A series of careful observations made him acquainted with the principal appearances revealed by modern instruments in the solar spots. He pointed out that they were limited to a certain defined zone on the sun's surface; he noted the *faculæ* with which they are associated, the penumbra by which they are bordered, their slight proper motions, and their rapid changes of form. He inferred from the regularity of their general movements the rotation of the sun on its axis in a period of little less than a month (the actual period is 25d. 7h. 48m.); and he grounded on the varying nature of the paths apparently traversed by them a plausible, though inconclusive, argument in favour of the earth's annual revolution. Twice in the year, he observed, they seem to travel across the solar disk in straight lines; at other times, in curves. These appearances he referred with great acuteness to the slight inclination of the sun's axis of rotation to the plane of the ecliptic. Thus, when the earth finds herself in the plane of the sun's equator, which occurs at two opposite points of her orbit, the spots, travelling in circles parallel with that plane, necessarily appear to describe right lines; but when the earth is above or below the equatorial level, the paths of the spots open out into curves turned downwards or upwards, according to the direction in which they are seen. The explanation, however, of this phenomenon is equally consistent with the geocentric as with the heliocentric theory of the solar system. The idea of a universal force of gravitation seems to have hovered around the borders of this great man's mind, without ever fully entering it. He perceived the analogy between the power which holds the moon in the neighbourhood of the earth, and compels Jupiter's satellites to circulate round their primary, and the attraction exercised by the earth on bodies at its surface;[1] but he failed to conceive the combination of central force with initial velocity, and was disposed to connect the revolutions of the planets with the axial rotation of the sun. This notion, it is plain, tended rather towards Descartes's theory of vortices than towards Newton's theory of gravitation. More valid instances of the anticipation of modern discoveries may be found in his prevision that a small annual parallax would eventually be found for some of the fixed stars, and that extra-Saturnian planets would at some future time be ascertained to exist, and in his conviction that light travels with a measurable although, in relation to terrestrial distances, infinite velocity.

The invention of the miscroscope, attributed to Galileo by his first biographer, Vincenzo Viviani, does not in truth belong to him. Such an instrument was made as early as 1590 by Zacharias Jansen of Middleburg; and although Galileo discovered, in 1610, a means of adapting his telescope to the examination of minute objects, he did not become acquainted with the compound microscope until 1624, when he saw one of Drebbel's instruments in Rome, and, with characteristic ingenuity, immediately introduced some material improvements into its construction.

The most substantial, if not the most brilliant part of his work consisted undoubtedly in his contributions towards the establishment of mechanics as a science. Some valuable but isolated facts and theorems were previously discovered and proved, but it was he who first clearly grasped the idea of force as a mechanical agent, and extended to the external world the conception of the invariability of the relation between cause and effect. From the time of Archimedes there had existed a science of equilibrium, but the science of motion began to exist with Galileo. It is not too much to say that the final triumph of the Copernican system was due in larger measure to his labours in this department than to his direct arguments in its favour. The problem of the heavens is essentially a mechanical one; and without the mechanical conceptions of the dependence of motion upon force which Galileo familiarized to men's minds, that problem might have remained a sealed book even to the intelligence of Newton. The interdependence of motion and force was not indeed formulated into definite laws by Galileo, but his writings on dynamics are everywhere suggestive of those laws, and his solutions of dynamical problems involve their recognition. The extraordinary advances made by him in this branch of knowledge were owing to his happy method of applying mathematical analysis to physical problems. As a pure mathematician he was, it is true, surpassed in profundity by more than one among his pupils and contemporaries; and in the wider imaginative grasp of abstract geometrical principles he cannot be compared with Fermat, Descartes, or Pascal, to say nothing of Newton or Leibnitz. Still, even in the region of pure mathematics, his powerful and original mind left notable traces of its working. He studied the properties of the cycloid, and attempted the problem of its quadrature earlier than Mersenne; and in the "infinitesimals," which he was one of the first to introduce into geometrical demonstrations, was contained the fruitful germ of the differential calculus. But the method which was peculiarly his, and which still forms the open road to discoveries in natural science, consisted in the combination of experiment with calculation—in the transformation of the concrete into the abstract, and the assiduous comparison of results. The first fruits of the new system of investigation was his determination of the laws of falling bodies. Conceiving that the simplest principle is the most likely to be true, he assumed as a postulate that bodies falling freely towards the earth descend with a uniformly accelerated motion, and deduced thence the principal mathematical consequences, as that the velocities acquired are in the direct, and the spaces traversed in the duplicate ratio of the times, counted from the beginning of motion; finally, he proved,

[1] The passage is sufficiently remarkable to deserve quotation in the original:—"Le parti della Terra hanno tal propensione al centro di essa, che quando ella cangiasse luogo, le dette parti, benchè lontane dal globo nel tempo delle mutazioni di esso, lo seguirebbero per tutto; esempio di ciò sia il seguito perpetuo delle Medicee, ancorché separate continuamente da Giove. L'istesso si deve dire della Luna, obbligata a seguir la Terra."—*Diologo dei Massimi Sistemi*, Giornata terza, p. 351 of Albèri's edition.

by observing the times of descent of bodies falling down long inclined planes, that the postulated law was the true law. Even here, he was obliged to take for granted that the velocities acquired in descending from the same height along planes of every inclination are equal; and it was not until shortly before his death that he found the mathematical demonstration of this not very obvious principle.

The first law of motion—that which expresses the principle of inertia—is virtually contained in the idea of uniformly accelerated velocity. The recognition of the second—that of the independence of different motions—must be added to form the true theory of projectiles. This was done by Galileo. Up to his time it was universally held in the schools that the motion of a body must cease with the impulse communicated to it, but for the "reaction of the medium" which helps it forward. Galileo showed, on the contrary, that the nature of motion once impressed is to continue indefinitely in a uniform direction, and that the effect of the medium is a retarding, not an impelling one. Another commonly received axiom was that no body could be affected by more than one movement at one time, and it was thus supposed that a cannon ball, or other projectile, moves forward in a right line until its first impulse is exhausted, when it falls vertically to the ground. In the fourth of Galileo's dialogues on mechanics, he demonstrated that the path described by a projectile, being the result of the combination of a uniform transverse motion with a uniformly accelerated vertical motion, must, apart from the resistance of the air, be a parabola. The establishment of the principle of the composition of motions formed a conclusive answer to the most formidable of the arguments used against the rotation of the earth, and we find it accordingly triumphantly brought forward by Galileo in the second of his dialogues on the systems of the world. It was urged by anti-Copernicans that a body flung upwards or cast downwards would, if the earth were in motion, be left behind by the rapid translation of the point from which it started; Galileo, however, proved that the reception of a fresh impulse in no way interfered with the movement already impressed, and that the rotation of the earth was insensible, because shared equally by all bodies at its surface. His theory of the inclined plane, combined with his satisfactory definition of "momentum," led him towards the third law of motion. We find Newton's theorem, that "action and reaction are equal and opposite," stated with approximate precision in his treatise *Della Scienza Meccanica*, which contains the substance of lectures delivered during his professorship at Padua; and the same principle is involved in the axiom enunciated in the third of his mechanical dialogues, that "the propensity to fall of a body is equal to the least resistance which suffices to support it." The problems of percussion, however, did not receive a definitive solution until after his death.

His services were no less conspicuous in the statical than in the kinetical division of mechanics. He gave the first direct and entirely satisfactory demonstration of equilibrium on an inclined plane, reducing it to the lever by a sound and ingenious train of reasoning; while, by establishing the theory of "virtual velocities," he laid down the fundamental principle which, in the opinion of Lagrange, contains the general expression of the laws of equilibrium. He studied with attention the still obscure subject of molecular cohesion, and little has been added to what he ascertained on the question of transverse strains and the strength of beams, brought by him for the first time within the scope of mechanical theory. In his *Discorso intorno alle cose che stanno su l'acqua*, published in 1612, he used the principle of virtual velocities to demonstrate the more important theorems of hydrostatics, deducing from it the equilibrium of fluid in a siphon, and proved against the Aristotelians that the floating of solid bodies in a liquid depends not upon their form, but upon their specific gravities, relative to such liquid.

In order to form an adequate estimate of the stride made by Galileo in natural philosophy, it would be necessary to enumerate the confused and erroneous opinions prevailing on all such subjects in his time. His best eulogium, it has been truly said, consists in the fallacies which he exposed. The scholastic distinctions between corruptible and incorruptible substances, between absolute gravity and absolute levity, between natural and violent motions, if they did not wholly disappear from scientific phraseology, ceased thenceforward to hold the place of honour in the controversies of the learned. Discarding these obscure and misleading notions, Galileo taught that gravity and levity are relative terms, and that all bodies are heavy, even those which, like the air, are invisible; that motion is the result of force, instantaneous or continuous; that weight is a continuous force, attracting towards the centre of the earth; that, in a vacuum, all bodies would fall with equal velocities; that the "inertia of matter" implies the continuance of motion, as well as the permanence of rest; and that the substance of the heavenly bodies is equally "corruptible" with that of the earth. These simple elementary ideas were eminently capable of development and investigation, and were not only true, but the prelude to further truth; while those they superseded defied inquiry by their vagueness, and baffled it with their obscurity. Galileo was a man born in due time. He was superior to his contemporaries, but not isolated amongst them. He represented and intensified a growing tendency of the age in which he lived. It was beginning to be suspected that from Aristotle an appeal lay to nature, and some were found who no longer treated the *ipse dixit* of the Stagirite as the final authority in matters of science. A vigorous but ineffectual warfare had already been waged against the blind traditions of the schools by Ramus and Telesius, by Patricius and Campanella, and the revolution which Galileo completed had been prepared by his predecessors. Nevertheless, the task which he so effectually accomplished demanded the highest and rarest quality of genius. He struck out for himself the happy middle path between the *a priori* and the empirical systems, and exemplified with brilliant success the method by which experimental science has wrested from nature so many of her secrets. His mind was an eminently practical one. He concerned himself above all with what fell within the range of exact inquiry, and left to others the larger but less fruitful speculations which can never be brought to the direct test of experiment. Thus, while far-reaching but hasty generalizations have had their day and been forgotten, his work has proved permanent, because he made sure of its foundations. His keen intuition of truth, his vigour and yet sobriety of argument, his fertility of illustration and acuteness of sarcasm, made him irresistible to his antagonists; and the evanescent triumphs of successful controversy have been succeeded by the lasting applause of posterity.

The first complete edition of Galileo's writings was published at Florence (1842–1856), in 15 8vo vols., by the Società Editrice Fiorentina, under the able supervision of Signor Eugenio Albèri. Besides the works already enumerated, it contains the hitherto inedited *Sermones de Motu Gravium*, composed at Pisa between 1589 and 1591; his letters to his friends, with many of their replies, as well as several of the essays of his scientific opponents; his private comments on the *Orlando Furioso*, of which he was an enthusiastic admirer, and on the *Gerusalemme Liberata*, of which he was an equally persistent depreciator; some stanzas and sonnets of no great merit, together with the sketch of a comedy; finally, a reprint of Viviani's *Life*, with valuable notes and corrections. The original documents from the archives of the Inquisition, relating to the events of 1616 and 1633, recovered from Paris in 1846 by the efforts of Count Rossi, and now in the Vatican Library, were to a limited extent made public by Monsignor Marino-Marini in 1850, and

more unreservedly by M. Henri de l'Épinois, in an essay entitled "Galilée, son Procès, sa Condemnation," published in 1867 in the *Revue des Questions Historiques*. He was followed by M. Karl von Gebler, who, in an able and exhaustive but somewhat prejudiced work, *Galileo Galilei und die Römische Curie* (Stuttgart, 1876), sought to impeach the authenticity of a document of prime importance in the trial of 1633. He has, however, been victoriously answered by Signor Domenico Berti, in *Il Processo originale di Galileo Galilei* (Rome, 1876), and by M. de l'Épinois, with *Les Pièces du Procès de Galilée* (Rome, Paris, 1877). The touching letters of Galileo's eldest daughter, Sister Maria Celeste, to her father were printed in 1864 by Professor Carlo Arduini, in a publication entitled *La Primogenita di Galileo Galilei*. See also M. Th. Henri Martin's excellent biography, *Galilée, les Droits de la Science et la Méthode des Sciences Physiques*, Paris, 1868; and the anonymous *Private Life of Galileo*, London, 1870. (A. M. C.)

GALITCH, or Halicz, a town of Russia, at the head of a district in the government of Kostroma, 80 miles N.E. of Kostroma, in 57° 15′ N. lat. and 42° 56′ E. long., on the low south-eastern shore of Galitch Lake. Among its public buildings are a hospital, a poorhouse opened in 1855, about 15 churches, and a convent of the third class. The chief occupation of the inhabitants is the manufacture of leather and gloves; and the fisheries of the lake yield about 30,000 rubles per annum, and give employment to about 400 fishermen, whose rights are secured by ancient charters. At the annual fair a considerable trade is done in woollen and cotton goods, earthenware, and miscellaneous articles. In 1860 the population was 6536; but in the *St Petersburg Calendar* for 1878 it is given at 5620.

GALL, Franz Joseph (1758–1828), anatomist, physiologist, and founder of phrenology, was born at Tiefenbrunn near Pforzheim, Baden, on the 9th of March 1758. After completing the usual literary course at Baden and Bruchsal, he began the study of medicine under Hermann at Strasburg, whence, attracted by the names of Van Swieten and Stoll, he removed to Vienna in 1781. Having received his diploma, he began to practise as a physician there in 1785; but his energies were mainly devoted to the scientific investigation of problems which, even from boyhood, had been occupying his attention. At a comparatively early period he had formed a generalization which he believed to be a sound one, that in the human subject at least a powerful memory is invariably associated with prominent eyes; and further observation had enabled him, as he thought, also to define the external characteristics indicative of special talents for painting, music, and the mechanical arts. Following out these researches, he gradually reached the strong personal conviction, not only that the talents and dispositions of men are dependent upon the functions of the brain, but also that they may be inferred with perfect exactitude and precision from the external appearances of the skull. Gall's first appearance as an author was made in 1791, when he published the first two chapters of a (never completed) work entitled *Philosophisch-medicinische Untersuchungen über Natur u. Kunst im kranken u. gesunden Zustande des Menschen*. The first public notice of his inquiries in cranioscopy, however, was in the form of a familiar letter addressed to a friend, which appeared in Wieland's *Deutscher Mercur* in 1798; but two years before this Gall had commenced giving private courses of phrenological lectures in Vienna, where his doctrines soon attracted general attention, and met with increasing success until, in 1802, they were interdicted by the Government on the ground that they were dangerous to religion. This step on the part of the authorities had the effect of greatly stimulating public curiosity and increasing Gall's celebrity. In March 1805 he finally left Vienna, in company with his friend and associate Spurzheim, and made a tour through Germany, in the course of which he lectured in Berlin, Dresden, Magdeburg, and several of the university towns. These expositions, which he knew how to make popular and attractive, were much resorted to by the public, and excited considerable controversy in the scientific world. He had almost reached the zenith of his fame when, in 1807, he repaired to Paris and established himself there as a medical practitioner, at the same time continuing his activity as a lecturer and writer. In 1808 appeared his *Introduction au cours de physiologie du cerveau*, which was followed in 1809 by the *Recherches sur le système nerveux en général, et sur celui du cerveau en particulier* (originally laid before the Institute of France in March 1808), and in 1810 by the first instalment of the *Anatomie et Physiologie du système nerveux en général, et du cerveau en particulier, avec des observations sur la possibilité de reconnaître plusiers dispositions intellectuelles et morales de l'homme et des animaux par la configuration de leurs têtes*. The *Recherches*, and the first two volumes of the *Anatomie*, bear the conjoint names of Gall and Spurzheim. The latter work was completed in 1819, and appeared in a second edition of six 8vo volumes shortly afterwards (1822–25). In 1811 he replied to a charge of Spinozism or atheism, which had been strongly urged against him in certain quarters, by a treatise entitled *Des dispositions innées de l'âme et de l'esprit*, which he afterwards incorporated with his greater work. In 1819 he became a naturalized French subject, but his efforts two years afterwards to obtain admission to the Academy of Sciences, although supported by Geoffroy St Hilaire, were unsuccessful. In 1823 he visited London with the intention of giving a series of phrenological lectures, but was disappointed of the reception he had anticipated, and speedily abandoned his plans. He continued to lecture and practise in Paris until the beginning of 1828, when he was disabled by an apoplectic seizure. His death took place at Montrouge near Paris, on the 22d of August 1828. The *Anatomie* has been translated into English by Lewis (Boston, U.S., 1835).

GALLAND, Antoine (1646–1715), Orientalist and archæologist, the first European translator of the *Arabian Nights*, was born in 1646 at Rollot, in the department of Somme. The completion of his school education at Noyon was followed by a brief apprenticeship to a trade, from which, however, he soon escaped, to pursue his linguistic studies at Paris. After having been employed for some time in making a catalogue of the Oriental manuscripts at the Sorbonne, he was, in 1670, attached to the French embassy at Constantinople; and in 1673 he also accompanied his chief (De Nointel) to Syria and the Levant, where he availed himself of the opportunity to copy a great number of inscriptions, and also to sketch, in some cases even to remove, historical monuments. After a brief visit to France, where his collection of antiquities attracted some attention, Galland returned to the Levant in 1676; and in 1679 he undertook a third voyage, being commissioned by the French East India Company to collect for the cabinet of Colbert; on the expiry of this commission he was instructed by the Government to continue his researches, and had the title of "antiquary to the king" conferred upon him. During his prolonged residences abroad he acquired a thorough knowledge of the Arabic, Turkish, and Persian languages and literatures, which, on his final return to France, enabled him to render valuable assistance to Thevenot, the keeper of the royal library, and to D'Herbelot. After their deaths he lived for some time at Caen under the roof of Foucault the intendant, himself no mean archæologist; and there he began the publication (1704–17) of *Les Mille et Une Nuits*, a translation which excited immense interest during the time of its appearance, and which is still the standard French translation (last edition 1872). In 1701 Galland had been admitted into the Academy of Inscriptions, and in 1709 he was appointed to the chair of Arabic in the Collége de France. He continued to discharge the duties of this post until his death, which took place February 17, 1715.