Mathematics, Faith and Politics during the Italian Risorgimento
Snapshot Three - Unification Brings Choices

Introduction

In the first two snapshots of this series we learned how mathematicians responded to changes taking place in the political, social and religious life in Italy in the first half of the nineteenth century. Accompanying these changes were changing views on the roles mathematics and mathematicians should play in society. We saw examples of Italian mathematicians who engaged in public debates over these ideas and others who set aside their differences to work towards common goals for Italian mathematics. Our third snapshot looks at the events of the decades on either side of the unification of the entire Italian Peninsula, which took place in 1870 (unification of all of Italy except Venetia and the Papal States had already occurred by 1860). This was a time when the Catholic Church and its scientists were trying to deal with the increasing secularization they saw in the world as well as the imminent loss of the pope's temporal power and perhaps his influence in the world. We look at two eminent Catholic scientists, one a historian of mathematics and the other an astronomer, and show how they tried to reconcile faith and reason during an increasing secularization of science. We will see also how the Pope and the Catholic Church used their influence to further the image that the Church was not an opponent of science but rather the promoter of true science.

We will then return to the Risorgimento mathematicians we encountered in Snapshot Two: Brioschi, Betti, Cremona, and Genocchi, and see how they began to channel their energies into nation building for the newly unified country. They served as parliamentarians and senators, served in the Ministry of Education, and led the reform of the educational systems in Italy. These mathematicians "shared a vision in which culture and education were intertwined with freedom and nationality, in which mathematics played a principal role in secular culture." (Gasca, 2011, p. 46)

Snapshot Three: Unification Brings Choices

The 1850s continued to be a time of collaboration and cooperation between patriotic mathematicians and those more closely tied to the interests of the Catholic Church. Despite different agendas for the two groups, there were commonalities of purpose. Some shared an extensive correspondence; others wrote articles for each other's journals. All were interested in promoting Italian science. Their love of science and mathematics was able to transcend political and religious differences.

But the 1860s brought changes and with them more deliberate focuses of each of these two groups. The events in the 1870s of the unification of Italy and the Church and State's responses required the mathematicians aligned with the Church and those with the State to make choices, creating a chasm between them. We will look at the events that led to the formation of this chasm and the decisions made by leaders on both sides that added to the divide. Some efforts were made to bridge this chasm and we will examine how successful these efforts were.

<u>Two Catholic Scientists – Faith above reason</u>

The first Catholic scientist we look at is Prince Baldassarre Boncompagni-Ludovisi (1821-1894). Boncompagni was born into a wealthy and ancient noble Roman family. He studied under Barnabas Tortolini at *La Sapienza* University in Rome. In 1843 he published a memoir on definite integrals in *Crelle's Journal* but soon afterwards his interest turned towards the history of the mathematical and physical sciences. His 1851-1852 essay on Leonardo Pisano, also known as Fibonacci, earned him acclaim especially among those working in the history of science. He continued his work on Fibonacci, publishing a voluminous edition of Fibonacci's works during the years 1857-1862. Boncompagni used his vast personal fortune to support the study of the history of science. He collected copies of important manuscripts from libraries all over the world amassing the largest private collection of scientific codices existing in the nineteenth century with over 20,000 volumes and 650 manuscripts. The nuclei of his collection were works on mathematics and the mathematical sciences. Boncompagni opened his library to researchers and supported publications dealing with the history of science, even establishing his own printing press to facilitate such publishing.

In 1884 the *Accademia di Religone Cattolica* (ARC), the Catholic institute charged with harmonizing scientific research and the dogmas of the Church, asked for Boncompagni's help to resist the secularization of scientific knowledge. (Mazzotti, 2000, p. 276) The Church was concerned not only with political events which portended the end of the pope's temporal power, but what it saw as the accompanying loss of its influence against secular humanism. The Church called upon its academics to use their intellectual resources to fight the secularization of moral, political and scientific knowledge. The ARC's approach was to highlight the beneficial influence of Christianity on civilization while promoting empirical and local problem-solving techniques. Abstract or conceptual interpretation of the meaning of science was considered dangerous for empirical work.

As Mazzotti has pointed out in his *Geometers of God* article on Fergola, this local approach to science reflected a "cultural strategy that aimed to restore a hierarchical order among scientific, moral and religious sciences." (Mazzotti, 2000, p. 277) Members of the ARC were charged with restoring the harmony between science and faith according to the ideas of Thomas Aquinas who saw "all disciplines were harmonized around theology by means of philosophy." (Mazzotti, 2000, p. 277) Thomism was promoted to show that the Church was not an enemy of science while protecting the church against secular philosophy, rationalism, science, and Protestant individualism. (O'Leary, 2007, p. 59)

Boncompangi contributed to this effort through his journal, the *Bullettino di bibliografia e di storia delle scienze matematiche e fisiche* (Bulletin of bibliography and history of mathematical and physical sciences). This was the first Italian journal devoted to the history of mathematics. As editor, Boncompagni emphasized a local conception of mathematical procedures. Mathematical sciences, he felt, were to be studied in isolation from other branches of human knowledge such as the social sciences and humanities. Most of Boncompagni's own contributions to the journal were concerned with the Middle Ages, which he saw as a period of both unsurpassed cultural flourishing and rejection of the creed of materialism.

Boncompagni employed a unique methodology in his journals that many described as fanatical or excessive. He had very strict guidelines in regards to the handling of original sources, the way references and quotations were to be documented, and the use of detailed, overlong footnotes. The scrupulous reproduction of documentary sources was more important than the interpretation of these sources. He felt that the documents could speak for themselves and did not need historical or social interpretations. (This interpretation of documents was a practice that would become common for historians in the later nineteenth century.) While Boncompagni engaged in no direct political activity, he still played a crucial role in the ideological battle being fought by the Catholic Church against the secularization of knowledge and society. His support of neo-Thomism was a refutation of secularization and the humanistic approach to knowledge and morality that was part of the new Italy of the nineteenth century.

> *Although innovative in opening a space entirely devoted to the history of the exact sciences, Boncompagni's Bullettino adopted a historiographical methodology elaborated by scholars who resisted the secularization of knowledge. Boncompagni's methodological choices, usually described as extremely 'technical', philosophically 'neutral' and even 'positivistic', were in fact organically connected to the Neo-Scholastic (Thomistic) conception of knowledge.* (Mazzotti, 2000, p. 282)

Another way Boncompagni supported the Church's position on the interplay between science and faith was through the *Bullettino*'s biographical sketches. These sketches give insight into Boncompagni's view of the ideal scientist or mathematician.

> *According to the Bullettino the scientist, and the mathematician in particular, is primarily an ascetic. Mathematical practice is indeed presented as entirely detached from the rest of cultural and social life. The mathematician pursues a pure, disinterested search for mathematical knowledge. Often the purity of such research is contrasted with the interests of that acting in more mundane spheres, like politics and administration. Indeed, the true mathematician is described as one who carefully avoids getting involved in debates over social issues.* (Mazzotti, 2000, p. 273)

This description mirrors the view of the ideal mathematician as portrayed by Nicolas Fergola decades earlier.[i] For both men real scientists are men of faith who reconcile the use of reason with the strength of their own faith. The virtues of faith, such as humility and the contemplation of the wonders of creation, open the mathematician to inspiration and improve his possibility for success. They felt that those who tried to make sense of the world without faith were guilty of the sin of pride. (Mazzotti, 2000, p. 274) For Boncompagni the ideal scientist was one who limited his interest to the technical side of his work and didn't get involved with philosophical and moral questions or theological wars. He gave an example in his biographical sketch of Augustin Cauchy. In this sketch Boncompagni states, "While he was at the Polytechnic School he always behaved as a sincere Christian: he was devout and he was benevolent and kind towards his own fellows. One could see him on his knees, by his bed, reciting devotedly his usual prayers amidst the general indifference; but his fellows never disturbed him, as his extraordinary merit imposed respect." (Mazzotti, 2000, p. 273) He went on to recall how Cauchy aimed to stay out of political events and concentrated instead on study, charity and his family.

Boncompagni himself fit this description of the idealized Catholic man of science. He was known as being deeply devout in his faith and completely absorbed in what he considered to be his work: scholarly studies, editorial work, and religious practices. He lived simply, refusing the luxuries that his personal wealth allowed. He used his money to finance charities, his library and his editorial work. (Mazzotti, 2000, p. 274)

Not all the biographical sketches in the *Bullettino* were of men of faith. There were also biographical sketches of secular mathematicians and irreligious mathematicians. For the former, their virtues were highlighted and for the latter, their mathematical contributions were noted but some hesitancy was expressed about their character. (Mazzotti, 2000, p. 274)

The second Catholic scientist we look at is Angelo Secchi, a Jesuit priest. Jesuits had been interested in the natural sciences since the founding of their order in 1540. An important part of the Jesuit scientific tradition was the establishment of observatories. Astronomical observatories also supported mathematical work. The Golden Age of Jesuit observatories started in the middle of the nineteenth century and one of the premier Jesuit astronomers was Angelo Secchi. Secchi (1818-1878) entered the Jesuit novitiate in Rome at age fifteen and two years later entered the *Collegio Romano* where he distinguished himself in mathematics and physics. When the Jesuits were expelled from Rome in 1848 following the wars of independence, Secchi went to the Jesuit college in Stonyhurst, England and then to Georgetown University in Washington, D.C. where he worked as assistant to the director of the observatory. There he became acquainted with the hydrographer M.F. Maury and his meteorological works. When the ban against the Jesuits lifted in 1849 Secchi returned to Rome where he was appointed director of the observatory of the *Collegio Romano*. He made significant contributions in fields ranging from astronomy to astrophysics to meteorology. Secchi had a genius for instrumentation as exhibited in his famous Universal Meteorograph, an instrument that simultaneously recorded several meteorological measurements: pressure, temperature, humidity and wind velocity and direction. This instrument was awarded a gold medal at the Paris World Fair of 1868. The Catholic Church used this international recognition to break its cultural and diplomatic isolation and to promote itself as a supporter of science. Secchi received many international acclamations including being elected as a Fellow of the Royal Astronomical Society. (Udias, 2001, p. 2.23) A prolific writer, Secchi published many articles in scientific journals and several books. He issued regular *Memoirs* containing data and the scientific results from his observations. In 1862, he began publication of *Bullettino meteorologico dell' Osservatorio del Collegio Romano*, which appeared for seventeen years until his death. Secchi dedicated the *Collegio Romano* observatory to the field of physical astronomy, the present discipline of astrophysics. Setting up an observatory required significant financial resources but Secchi's observatory received considerable resources from Pope Pius IX's pontificate (1846-1878). (Ptitsyna, 2012, p. 35) Pius IX had political motivations for doing so, but he was also motivated by his own interest in science. Pius had taken science courses at a Scolopian college before being ordained and had graduated with a dissertation on the construction of telescopes.

In his article on Secchi, Mazzotti has established a case for the role astronomy (similar to Boncampagni's *Bullettino*) played in the cultural policy of the Catholic Church during the second half of the nineteenth century. (Mazzotti, 2010, pp. 59-64) The observatory at the *Collegio Romano* had an important function in the centralizing strategies employed by the Church at this time. These strategies ranged from technological means to a centralized church authority (papal infallibility). The observatory helped maintain a standardization of time, which was important for communication and transportation structures within the Papal States. Secchi's observatory was also a key player in the Pope's modernization project. We have already mentioned the importance that Secchi's meteorograph winning the gold medal had in bringing acclaim to the work of Catholic scientists. Secchi's development of an observational network consisting of other Jesuits as well as civil servants and clerics from around the world gave a global dimension to the Church's scientific work, which mirrored the global spiritual mission of the Church. It also portrayed Rome, the Pontifical home, as a universal rather than Italian city. (Mazzotti, 2010, p. 67)

Secchi saw his religious faith as the motivator behind his astronomical studies. According to Secchi: "To whisper to oneself how magnificent it is to reveal the works of the Creator: this is a stimulus which lasts when all other motives fail". He believed that "ultimately, existing physical laws depended on the infinite freedom of the Creator." (Udias, 2003, p. 65)

Secchi had collaborators around the world, but he worked particularly closely with Pietro Tacchini (1838-1905) who shared his conviction that the future of astronomy lay in astrophysics. Tacchini was born in Modena and graduated from the university in Modena with a degree in engineering. He then went to Padua to specialize in astronomical research. In 1859 he was appointed director of the Observatory of Modena. Through the influence of Secchi, Tacchini was appointed astronomer in the Observatory at Palermo in 1863. Their common scientific interest led to a fruitful correspondence during the years 1861-1877 and a scientific collaboration that was of significant importance in the transition from traditional positional astronomy to the new astronomy of astrophysics.

In 1870 Italian troops entered Rome. The Jesuits were again driven into exile and the *Collegio Romano* was expropriated by the Italian government and declared state property. The worldwide reputation of Secchi and his observatory exempted him and his assistants from this banishment. Under a special Act of the Italian Parliament they were allowed to continue living and working in the observatory though Secchi's activities were restricted. One curtailment was that he was not allowed to have any official role in the 1870 solar eclipse expedition to Sicily, though this expedition was organized around Secchi's work. In 1874 he was not permitted to join the Italian expedition to India to observe the transit of Venus. He spent his last years preparing his scholarly writings for their final editions. He remained loyal to the Pope until he died. When he died, Pope Pius IX said of him "Father Secchi has always known how to unite science with religious virtue, but the two virtues which shone most in him were humility and obedience". (Udias, 2003, p. 65) Again we see the idealized Catholic scientist, with faith and humility as the paramount features of his life.

Secchi, Boncompagni and other Catholic scientists such as Fergola, Ruffini, Piola and Tortolini [ii] each tried in his own way to respond to the secularization of knowledge and to show that rather than being hostile to science, Catholicism was its main ally in the search for scientific truth. (Udias, 2003, p. 276) Yet each of these mathematicians did not work in isolation from the secular society around him. Recall that Fergola had been open to the ideas of the Enlightenment philosopher Genovesi and developments from the French. Ruffini corresponded with renowned mathematicians in Europe as he tried to get acceptance for his work on the quintic equation. Piola studied under Vincenzo Brunacci in Pavia and was trained in Lagrange's method. In turn he mentored young mathematicians, including Brioschi, in his scientific *circolo*. He was also involved in the Italian Congresses of Scientists and was engaged with many of the mathematical developments of his time. Secchi was an internationally recognized astronomer who worked with scientists from around the world. He mentored Tacchini who would eventually be appointed by the Italian government as his replacement. We have seen Tortolini's work with Brioschi, Betti and Genocchi on the *Annali*. Genocchi's work in analysis was greatly influenced by the Catholic mathematician Cauchy. Genocchi's interest in number theory and the medieval period led him to an extensive correspondence with Boncompagni, which totaled over 1500 letters in the 1850s. (Bottazzini, 2002, p. 79) As late as 1870 Genocchi was contributing to the *Bullettino*. Thus while the Risorgimento mathematicians and the mathematicians more interested in upholding the importance of faith and the rule of the Church had different agendas, their love of their subject allowed a working relationship that supported their scientific studies. Only later, with the events of 1870 onward, would a chasm be created that made this cooperation impossible.

Patriot Mathematicians

Risorgimento mathematicians had a positivistic view of science in that its influence permeated all areas of society; to some it was the new secular religion. In Snapshot Two we learned about some mathematicians who had played key roles in the Risorgimento, including Brioschi, Betti, Cremona and Genocchi. These men had all fought in wars of independence but now they turned their efforts toward nation building. They realized that the newly unified country of Italy would need to develop infrastructures and better standards of living if it was to take its place amongst the more developed countries of Europe. They saw it as their patriotic duty to train engineers and teachers and the future elite necessary to run the new Italian state. (Brigaglia, 2011, p. 101) They served in significant political and administrative positions in the new government. A primary area of service for each of them was in the development of the Italian education system. At the time of Italian unification about 70% of the population was illiterate. There were a small number of university students. (Guerraggio, 2005, p. 8) Brioschi, Betti and Cremona worked to improve this situation, especially in the area of mathematics education.

In 1858 Brioschi, Betti and Casorati had visited the best of the German and French mathematicians and universities. Part of their motivation was to promote Italian mathematics abroad. But they also wanted to learn how universities in these countries operated. Upon their return they sought to incorporate the best of the German and French systems into Italian universities. From the French schools they adopted the importance of a centralized education system and from the Germans the ideal of academic freedom and the importance of applied research and technology. The modernization of Italy would require engineers, technicians and teachers with sound scientific training. These Risorgimento mathematicians worked, each in his own way, to build an educational system that would prepare Italy to take its place on the European stage.

Brioschi worked primarily in northern Italy, founding the Polytechnic of Milan (1863). Admission to this institute was based not on birth or religious beliefs but on an entrance exam. This institute drew many students from the lower middle class and lower social ranks. These students went on to become the qualified technicians needed for Italy's industrial growth. Their rise in status resulted in the rise of a new ruling class in Italy, no longer dependent on aristocratic birth or religion. (Guerraggio, 2005, p. 3) Betti was responsible for directing the *Scuola Normale Superiore di Pisa* and under him it became one of the leading Italian centers for mathematical education and research. Cremona served as the first director of the newly organized School of Engineering in Rome. He was charged with transforming it into one of the most advanced scientific and technological schools in Europe.

Brioschi, Betti, Cremona and other scientists also worked in national political venues for education reforms at both the secondary and university levels. Brioschi acted as Under Secretary to the Ministry of Public Instruction. He became a Member of Parliament in 1862 and a Senator in 1865. Genocchi served as Senator of the Kingdom from 1886 until his death in 1889. Betti served as a Member of Parliament and as a member of the Higher Council for Public Instruction and later was appointed Senator and Secretary within the Ministry of Public Instruction. Cremona's political involvement came mainly in the 1870s when he was appointed Senator in 1876. He belonged to the Superior Council of Public Instruction and was temporarily Minister of Public Instruction (June 1898). He was also very active in organizing secondary and higher education, in particular mathematics education, through his roles in Parliament and in writing textbooks.

The Casati Law for Public Education of 1859 and subsequent educational laws such as the Coppino Act of 1867 resulted in important changes for the teaching of mathematics. The Casati law was originally designed for Piedmont and Lombardy but with the annexation of more regions of Italy it was extended to the other states as well. The Casati Law gave the state the right to oversee and control education at all levels of instruction, lessening the influence of the Church and private institutions. (Martini, 2006, p. 70) This also led to a centralized approach to education, especially at the university level and a loss of regional autonomy. Through their political involvement and work for reforms at the university and secondary level, Brioschi, Betti, Genocchi and other scientists fundamentally affected the reform and development of Italian institutions of higher education in post-unification Italy.

The Coppino Act stressed the importance of the teaching method used in the schools. (Giacardi, 2011, p. 589) The mathematics curriculum was especially impacted by the call for new syllabi and textbooks. Cremona was responsible for changes to the mathematics syllabi and instructions on teaching methods. He reintroduced Euclid's *Elements* as the textbook to be used in the classical secondary schools. He felt that mathematics should not be seen just as set of propositions that students should learn to apply in real life but that mathematics should be seen as a kind of "mental gymnastics aimed as exercising the faculty of reason." Brioschi, Betti and Cremona believed that Euclid's method should be the model used in the schools and authored textbooks that employed this approach. (Giacardi, 2011, p. 590) Brioschi and Cremona were especially interested in the education of the future elite in Italy and they believed these people needed to learn how to use deductive reasoning as a method for problem solving. Cremona wrote

> *When taught with the same methods used by the ancient Greeks geometry is easier and more interesting than the abstract science of numbers…The teacher is advised to follow Euclid's method, because it is the best possible way to create in young minds the habit of constant rigor in their reasoning. Above all, he must not*

> *pollute the purity of the geometry of ancient times by transforming geometrical theorems into algebraic formulae, thus replacing the concrete magnitudes with their measurements.* (Giacardi, 2011, p. 589)

Cremona also proposed teaching arithmetic using deductive and demonstrative methods. "Cremona's principal concern was the education of the future elite. He believed the role of the *ginnasio-liceo* (grammar school) was not to furnish students with a mass of knowledge, but rather to provide a method to deal effectively with problems." (Giacardi, 2011, p. 589)

Cremona's proposals sound like something Fergola would have advocated.[iii] It is also interesting that both the Risorgimento mathematicians and Fergola emphasized the teaching of the 'elite.' It was their definition of the 'elite' and the motivation behind this training that differed between the two. Yet their arguments against algebraic approaches and a focus on abstractions sound very similar.

However, not all mathematicians agreed with this strictly Euclidean approach or with the goal of teaching the future elite. One dissenter was Giuseppe Battaglini, the editor of the journal *Giornale di matematiche* (Journal of Mathematics). Unlike the *Annali*, with its goal of highlighting on the international scene the work of Italian mathematics, the *Giornale* targeted university students through its dissemination of their research. It was founded in Naples and thus served to bring universities of southern Italy onto the Italian mathematical scene. (Martini, 2003, p. 217) Battaglini felt that education should be geared not towards the elite that some considered necessary for nation building, but toward the masses. Battaglini's journal became a forum for this pedagogical debate.

This debate amongst mathematicians as to how mathematics should be taught and where the focus of education should be was a healthy one for Italy, with positive results. It became a catalyst in "arousing the Italian secondary school from the state of inertia into which it had fallen." (Giacardi, 2006, p. 592) As Enrico d'Ovidio and A. Sannia wrote, "it was like a surgical operation: extremely painful, but curative." (Giacardi, 2006, p. 592) [iv]

Debates over mathematical teaching and curriculum would continue well into the twentieth century. In 1911 Guido Castelnuovo, when given the task of preparing new math guidelines, agreed with Battaglini that the main aim of the secondary school system was "to educate the future citizen." (Giacardi, 2006, p. 592) He felt that if the education system was to be effective and cultivate democracy, then it needed to be directed at people of average intelligence. He also believed in the importance of practical applications of mathematics rather than a theoretical approach.

Thus the second half of the nineteenth century and the early part of the twentieth century saw debates over what kind of mathematics should be taught, how it should be taught and for what purpose (training future elite or the common citizen). Some of these debates sound similar to those between Fergola and the engineers in the early years of the nineteenth century. A difference was that these latter debates resulted in healthy dialogues, better textbooks and journals, and interactions between mathematicians at university and secondary levels as well as within the political spectrum (writing laws and serving in the Ministry of Education), all working together to improve mathematical literacy for Italy.

National Secular Religion

Many Risorgimento mathematicians saw science rather than religion as offering the exclusive path to truth and progress as well as serving as a sound basis for everyday life. (O'Leary, 2007, p. 59) Cremona, known for his democratic and anti-clerical beliefs, advocated the secular religion of mathematics and science. (Gasca, 2011, p. 53) The following are his words to his students in 1860:

> *Oh young people, shun the malicious words of those who, to conceal their own ignorance or to give vent to irate prejudice, will, with an ironic smile, ask you what is the point of these and other studies, and will speak of the practical importance of men who devote themselves entirely to the progress of their beloved science. Even if geometry did not render, as instead it does, an immediate service to the fine arts, industry, mechanics, astronomy, and physics; even if a century-old experience did not show us that even hitherto unsuspected applications; even if before our minds we did not have the history of many illustrious men who, without ever flagging in their pursuit of pure science, were the most effective promoters of our present civilization – still I would say to you: this science is worth loving, it possesses so many and such sublime beauties that it cannot fail to exert on the generous and unspoiled souls of young people a noble educational influence, raising them to the serene and inimitable poetry of truth!...Shun, therefore, these apostles of darkness; love truth and light; have faith in the services that science sooner or later renders to the cause of civilization and liberty. Believe in the future! This is the religion of our century.* (Gasca, 2011, p. 48)

This *science as the new religion* attitude was shared by many Italian mathematicians and was one of the basic elements of the Italian Risorgimento. Brioschi, when faced with Tortolini's hesitancy to make changes to the *Annali,* [v] reminded him and his fellow cardinals that "the time of Galileo's trial was long past." Casorati had written to Betti in 1860 that he wished Rome to be "freed of papal tyranny" as soon as possible. Cremona encouraged Betti and Brioschi as members of the Higher Council for Education "to put an end to the shameful requirement that, to be admitted to the universities of the new Kingdom, students should take an examination of 'the mysteries of the Catholic faith.'" (Mehrtens, 1981, pp. 172-173)

At the end of the 1860s Rome still belonged to the papacy. But for the liberal elites of Italy, Rome was seen as the symbol of the new nation and they felt that it could not be left in the hands of the clergy. The 'Roman Question' represented the main political problem for the new nation. "At stake was not only the administrative status of the city but a redefined relation between church and state as much as between reason and faith. Hence the distinctively anticlerical spirit of the Italian Risorgimento, its radical tones, and the perception of the Catholic Church as a deadly threat to the nation." (Mazzotti, 2010, p. 72)

In September 1870 Italian troops entered Rome and Pope Pius IX retreated to the Vatican, declaring himself "a prisoner in the Vatican." A plebiscite was held in Rome resulting in the complete unification of the Italian peninsula. Numerous scientists who had fought for Italian statehood now took an active role in the new government. Quintino Sella, an economist and scientist, played a significant role in the promotion of science as the new national religion. (Mazzotti, 2000, p. 280) Sella wanted to make Rome into a great international center for science, exalting positivism and progress over the temporal powers of the papacy. He envisioned a Rome with a string of academies and schools, institutes of chemistry, physics and biology, botanical gardens and centers for the arts. His goal for the University of Rome was that it would be transformed into one of the most advanced in Europe, especially in the areas of science and technical knowledge. "Rome would thus become a formidable moral and material symbol of the nation, uniting Italians in a common purpose, with 'the struggle for truth against ignorance, prejudice and error' giving rise to 'the same unanimity as is to be found in the days of fighting to defend the fatherland'." (Duggan, 2008, p. 244) To the Pope, the idea of Rome as a lay city, including the taking of the University away from the control of the Church and placing it under the Italian ministry of education, was a grievous thing. He saw it as teaching impiety to the young. (Chadwick, 1998, p. 225)

Sella was one of the more openly hostile scientists in regards to the temporal power and cultural dominion of the Church. He wrote "as empirical sciences advances, God must necessarily retire." (Mazzotti, 2000, p. 281) Sella saw the religious universalism of the church being replaced by the universalism of modern science. (Mazzotti, 2010, p. 72) Sella served as prime minister and later elected president of the *Accademia Nazionale dei Lincei* in 1874. He was also largely responsible for changing the nature of the *Accademia*, leading to its split.

Federico Cesi founded the original *Academia Dei Lincei* in 1603. It was intended to be a place where one could study all the natural sciences from a liberal and experimental viewpoint free from any traditional encumbrances or authority. (Gabrieli, 2010, p. 5) It was founded in 'the climate of the Counter Reformation and post-Renaissance scientific thought." (Martini, 2006, p. 38) Galileo was a member. The *Accademia* came to an end in 1630 with Cesi's death but was revived and suppressed several times during the first half of the nineteenth century. In 1847, Pope Pius IX reestablished it under the name *Pontificia Accademia dei Nuovi Lincei*. Its purpose was to promote scientific research and advise the Papal authorities on scientific issues. (O'Leary, 2007, p. 47) When Sella took charge of the *Accademia* he gave it a new focus. Sella's vision for the *Accademia* was to expand it from the physical, mathematical and natural science to include the 'moral' or humanistic sciences (history, philology, archaeology, philosophy, economics and law). Sella believed the *Accademia* should reflect *laicization*, which he saw as the ideal and primary policy to cultivate in Rome, the capital of the new Kingdom of Italy. He believed that he was reviving Cesi's original intention for the *Accademia dei Lincei*. Sella's revived *Accademia Nazionale dei Lincei* thus became a lay and liberal offspring of the Italian Risorgimento.

Sella's proposed changes to the *Accademia* drew the ire of many of its members who were loyal to the Catholic Church. Benedetto Viale-Prela, the president of the *Pontifical Accademia* in 1870 and physician to the pope, withdrew from the institute with a group of scientists. Membership in the new *Accademia* required allegiance to the new Italian government but these scientists, loyal to the pope, did not recognize the legitimacy of the new state. They also believed that moral and humanistic sciences should play no role in the *Accademia* – this to them was one more example of the secular religion of the science of the age. Those academics that supported the Italian state and the secularization of culture called their society the *Accademia Nazionale dei Lincei*, and those loyal to the Church reorganized under the previous name of the *Accademia Pontificia dei Nuovi Lincei.* Boncompagni joined the Pontifical Academy and devoted his energies and resources, including his printing press, to supporting its mission.

The institutionalization of science as the new religion added to the opening chasm between Church and State.

> *Political action, cultural reform, and the advancement of science were all seen as vital elements of the process of modernization, which was regarded as essential for national resurgence. All this was strikingly different from the conservative Catholic view of the ideal scientist whose faith kept his reason in check. Scientists were not supposed to participate in controversies external to their discipline, especially those that were concerned with social, philosophical and moral questions. Frequently, they did not measure up to the devout stereotype of conservative Catholicism, and this in turn led to the belief that they were enemies of the church.* (O'Leary, 2007, p. 60)

<u>The Church's response - Syllabus of Errors and Papal Infallibility</u>

When Pius IX was elected pope in 1846 he was first seen as a friendly, pastoral sort of person: very religious, an outsider to the central Church government in Rome, and a possible reformer. The Neo-Guelfs movement, led by Vincenzo Gioberti, had hoped this pope would become the head of an Italian federation in a united Italy. The Pope's initial support of the revolts in Milan and Venice in 1848 encouraged this idea. However, when the Pope refused to send Papal troops to invade Catholic Austria and later rescinded the constitution he had granted to the Papal States, this hope died. With the subsequent murder of his prime minister Pellegrino Rossi and his own forced flight from Rome to Gaeta, the "Pope's quest for a constitution compatible with the papal office and with the freedom of Italy from the foreigner had died". (Chadwick, 1998, p. 82) The once liberal-minded pope had become a resolute conservative.

Italy in the 1850s was on the cusp of unification but the Pope felt safe from the Italian armies due to the French and Austrian soldiers who in turn supported and guarded the Vatican. There were also pious Catholic crowned heads with real power who were friendly and supportive of the pope and his power. The European image of the Pope was that he was a man of deeply pious faith but worldly to excess and whose mind and leadership were moving away from the direction in which European culture was moving. The Papal States were seen as an Achilles heel in the hope for Italian unification. People also questioned the validity of having central Italy (location of the Papal States) governed by someone who could only remain in power with the help of two foreign armies. (Chadwick, 1998, p. 124)

Accused of being out of step with the times, the Church felt it needed to address the errors that it saw in the modern world. Various conservatives in the Curia had talked about writing such a document in the 1850s. The impending unification of Italy made the idea more urgent. In 1860 the Kingdom of Sardinia-Piedmont annexed the Papal States of Romagna, Umbria and the Marches. Only Rome and its surrounding area remained under papal control and were under French protection. This would change in 1864 when France and Italy came to an agreement whereby the French troops would leave Rome if the Italian government would guarantee the territorial independence of Rome under papal rule.

The Pope endorsed work on such an encyclical but by 1862 it only existed in draft form. In 1863 at a conference in Belgium, the French liberal Catholic Montalembert, an advocate for a 'Church in a free State,' stated "Catholics had to reconcile themselves to civil equality, religious liberty and political liberty." (Chadwick, 1998, p. 171) He urged the Church not to be afraid of democracy. It was coming and the "Church must venture in and try to guide it, and it had the one compass that could guide it aright." (Chadwick, 1998, p. 172) Meanwhile in Germany, Dollinger, who was a professor of church history at Munich, 'spoke for the free right of scholarship to think as the evidence demanded, irrespective of what the authority of the Church should say." (Chadwick, 1998, p. 172) The papal response was one of concern that some Catholic students were putting too much reliance on the power of reason, even arguing for independence of science to such an extent that their views conflicted with the teachings of the Church. It stated that Catholics, including Catholic scientists, were obliged to submit to the dogmas of the Church, to accept its doctrinal decisions and the teaching of its theologians. Thus faith as interpreted by the ecclesiastical authorities of the Church was to reign supreme over natural science. The English Cardinal John Henry Newman supported the basic tenets of the Munich Brief but expressed concerns regarding its applications. For example,

> *He asked if Newton was unable to reach 'useful and certain' conclusions in astronomy because of not being a Catholic. Does a scientists have to be constantly alert to the danger that the outcome of his research may lead him to conclusions that seem to contradict revelation or are incompatible with a literal interpretation of scripture? If a man's reasoning leads him to a conclusion contrary to Catholic doctrine should he then terminate his research in the absence of detecting any error in his work?* (O'Leary, 2007, p. 49)

Adversarial circumstances such as the loss of most of his papal lands in 1859-1860, the speeches made by liberal Catholics encouraging the Church to reconcile with the modern state in 1863, and the agreement between the French and Italian governments over the protection of Rome in 1864, angered the pope. Pius IX believed he needed to reassert both his authority within the Church and to dispel any doubts about the Church's views on a broad range of issues. A new draft of an encyclical delineating the errors of the modern world was prepared and in December 1864 the *Quanta Cura* with its annex, the *Syllabus of Errors*, was sent out to bishops.

Many of the 'errors' delineated in the *Syllabus* would be ones that most Christians were united in condemning. "But other statements were the words of a dying order in conflict with a new world, for instance, that it is always wrong to rebel against lawful governments; it is always wrong to allow divorce; it is wrong to think that if the pope lost the Papal State it would conduce to the freedom and happiness of the Church. It is wrong to believe that nowadays Catholicism should not be the only authorized religion in a State. It is wrong to believe that a Catholic State ought to give the right of public worship to immigrants of a different religion; to think that freedom of the press, and of the expression of opinion, does not lead to decline in public morality." And finally the last – the only proposition that most of Europe noticed "it is wrong to believe that the pope can and ought to reconcile himself with progress, liberalism, and modern civilization." (Chadwick, 1998, p. 176)

The *Syllabus of Errors* was written mainly with Italian circumstances in mind. The main perceived threat to the church was not science itself or the independent-minded scientists. The church feared the "liberals, socialists, freemason, and atheists, who exploited the materialistic presentation of science to undermine the church, politically and otherwise." (O'Leary, 2007, p. 53) The 80th proposition condemned the Piedmontese government's notion of progress and liberalism, which included the closing of convents and monasteries and the establishment of secular education. Though not intended as a general condemnation of all modern societies, this 80th proposition opened a chasm between the pope and modern European society.

The issuing of the *Syllabus* was followed by a call for a General Council of the Church to be convened in 1869. This was the first general council of the Church since the Council of Trent in the 16th century. (Chadwick, 1998, p. 185) Agenda items for the Council included missions, discipline and pastoral care. However, the main doctrine to be debated at the Council was the authority of the pope's office. With the impending end of the pope's temporal powers, the question of the nature of the pope's authority was being questioned. The topic of papal infallibility had long been discussed and debated and the pope now urged the Council to rule on it. The bishops had varying views of what constituted papal authority, but there was little room for debate or opportunity to originate motions. There was also pressure to support the Pope in his need for ecclesiastical influence at a time when he was losing his political influence. (O'Leary, 2007, p. 55)

By February 1870, with occupation of Rome just months away, the Pope felt that the world was increasingly against the Church. The idea of papal infallibility became for him synonymous with a true understanding of faith. He pushed the Council to define papal infallibility in an ultramontane form, which advocated supreme papal authority in matters of faith and discipline. In July of 1870 the bishops approved *Pastor Aeternus*, which defined the meaning and power of papal primacy and the doctrine of papal infallibility This constitution gave the pope broad authority on issues:

> *When he taught ex cathedra –that is when he officially fulfilled his office as the pastor and teacher of all Christians – that a doctrine or a decision on morals was to be held by the universal Church, he had the help of God promised to St. Peter, and therefore his decisions could not be altered and had their authority from themselves and not by reason of any agreement of the Church.* (Chadwick, 1998, p. 214)

France declared war against Prussia on the day after the infallibility decree. French troops, which had remained in Rome, left to fight in the war. In September 1870 Italian troops entered Rome and on October 2 a plebiscite was held with the statement "I wish to be united with the Kingdom of Italy under the rule of King Victor Emmanuel and his successors" being approved by a vast majority of male adults. That same month the Pope adjourned the Vatican Council without resolving the other concerns of the Council.

When the Italian troops entered Rome the pope retreated to the Vatican declaring himself a prisoner. He never again left the Vatican. He repudiated efforts by the Italian government to guarantee him 'the personal prerogatives of a sovereign' and 'territorial freedoms.' Instead, while the Italian government was experiencing all the difficulties a newly formed state encounters as it tries to unify diverse regions, develop infrastructure and establish its authority, the Church added to its difficulties by setting up a separate 'court' with its pope-king. While the Italian government by necessity treated the pope with dignity and honor, the Pope felt no such obligation and would make rude remarks about the secular government and its supporters, creating divisions within society. Pius IX's extreme language towards the Italian government and his encouragement of similar utterances by bishops and parish priests was harmful both to the state and the Church.

> *Many Italians were Catholics who needed to be reconciled to their regime, which was having a difficult enough time anyway, trying to make a unified country out of so many different States. The divisions of Italy were deepened because the government and Pope could never agree. The Parliament of Italy never won the affections of the Italian people, and this was partly because the Pope wanted Catholics to have nothing to do with electing anyone to the Parliament and so refuse it recognition. This division stored up a legacy for the future of Italy.* (Chadwick, 1998, p. 235)

The Pope also refused to allow Catholics to vote in general elections or to accept office as members of Parliament. Members of Parliament were required to take an oath of allegiance to the Italian State, which the Curia held that no Catholic could recognize. Thus in 1871, when Quintino Sella approached Boncompagni offering him a seat in the parliament of the Kingdom of Italy in recognition of his contributions to Italian science, Boncompagni without hesitation refused. Originally the wording to prevent Catholics from voting in national elections was "it is not expedient to do so." However in 1876 the Italian political left, with known hostility to the Church, won power and many Catholics wondered if this "not expedient" was contributing to the weakness of the less hostile liberal party and thus adding to the Church's troubles. Therefore many Catholics returned to the voting booth. Instead of supporting this move, the Church's response was to change the wording from "it is not expedient" to "it is not permissible." (Chadwick, 1998, p. 237) Thus the Church lost an important chance to influence Italian society and politics.

Attempts to bridge the divide

Not all Catholics agreed with the Pope's call for the return of his temporal powers. One of these was Carlo Curci, a famous Jesuit priest and one of the founders of the ultraconservative Jesuit journal *Civilta Cattolica.* The Jesuits founded the *Civilta Cattolica* in 1850 in response to the Pope's call to defend the Church and the papacy. Curci himself had been a strong supporter of the Pope and had originally longed for the Pope's restoration. But gradually he ceased to believe this was possible and instead advocated that it was the duty of Catholics to do what they could for the new Italy, working for its moral well being as well as its economic prosperity. Therefore Catholics should be engaged in national elections, join in public life, and do all they could to prevent the de-Christianization of Italy. (Chadwick, 1998, p. 245) Curci's attempts to get the Church to see a healthy role in society were scuttled by a Curia unwilling to change. (O'Leary, 2007, p. 58)

Meanwhile the Church continued in its opposition to the Italian government, undermining it however it could. While forbidding its members' participation in national politics, it encouraged them to be active in local politics. The Church promoted mutual aid societies and rural banks and cooperatives, as these were instruments for maintaining the loyalty of the masses and means of counteracting the doctrines of individualism. (Duggan, 2008, p. 299) Toward the end of the century, the Church's stance regarding the state began to soften as it realized that the liberalism, in contrast to the rising socialism, was the lesser evil. (Duggan, 2008, p. 365)

The Italian government also reached out to prominent Catholic scientists such as Boncompagni and Secchi, offering them positions in the new Italy. Boncompagni and Secchi were each held in such esteem by the scientific community that this was a necessary action on the part of the secular government. Boncompagni, as we have seen, refused without hesitation. Secchi was offered a chair of physical astronomy at the new University of Rome. Francesco Brioschi was chosen as the channel through which this offer came to Secchi. He discreetly contacted Secchi after the occupation of Rome in September 1870. Secret negotiations continued for several weeks. Secchi originally accepted the position on the condition that restrictions on Jesuit teaching and research be lifted. The government refused to deviate from its anti-clerical line and by November 1870, negotiations collapsed and Secchi declined the position. (Mazzotti, 2010, p. 79) The Italian government began restricting Secchi's activity, biding its time until they could turn to Pietro Tacchini, Secchi's apparent successor and one who did not have Church ties.

Brioschi could have been a bridge builder between the new Italian government and the Church. There are indications that Brioschi was more of a statesman than some of his fellow Risorgimento mathematicians. His political views had moderated some after the 1848 wars of independence. (Martini 2006, p. 100) He turned his efforts first to promoting Italian mathematics through the publication of the *Annali* and later towards nation building by working on economic and financial issues in addition to education reform. When the left wing socialists defeated his liberal party in 1876 Brioschi later headed up the opposition party. (Martini 2006, pp. 103-104) So in some ways Brioschi was a common thread among the different factions present in Italy. Yet his indignation could also undermine the bridge-building efforts. When Battaglini criticized Brioschi and Betti's textbook emphasizing the Euclidean approach, Brioschi and Cremona immediately responded with an angry letter to the editor in the 1869 issue of the *Giornale di matematiche* (Battaglini's journal). Ultimately Brioschi was forced to concede that perhaps his and Betti's approach needed some revisions. In June 1871, several months after having refused the chair at the University of Rome, Secchi wrote to Abbe Moigno, editor of a French scientific journal *Les Mondes*. He alluded to the horrors that Paris had just experienced[vi] and then said

> *'What will be our lot here, I do not know: but if to restore the order of humanity which has been so profoundly disturbed, Rome must needs undergo the fate of Paris, God's will be done. In any case, a life like that we lead here now is much harder than death; and it must end one way or the other…. I find consolation only*

in work and in the prosecution of my researches on the physical constitution of the sun, which occupy all my time, and so far prevent me from feeling the cruel sufferings of the present moment. Unfortunately, the resources of our Observatory are so diminished nowadays as to be far from sufficient to accomplish what I could desire.' (*The Nation*, 1871, p. 74)

He went on to tell how the Italian government had *begged* him to accept a chair at the University of Rome. He gave some muddled account of the negotiations that had taken place between him and Brioschi. This letter came to the attention of Brioschi who wrote an indignant reply. Brioschi considered Secchi's letter as characteristic of that 'puerile vanity of his which has become proverbial among scientific men;' denounced him for the atrocious suggestion that the occupation of Rome would lead to a second Darboy massacre; and printed a letter of Father Secchi's, written the previous November, in which he accepted with gratitude the *invitation* to teach in the University. In this letter he had also thanked Brioschi for the good wishes Brioschi had conveyed to him on the eve of Secchi's starting on the eclipse expedition.

Brioschi went to say that a comparison of the two letters revealed the character of the man who wrote them and added "let us hope, for his sake, that at least his fame as a savant may ever remain unimpaired." Father Secchi replied in his defense that the letter to Abbe Moigno was not meant for publication. He wrote about his fears for the safety of Jesuits. He added "that some things are difficult to be understood by those who have not received the Christian education in regard to God's educing good from evil; and his acceptance of the government chair was given in the hope of saving the *Collegio Romano* from being converted into a national school, which it has since become." (*The Nation*, 1871, p. 74) Thus Brioschi efforts to reach out to Secchi were thwarted both by Secchi's careless complaints and Brioschi's resulting indignation. An opportunity for bridge building was lost. Perhaps if Brioschi had been able to comprehend the fears and misapprehensions of an opponent, some bridging of the divide might have occurred.

Though relations between Secchi and the Italian government had disintegrated, Secchi was able to continue his work with Tacchini. At the end of 1871 they announced the creation of a national society, the *Societa degli Spettroscopisti Italiani* (Italian Spectroscopy Society), with the goal of coordinating solar spectroscopic research in Italy. The following year they launched the Society's journal *Memorie*. This journal, edited by Tacchini, was the first astrophysics journal ever published.

Tacchini, in addition to his scientific qualities, demonstrated diplomatic and managerial talents. (Mangianti De Angelis, 2009, p. 584) He played a key role in the future mediation between Secchi, the Italian astronomical community and the Italian government, succeeding where Brioschi had failed. (Mazzotti, 2010, p. 78) Though pressures from the anti-clerical ministers Quintino Sella and Ruggero Bonghi had led to the confiscation of the *Collegio Romano* and the limited activities for its remaining Jesuit Secchi, when Tacchini approached Sella for astrophysical research funding, Sella responded favorably. (Mazzotti, 2010, p. 71) Tacchini realized that the government was sensitive to its international image and was also supportive of processes that led to centralization and standardization, and he leveraged this for resources for the observatory. By 1873 Secchi had almost ceased to make observations. He continued to publish notes in the *Memorie*. He spent his last years preparing his scholarship writings for their final editions. Shortly after his death in 1878 the Italian government confiscated the observatory itself. In 1879 Tacchini, the former student and friend of Secchi, was appointed its first lay director. Tacchini carried on Secchi's work. He collected funds to build a commemorative monument to Secchi in Secchi's hometown of Reggio Emilia. This monument was to be a solar tower in memory of the important solar research carried out by Secchi. (Chinnici, 2009, p. 593) Despite Tacchini's efforts, this project was never accomplished.

While many post-unification efforts at bridging building and reconciliation failed, Tacchini's appeared to be somewhat successful. So why were Tacchini and Secchi, one a lay astronomer favored by the Italian government and the other an eminent astronomer favored by the Catholic Church, able to accomplish so much together? Perhaps it was due to Tacchini's diplomatic nature but evidence also points to the friendship between these two men and their common interest in astrophysics at a time when many disagreed with their approach.

Looking back to other instances of collaboration that occurred between Risorgimento and Catholic scientists there appear to be some common themes. Collaboration or at least cooperation and mutual respect occurred when there was a shared goal such as achieving recognition for the work of Italian mathematicians or disseminating the latest mathematical research. For example, Brioschi called attention to the work of Italian mathematicians regardless of their religious perspective because highlighting them would contribute to the consciousness of a national mathematical tradition which could inspire future Italian mathematicians. He highlighted the work of Piola, Ruffini, Fontana, Saladini, Lorgna and many others, lamenting that these men's works were not known either in Italy or in the wider European mathematical community. (Bottazzini, 2002, p. 78) Secchi and the Risorgimento physicist Carlo Matteucci shared a correspondence based on their common interests in astrophysics, as did Genocchi and Boncompagni over their interest in medieval mathematics. Tortolini served as an intermediary between Italy and Europe, disseminating the latest mathematical developments of Europe to Italy and the work of his fellow Italian mathematicians, such as Betti, to Europe.

Friendships and relationships built on mutual respect also served as bridge builders in this century of turmoil and change. Often these stemmed from a mentor-mentee relationship or through a joint effort on a project. Vincenzo Brunacci, a Lagrangian analyst, passed on his ideas of analysis to his students who included Piola, Bordoni and Mossotti. These latter three men remained close despite Mossotti's participation in the fight for Italy's independence. Brioschi later studied at Piola's *circolo* and Brioschi continued to promote Piola's work even after Piola's death. Secchi was responsible for Tacchini's appointment at the observatory at Palermo and continued to mentor him throughout his career. We have seen the esteem which Secchi was held by Tacchini and Tacchini's attempts to honor him after his death.

Yet not all mentor-mentee relationships ended so positively. We have also seen how Fergola and Flauti's star pupils, Giordano and Trudi, turned their back on their mentors. Politics may have been one factor, but the vehemence of their rejection of their mentors argues for a deeper reason. Both Fergola and Flauti attacked their opponents with acrimonious language, making arguments based on an interpretation of religion that owed more to a desire to hold on to an existing order than any Biblical truth.

In addition to personal relationships and common interests, another bridge builder was the common ‘enemy’ of socialism. The rise of socialism in the latter part of the nineteenth century led if not to *collaboration* at least to *cooperation* between Church and State. Are divides really as deep as two sides claim if reconciliation can happen when a perceived greater evil presents itself?

Conclusion

Mathematicians played a unique role in Risorgimento Italy. The desire to restore Italy both politically and mathematically to the world leadership dominated the efforts of mathematicians such as Brioschi, Betti, Cremona and Betti. The desire to maintain the existing order, religiously and politically, motivated mathematicians such as Fergola and Flauti. And for others politics was considered to be outside the realm of a mathematician’s work, even though religion and mathematics could be used in the fight against secular philosophies.

Throughout the nineteenth century there were instances of mathematicians from different ideological perspectives coming together to work for a common goal. Mutual respect, professional and personal relationships and abilities to set aside personal ambitions underlay these collaborative efforts. With Italian unification and the end of the Pope’s temporal power resulting actions and rhetoric by both sides made this collaboration more difficult. Yet some mathematicians were able to transcend even these challenges and achieve significant results.

Though the controversies mathematicians face today may seem more subtle, it can be helpful to look back to times like these in history when mathematicians had to make deliberate choices regarding the intersection of politics, faith, and their mathematics, and how they would treat each other. Approaching situations with humility, a clear understanding of one’s own motivations, and a listening ear to the concerns of others can create opportunities for healthy debate and dialogue over how mathematics should be done and can bridge a chasm of differences.

Endnotes

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[i] See Snapshot One for a Fergola’s description of the ideal mathematician.
[ii] Details about the lives of Piola and Tortolini can be found in Snapshot Two; details about Fergola's life can be found in Snapshot One.
[iii] For more information on Fergola, see Snapshot One.
[iv] Giacardi is quoting from Sannia, Achille, and Enrico D’Ovidio. *Elementi di Geometria*. Napoli: Pellerano, 1895: V.
[v] See Snapshot Two for the history of the *Annali* and Brioschi and Tortolini’s roles as its editors.
[vi] Secchi is referring to the execution of Archbishop Darboy and other clergy as a result of the revolutionary socialist Paris Commune uprising of 1870-1871.

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