of great excellence, while in some respects they are altogether unique. In principle they embrace a very complete system of culture, in practice, however, it is found that their system is more especially adapted to the wealthier classes of the community. Judging of a tree by its fruits, we must not forget what a brilliant galaxy of statesmen, divines, philanthropists, and men of the highest general culture, have owed their training to these great Universities. It is when we come to strictly scientific professions, such as medicine and chemistry, that the deficiencies of these institutions begin to appear; neither Oxford nor Cambridge has turned out an appreciable number either of distinguished physicians or distinguished chemists. Those who are desirous to become proficient in these branches of knowledge almost invariably go elsewhere. The same may perhaps be said of the science of engineering.

It has been proved a great misfortune to the country that these two Universities have unwarrantably neglected the scientific training of their graduates. Nor is it untrue to say that in the past generation they have produced statesmen of unquestionable eminence, but yet profoundly ignorant of the scientific requirements of their country. It is only now, after a somewhat prolonged agitation, that the minds of the rulers of this country are becoming awake to the paramount value of science in the development of our resources.

Let us now briefly consider the four Universities of Scotland. These institutions educate a far larger proportion of the people of Scotland than Oxford and Cambridge do of the English people. They are the training-schools rather of the middle than of the upper classes of the community. They excel in those branches in which Oxford and Cambridge are deficient, and they are deficient in those respects in which Oxford and Cambridge excel. Good medical men and men of good acquirements in various branches of science are produced by these Universities, but the accomplished scholar or mathematician is not produced—at least to any great extent. Nor, so far as we are aware, is any attention given to the physical training of the undergraduates. The Scotch Universities are not now connected with the Established Church of Scotland, except in the fact that there is a theological faculty attached to each of them, and that the Church of Scotland looks to that faculty alone for the theological training of its ministers. They are in the habit, however, of giving theological degrees with praiseworthy impartiality to eminent divines in all the somewhat numerous divisions of the Presbyterian Church, and occasionally to English Nonconformists.

The University of London is different from all these, inasmuch as it is entirely unconnected with any religious denomination. It had its origin, if we mistake not, in the wish to give degrees to those who, from adverse circumstances, had been unable to receive a University education, but who were yet possessed of the requisite information implied in a degree.

At the present moment a large number take advantage of this institution, and we believe that nearly 700 candidates presented themselves at the recent matriculation examination. Of these, however, the great majority are not unattached students, but are probably connected with some metropolitan or provincial college that has not the

power of granting degrees. Thus the University of London is at present the degree-giving body for the alumni of a considerable number of colleges scattered throughout the country, and in virtue of this position it has a very great influence in regulating the studies at those institutions.

We have thus briefly described the present position of the higher education of this country, and it remains to consider in what respect the present system is deficient and how this deficiency may be remedied, consistently, of course, with those conditions which we have stated, and which no legislation can possibly ignore. This, however, must be reserved for a future occasion.

GALILEO AND THE ROMAN COURT

Galileo Galilei und die Römische Curie. Von Karl von Gebler. (Stuttgart, 1876. London: Trübner and Co.)

THIS work supplies a continuous and detailed narrative of the circumstances under which Galileo incurred the hostility of the dominant party at Rome at the opening of the seventeenth century, and was by their influence denounced to, and ultimately tried and condemned by, the supreme tribunal of the Inquisition. An Appendix contains the text of the principal documents referred to in the body of the work. The whole forms a volume of rather more than 400 pages.

Such an undertaking, though it may, at first sight, appear a mere piece of surplusage to those who know how extensive is the already existing Galileo literature, is yet abundantly justified by recent events. Within the last ten years original documents published in France and Italy, and German critical researches based upon them, have completely overthrown the view hitherto held by the most competent writers on this subject, and compelled the adoption of a diametrically opposite conclusion. All previous narratives of the trial of Galileo are thus necessarily superseded, and its history must be entirely re-written. Without attempting to explain the nature of the evidence which has brought about this change of view, a task much beyond my present limits, I propose to state wherein the change itself consists, and to what extent the opinions hitherto held concerning the conduct of the prisoner and of the Court are affected by it.

The essence of the charge against Galileo was, as we learn from the sentence finally pronounced, that after having been formally prohibited by the Inquisition from defending the Copernican theory, he had, in his Dialogues on the two rival systems of the universe, openly contravened this order, and so committed a clear act of contumacy, or, as we should call it, contempt of Court. On the question whether the accused had actually defended Copernicanism in his Dialogues, modern writers were able to form an independent judgment by the study of his incriminated work; but the statement about the injunction personally laid upon him by the Inquisition rested solely on the assertion of the Court itself, unsupported by one tittle of corroborative evidence. It is therefore a remarkable circumstance, and no bad illustration of how much may be done by strong asseveration, that the best historians, including some by no means antecedently inclined to repose a child-like confidence in the veracity of the Holy Office, one and all accepted its statement

on this decisive point as representing an undoubted historical fact. As Galileo's advocacy of Copernicanism was indisputable, the gratuitous admission of the second premiss of the Court necessarily also involved its conclusion, viz., that it had a right to punish the philosopher for his transgression of its command. Such accordingly was the practically unanimous verdict of historians.

Up to 1867 no portions of the proceedings in the case, except the sentence and form of recantation, had been made public in a trustworthy shape; but in that year M. de l'Épinois was permitted by the Roman authorities to publish *in extenso* the greater part of the original trial-record preserved in the archives of the Inquisition. A mass of fresh evidence thus became generally accessible, and was further increased by the publication in 1870, by Prof. Gherardi, of a second set of original documents bearing on the trial. It now became possible to check the statements of the tribunal by reference to the documents which it employed, and to the defence and depositions of the accused. This was done by Dr. Emil Wohlwill, of Hamburg, who, in a pamphlet published in 1870, showed that such a comparison led straight to the conclusion that the personal injunction asserted and relied on by the Inquisition had never been actually delivered to Galileo. Wohlwill supports this position by a mass of corroborative testimony extracted, with singular acuteness and ability, from Galileo's works and letters, and thus renders his case perfectly irresistible. These new results, striking and interesting as they obviously are, have attracted but little notice on the Continent, and an account of them given by me in a Friday evening lecture at the Royal Institution¹ constitutes, I believe, the only public attention they have received in this country.

As the charge advanced against Galileo was, after all, only formal and technical, his exoneration from it will hardly be considered as affecting in any considerable degree the estimate hitherto formed of his conduct in the matter, except indeed by those persons who consider unhesitating obedience to the will of a Roman Congregation as the duty of every right-thinking man. Unfortunately too, the nature of his answers under examination must influence opinion more considerably in an unfavourable direction. Not only did Galileo deny on oath having ever held the Copernican doctrine; he actually offered to write another Dialogue in refutation of the arguments in favour of the condemned tenet to be found in his former work, and protested his belief in the old Ptolemaic hypothesis as "most true and indubitable." Much allowance ought unquestionably to be made for an infirm and terror-stricken old man, but, even so, there remains an amount of really gratuitous insincerity on which it is painful to dwell, though it would be disingenuous to pass it over in silence.

As to the course pursued by the condemning tribunal, there can be little or no doubt that it deliberately lent itself to perhaps the most nefarious practice of which a judicial body can be guilty, namely, the admission of evidence known both to be false and to have been fabricated for the express purpose of securing a conviction which could not be compassed by fair means. The theological antagonists of the Holy Office have, no doubt, over

and over again charged it with atrocities of this and of every other description, but I know of no instance save the present in which it has been convicted of such an enormity out of the mouth of its own records.

Thus much of introduction appeared indispensable in order to define the point of view from which the volume in hand is written. Herr von Gebler regards the conclusions of Wohlwill as so firmly established, that his duty as an historian is no longer to discuss or defend them, but to weave them, together with the previously known facts of the case into a succinct narrative arranged in the order of time. Even to summarise the contents of his volume would be to attempt a fresh Life of Galileo. All that can be done here is to draw attention to a few of the salient incidents as they are presented in Von Gebler's pages.

It would seem that it was the Jesuits who, from beginning to end, were responsible for the persecution of the philosopher; and, most unfortunately for him, he quitted the service of the only State in Italy which could have enabled him to defy their machinations at the very time when its protection began to be urgently needed. Oppressed by the amount of lecturing and teaching incumbent upon him as Professor at Padua, and anxious, as it would seem, to illustrate in his own person the benefits to be derived from the "endowment of original research," Galileo applied for, and after some negotiation obtained, the post of first Mathematician about the person of the Grand Duke of Tuscany, which he hoped would secure him uninterrupted leisure for the prosecution of investigation and discovery. Von Gebler comments as follows on this calamitous step:—

"In spite of all the great advantages which this new post brought him, Galileo made a thoroughly bad exchange when he quitted the free territory of the Venetian republic in order to commit himself to the doubtful protection of a sovereign who, though personally very well disposed towards him, was young, vacillating, and, moreover, completely under the control of Rome. It was essentially the first step in the course which led Galileo towards his doom. Complete freedom of teaching existed actually in the Venetian Republic; nominally only in Tuscany. In Venice politics and science appeared guaranteed against Jesuit intrigues, for when Paul V. had thought fit to lay the uncompliant Republic under an Interdict (April 13, 1606), the Fathers of the Society of Jesus had to submit to immediate and permanent expulsion from its territory. In Tuscany, on the other hand, where the Order was thoroughly at home, its mighty influence lay heavy on all that touched its interests, and especially therefore on politics and science. Had Galileo never forsaken the fresh healthy air of the Free State, in order to breathe a close Rome-infected Court atmosphere, he would, there is every reason to believe, have escaped the subsequent persecutions of Rome, inasmuch as that same republic which, but shortly before, had not allowed itself to be intimidated by the papal excommunication pronounced against its Doge, its Senate, and its entire Government, would assuredly not have delivered up one of its University professors to the vengeance of the Roman Inquisition."

The period of private controversy during which the question at issue between the old and the new astronomy was forced, against the wish of Galileo, from a scientific to a theological mode of discussion, is very fully described by our author, who gives many amusing instances of the

¹ On May 8, 1874.

ludicrous manner in which the Aristotelian philosophers attempted by *à priori* logical considerations to disprove the reality of the celestial appearances revealed by the telescope, and "as by magical enchantments to conjure them out of the heavens." So far as the *truth* of the Copernican theory was concerned, these individual skirmishes were put an end to by the peremptory decree of the Index Congregation (March 5, 1616), which reduced the revolutionary theory, for all Roman Catholic astronomers, to the level of a mere hypothesis, convenient indeed for the representation of phenomena, but not corresponding to actual external facts. This, the undoubted scope of the decree, which has escaped most previous writers, is carefully stated by von Gebler. The point is one of much interest, since the repressive attitude then taken up was not finally abandoned until as late as 1820. Two hundred years of astronomical research were needed to break down the unyielding Papal *non possumus*.

The appearance in 1632 of Galileo's *Dialogue on the Ptolemaic and Copernican systems* was the signal for the final catastrophe. Its high significance is well brought out in the following extract:—

"The book contains far more than the title promises, for the writer has, in connection with his discussion of the two great systems of the universe, introduced a record of almost every important result obtained by him during nearly fifty years of scientific research and discovery. The author shows himself determined to adopt a style which should appear not exclusively calculated for scholars, but, on the contrary, intelligible and even highly attractive for every really educated man. The essential object of the book was to spread abroad as widely as possible a clear recognition of the constitution of nature in its absolute and final form. That this object was so successfully achieved is attributable not merely to Galileo's philosophic, but, in the first instance at least, perhaps even more to his literary eminence. The external form of the work was in itself most happily chosen. There is not a trace of the dryness of a systematic treatise in which proof succeeds proof with a wearisome monotony, hardly relieved by a single pause. On the contrary, the facile lively form of dialogue so tolerant of digression, gave the author full opportunity to develop his impetuous eloquence, his singular power of reasoning, his biting satire—in short, his special and brilliant style."

Next let us observe the effect of the work on the enemies of its author:—

"Galileo, as one of the most momentarily effective of pioneers, was in a high degree obnoxious to the Jesuits, and members of the order had repeatedly been signally worsted in scientific conflicts with the great philosopher, a circumstance by no means fitted to dispose the Fathers of the Society more favourably towards him. As soon as they recognised that in his latest work he had employed an immense array of facts and an overwhelming force of argument for the destruction of the fundamental principles of the old school, in order to build up with an inexorable logic the modern edifice upon its ruins, the Jesuits set all their levers to work to secure the suspension of the revolutionary book, and later, to bring about the ruin of its dangerous author. A prosecution before the Inquisition was their most convenient, indeed probably their only possible weapon."

The notion, still entertained by some writers, that nothing really serious was meant by the trial, but only the settlement of a point of ecclesiastical etiquette, is

totally dispelled by the evidence stated in von Gebler's narrative. We see Galileo completely panic-stricken on first receiving the summons of the terrible tribunal, endeavouring in every possible way to keep out of its grip, and only finally complying when the Court had actually issued its writ to have him brought up to Rome *in irons*. We see the Grand Duke of Tuscany writing autograph letters to the Cardinals who were members of the Holy Office, begging for a favourable consideration of his servant's case. We see the Pope himself in a fit of ungovernable fury against Galileo;—fury so intense that the Florentine Ambassador, who had provoked it by defending the philosopher, precipitately dropped the subject, "lest he too should be charged with heresy by the Holy Office." During the slow progress of his case in Rome, Galileo was unquestionably treated with quite exceptional favour, in being allowed to reside in the house of the Ambassador except during the days of his actual examination, and even then lodged in comfortable rooms in the apartments of the Commissary Fiscal, instead of in the ordinary prison. Of what took place during the examination we are not completely informed. That the prisoner was threatened with the torture is certain; whether it was actually inflicted is still a moot point. Von Gebler very confidently maintains that it was not, and his reasoning at least proves that, if employed at all, it must have been but slightly.

The closing portion of the narrative presents a dismal picture of years lingered out amid severe physical suffering under the stony-hearted supervision, constant petty interference, and reiterated threats of the Holy Office. And when at last the old man dies, blind and helpless, but surrounded with a glory destined to outlive that of popes and cardinals, the Inquisition is seen nervously bustling about to prevent any memorial being erected to the great astronomer, "lest the good be scandalised," or if that could not be achieved, at least to secure that neither in the inscription nor in the oration pronounced at the grave, "words should occur injurious to the reputation of this tribunal."

"The feeble Duke of Tuscany did not venture to disregard in the smallest degree these unamiable Papal wishes. Even the last directions of Galileo, that he should be laid in the tomb of his ancestors in the church of Santa Croce at Florence, were not respected. The insignificant side chapel of that church, called the *capella del noviziato*, received the mortal remains of the great departed. His body was there buried quietly and without public ceremonial in accordance with the will of Urban VIII. No memorial, no inscription marked his last resting-place. But, do what Rome would to wipe out the memory of the famous philosopher, she failed in her attempt to bury in the same grave with his lifeless corpse, the immortal name of Galileo Galilei."

Herr von Gebler has performed his task with meritorious zeal and conscientious labour. He is scrupulously accurate in his use of authorities, and shows a fixed determination—no small merit in a biographer of Galileo—not to exchange the standing-ground of history for the quicksands of ecclesiastical controversy. His narrative is clear and readable, though not free from a tendency to diffuseness and verbal redundancy which are more sharply criticised in England than in Germany. On one point only does he appear to me open to any serious censure,

viz., in the amount of recognition which he has assigned to the principal pioneer in the department of history on which he writes, I mean, of course, Dr. Wohlwill. Without wishing to imply that von Gebler has intentionally minimized the credit he has given to Wohlwill, I certainly think that a person acquainted with the latter's pamphlet only by the former's references, would form an inadequate conception of the extent to which its few and unassuming pages have supplied both materials and suggestions since incorporated and turned to account in the present work.

SEDLEY TAYLOR

MARGARY'S JOURNALS AND LETTERS

The Journey of Augustus Raymond Margary from Shanghai to Bhamô, and back to Manwyne. From his Journals and Letters. With a brief Biographical Preface, and concluding Chapter, by Sir Rutherford Alcock, K.C.B. Portrait and Map. (London: Macmillan and Co., 1876.)

THE publication of these journals and letters can only serve to confirm and deepen the general regret felt at the untimely fate of Mr. Margary. After looking at the manly, genial, and determined face which Jeens has so faithfully reproduced, and reading the hurried but able and invariably interesting notes which have been preserved of the now famous journey, one burns with vexation that through some possibly preventible misunderstanding or ignorant blunder, so promising and noble a youth should have been sacrificed, just when he had shown of how great things he was capable. We need not here enter into details with which, doubtless, all our readers are familiar through the daily press, and to which we have already referred in connection with Dr. Anderson's recent work (vol. xiii., p. 422), to which the present publication is the fitting complement.

The Indian Government had determined to make another attempt—Sladen's in 1868 was a failure—to open up a trade route between Burmah and China. A party was to leave Bhamô in January, 1875, cross the frontier, and make its way to Shanghai. It was thought advisable that some one should traverse the route in an opposite direction, so as to meet this party on the frontier; Mr. Margary, who had been for some years in our Consular Chinese Service as interpreter, was selected for the critical but honourable duty, and in accordance with instructions set out from Shanghai in August, 1874. The energetic youth—he was twenty-eight years of age—eager to be of use in the world, and naturally eager for distinction, rejoiced to have such a splendid opportunity, dangerous though he knew the task to be, and with speed and secrecy made his preparations, and set out furnished with a pass from the Chinese Government. He had a journey before him of not far short of 2,000 miles, right through the heart of the Chinese Empire, a large portion of the distance over ground not previously traversed by any European. About one half of the distance was in steamer and by boat up the Yang-tse-Kiang, and its tributary, the Yuan. At Chen-Yuan-Fu, in the Kwei Chou province, he was furnished with carriers and baggage animals, and thus safely made his way to his destination, Bhamô, in Burmah, a short distance on the

other side of the Chinese frontier. Probably no one ever made a journey of such length through any part of China and met with fewer obstructions. It was not the pass he was provided with that alone did it, for in one or two instances the officials of towns could annoy him in spite of it. It was his humanity, his toleration, his geniality and sense of humour and disposition to see the best side of everything and everybody; it was these qualities combined with his perfect acquaintance with the language and knowledge of and respect for Chinese customs, along with a determination to make his mission a success, that carried him safely and happily through circumstances in which ninety-nine others would have come to grief.

During a great part of his journey, Mr. Margary was almost prostrated by illnesses of various kinds; yet those are mistaken who think that the book before us contains merely a few meagre scraps thrown together to make up a volume. In spite of illnesses and of the fact that as in duty bound he made all haste to get to the end of his journey, Mr. Margary contrived, by observation and intercourse, to obtain a substantial amount of really valuable information about the country and the people through which he passed. He had of course no time for minute exploration, though a fair acquaintance with geology and botany qualified him for profitable work of this kind; but his journals and letters contain many important notes on the physical geography and resources of the extensive tract through which his journey lay. He kept eyes and ears open, and his notes show that in this part of China there is plenty of scope for mining and commercial enterprise, and a fruitful field awaiting the scientific explorer. Many important observations will also be found in these remains concerning the people of the various districts and their ethnological relations. Especially do the notes of his intercourse with officials, and non-officials as well, serve to shed a light on Chinese character that we are sure will be new to many. Mr. Margary set himself from the first to understand the Chinese, a task of the greatest difficulty, and came to the conclusion that the common notions on this curious people are far from correct.

The brief biographical sketch and a few early letters enable one to trace the growth and training of the unfortunate youth from his school-days. He was evidently made of excellent stuff to begin with, and took the best possible advantage of his educational opportunities. When only about twenty he was appointed as interpreter to China. Here he speedily acquired a mastery of the language, and did duty at various places before his last settlement at Shanghai. While on the island of Formosa he supplemented his defective scientific education by, as we have said, the acquisition of a knowledge of botany and zoology. On several occasions, moreover, before his final feat, he showed his readiness of resource, bravery, determination, and skill in dealing with men. And yet, through some yet unexplained blunder, this splendid young fellow, so well adapted for long service to his country and to science, was obscurely and brutally murdered in a petty Chinese village. The mission under Col. Browne had proceeded on its way some little distance beyond the Burman frontier, when Margary volunteered to go forward with one or two attendants to remove some seemingly small obstruction at Manwyne. No more was