

# Renato Caccioppoli

## Naples: Fascism and the Post-War Period

Angelo Guerraggio

Renato Caccioppoli is probably the most “storied” Italian mathematician, the one who has been most talked and written about, even beyond the circle of specialists. He has been made familiar as a personage to a vast public (though his research topics have just been touched on) in an attempt to accomplish the difficult task of communicating how complex and fascinating mathematical thinking is. (Although is still hard to do, we can no longer complain about the unfavourable conditions or lack of opportunity for popularising mathematical methods and ideas.)

Much has been said about a whole series of meetings and conferences organised by his mathematical colleagues in Naples, but in other cities as well, which just goes to show that the memories and affection that tie Caccioppoli to his native city find echoes of interest and generosity in other research communities as well. There was the congress in 1968, that of Pisa in 1987, and then the “days” in Naples in February 2004, and then that of the following April in Rome (organised by the *Institute for the Applications of Calculation* (IAC) and the *National Research Council* (CNR)). And of course we can’t not cite the 1992 film “Morte di un matematico napoletano” directed by Mario Martone, with all of the discussion and debates that it gave rise to: television programs, books, biographies, commemorations, interviews that spoke about Caccioppoli and Naples in the 1950s. And then there was the novel *Mistero napoletano* by Ermanno Rea. There are no end of anecdotes, always charming, always told with affection.

We have reason to celebrate the life of Caccioppoli – even more than his tragic death –, and the life of a great mathematician is found above all in his research. Trying to summarise 30 years of work in just a short space inevitably leads to some arbitrary choices, but there are some points that are sufficiently “stable” to give a first, brief idea of Caccioppoli’s contributions:

- The first papers, around 1926, on the *extension* of the definition set of a linear functional using the technique of *extrapolation* that would characterise later works as well, and would find an immediate application in *integral theory*.
- Studies on a *geometric theory of measure* for a surface defined parametrically, which took into account the work of Lebesgue (as well as the more recent papers

by Banach and Vitali) and which led him in the years 1927–1930 to consider oriented surfaces and of the dual attributes – of *extension* and of *orientation* – to the area element; these studies would be taken up again in 1952, with the baton being passed to Ennio De Giorgi.

- The studies beginning in the 1930s on *ordinary differential equations* (including the generalisation of an existence theorem of Bernstein concerning among others a limit problem of a second degree equation) and *partial differential equations*, particularly elliptic: an existence theorem within the class of functions whose second derivatives are Hölder; various a priori upper bounds; the proof that  $C^2$ -class solutions of analytical elliptic equations are analytical, with the first answer to the nineteenth problem posed by Hilbert at the 1900 International Congress of Mathematicians, etc.
- The “discovery” of functional analysis and the fixed-point theorems at the beginning of the 1930s; the limited applicability of the theorems concerning the solutions of the equation  $x=S[x]$  to differential and integral equations would then lead to the formulation of the *principle of functional correspondence inversion*, the result of considering the transformation  $T[x]=x-S[x]$
- Studies on the *functions of more than one complex variable*, and on analytical and pseudo-analytical functions.



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Thanks to these studies and others, Caccioppoli undoubtedly deserves credit for having carried Italian analysis to the most advanced fronts of research. Carlo Miranda wrote, “it is above all thanks to the courses he charted that Italian analysts were able to overcome the isolation they experienced during the war years and those immediately after without too much harm having been done”. Caccioppoli’s “modernity” – with respect to what was going on in the international arena at that time – could also be evaluated indirectly, by means of the disputes and controversies over priority posed by his papers. The names Dubrovskij (for functions with limited uniform variation or uniformly additive), Radó (for controversies over measure theory), Stepanoff (for asymptotically differentiable functions), Petrovsky, Perron and Weyl (for the lemma on the harmonicity of functions orthogonal to any Laplacian) testify to Caccioppoli’s activity in the research of the day, destined to leave profound marks on the history of analysis in the twentieth century.

The process of reorientation towards the most promising research contents particularly holds for functional analysis.

As a discipline, functional analysis was born during the final decades of the nineteenth century, a development of the driving ambition, which would reach maturity over the course of the following century, to address not only numeric or geometric problems, but problems of any nature whatsoever – whatever their content, and whatever kind of object involved – by means of the set of such objects and their structure. This project was of immediate interest to mathematicians of the like of Salvatore Pincherle, and above all, Vito Volterra. It was Volterra who formulated the precise definition of the concept of a functional, or *line function*. He also developed a calculus of functionals, analogous to ordinary calculus, starting with the definition of a directional derivative which would later take the name *Gâteaux-Lévy derivative*. Fréchet’s 1906 *thesis*, entitled “Sur quelques points du calcul fonctionnel”, marked a turning point in the development of the discipline. Volterra’s contributions to it were motivated by the need for new, more refined instruments that could be *applied* to problems of mathematical physics or to other questions which had progressively become part of the mathematical research itself (such as in the case of integral equations).

Starting with Fréchet, functional analysis increasingly became a discipline in its own right, scarcely needing to justify its developments for possible applications. It usually happens that it is the successive generation – the first students of the “founders” – who, finding themselves with new *instruments*, formulated as such, study their natures and transform them into the central objects of an autonomous theory. This didn’t happen in Volterra’s case. His choices – in mathematics, as well as in life – prevented him from creating a genuine school, and he continued to think of functional analysis as a field of research that was to be developed in a climate of “relative” freedom, always with an eye towards the so-called *applications*. As evidence of this we need only recall his gentlemanly but obstinate quarrel with Fréchet regarding the definition of the derivative of a functional. In Volterra’s case it is perhaps more correct to speak of *non-linear analysis*; or perhaps, of an Italian way of doing functional analysis, at a time when Fréchet and Moore were decidedly oriented towards a more *general* way of doing it. The fact is that at the 1928

International Congress of Mathematicians in Bologna, Fréchet promptly gave a snapshot of the then current situation: *si, en Italie, l'Analyse générale proprement dite n'a pas encore trouvé d'adeptes, n'oublions pas que cette science nouvelle est née de l'Analyse fonctionnelle, merveilleuse création du génie italien* (if in Italy, general analysis proper has not yet found any supporters, let's not forget that this new science was born of functional analysis, a marvellous creation of Italian genius).

It was to a large extent Caccioppoli who filled the gap, in the 1930s. In the period between the two world wars, hardly anyone else published articles about functional analysis *à la Banach*, if you will; perhaps the only other one is only a 1932 article by Guido Ascoli on metric linear spaces. As we said, Caccioppoli worked on *fixed point theorems*. He published a series of three articles on this subject: “Un teorema generale sull'esistenza di elementi uniti in una trasformazione funzionale” (1930); “Sugli elementi uniti delle trasformazioni funzionali: un'osservazione sul problemi di valori ai limiti” (1931); “Sugli elementi uniti delle trasformazioni funzionali: un teorema di esistenza e di unicità e alcune sue applicazioni” (1932). In the first he proved an existence theorem “of a topological nature” for the fixed points of a continuous transformation on  $C[a,b]$  even when their domain could be given equivalently – Caccioppoli added – by either  $C^n[a,b]$  or  $L^2[a,b]$ . He then states the theorem of existence and uniqueness for a contractive function in a complete metric space (including the algorithm of convergence, simply remarking that “the proof is obvious”). This was the theorem proven by Banach in normed vector spaces in his 1920 thesis and then published in *Fundamenta mathematica* in 1922, just as the first applications of the fixed point theorem “to the study of functional equations” were due to Birkhoff and Kellogg. In the second of his three articles (the third one marks the passage to the inversion principle of functional transformations), Caccioppoli candidly admits that he “takes advantage of the occasion to acknowledge the priority of the authors”. This timely admission – Schauder had published his work on fixed point theorems just shortly before – would confirm Caccioppoli's importance for the history of analysis in Italy: some credit for priority is due to him, and some should be taken away, but on the whole, these show that Caccioppoli was sailing in high seas and did not restrict himself to the safer “territorial waters” of a national tradition.

Caccioppoli's contributions were remarkable. It's not only a question of the “number” of theorems proven, but is the constant attempt to “think big”. Carlo Miranda wrote that Caccioppoli “didn't love honing and polishing”. Using other words but with an analogous meaning, the commission of the competition of Cagliari (which designated him as the winner) wrote that “the orientation of his research is predominantly critical”. Caccioppoli did not limit himself to manipulating notions that had already been defined, but tried to develop general theories. The metaphor of Grothendieck comes immediately to mind, when he said that thought can choose to live in a house that is already constructed by preceding generations, perhaps moving some walls and adding a porch, and that this search for comfort – this more or less painstaking do-it-yourself work – constitutes the heart of a certain kind of academic mathematics. But thought can also choose to live in unexplored

territory, where it slowly constructs its own house. In Caccioppoli we see the latter choice, where he is always trying to find the right concept, with an optimum degree of generality. In his articles, which perhaps report on a given study but still express a general orientation – we find passages that speak of the “naturalness” of a formulation or of a “natural field of existence of the functional”: “the generality of the hypotheses often assure not only the generality but also the simplicity and the coherence of the results obtained”; or, “the problem of squaring surfaces has to be solved with the same degree of generality as that of the rectification of curves”. He is instead critical of other generalisations; though correct, they turn out to be “laborious and seem to march towards ever greater complication”, or “they break up the primitive unity of the theory”, or they are “fragmentary and reciprocally unrelated”.

Obviously, this “thinking big” also means taking bigger risks, even for Caccioppoli. If you read the two volumes of his collected works, *Opere*, published by the *Unione Matematica Italiana* in 1963, you will find that there often appear – on the part of the editors – phrases such as, “the function should be substituted by...”, “the proof of this theorem is not exact”, “the hypothesis is not always explicitly stated”. In one case, Caccioppoli himself spoke of an “oversight” of his that Tonelli had noticed, and added somewhat ironically, in regard to his first papers on the geometric measure theory, “if some of the ideas (but not all) that inspired my work are today rather widely known, some of the errors contained in them have either been ignored or quoted ... This carelessness is certainly deplorable but might be said to be *felix culpa*, if it hasn’t prevented the discovery of essential facts or more suitable methods”.

To describe Caccioppoli’s mathematical personality, it should be noted that he was part of a generation that believed deeply in research. Mathematics is not just a profession. It is a cumbersome and tyrannical taskmaster. Working 24 h a day and mixing up days and nights – as Laurent Schwartz described Grothendieck’s life – is not simply the result of a “career” choice. It is the expression of the awareness that one is in possession of privileged instruments that make it possible to understand, know and transform. It is possible to dedicate one’s very life – not just professional life, but one’s whole existence – to such concepts and instruments.

Those who knew Caccioppoli easily recognised his status as an outstanding researcher. In the world of mathematics, where the term *genius* is not lightly tossed around, it was soon attached to Caccioppoli. But the life of the *mathematician* Caccioppoli, who strongly believed in the value of mathematical culture, was never one of only scientific research.

Caccioppoli always lived in Naples, with the only exception being the period from 1931 to 1934 when he taught in Padua, substituting Giuseppe Vitali, who had transferred to Bologna. In the cultural circles of Naples, he was known for his passion for music and his bravura as a pianist (and also as a violinist). Also legendary were his love and comprehension of contemporary French literature, with a special passion for Rimbaud and Gide. After the war, his love for cinema led him to organise a group called *Circolo del cinema* in Naples; the Sunday morning films and Caccioppoli’s presentation of them were a standing appointment for many fans of cinema.

But before we get to the post-war years, we should take a look at the years of Fascism. Caccioppoli was a firm opponent of the regime. His ironic dissent using the “rooster on a leash” is well known: when the Fascist party advised men not to walk dogs because it was considered not very masculine, Caccioppoli walked down Via Caracciolo with a rooster on a leash. Much more serious was the episode involving the “Marseillaise”, which Ermanno Rea described so well in *Mistero napoletano*. At the beginning of May 1938, Hitler was about to arrive for a visit to Naples. Caccioppoli and his future wife, Sara, went into a beer hall late one evening and, annoyed by a group of Fascists singing “Giovinezza”, the official anthem of the Italian National Fascist Party, he sat down at the piano and sang the French national anthem, the “Marseillaise”, at the top of his lungs. He was immediately arrested. Punishment was really severe for pranks like this. In order to save him from being thrown into prison, his family claimed that he was mentally ill, and he was admitted to an insane asylum rather than prison.

Although this is how the story is told, the official police reports actually paint a grimmer picture. First of all, they record the episode as having taken place on 23 October 1938, so Hitler doesn't have anything to do with it. Then, rather than a beer hall, they say that it took place in a local pub “frequented by persons of modest extraction”, “a tavern located in Naples on the Riviera di Chiaia”, where a man – Renato Caccioppoli – “of decent aspect” is however described in another report as “shabbily dressed” or “badly dressed” and a woman – elegant, spirited, lively and who spoke French to her companion (who pretended to be Russian) “of an easy nature and with quite liberal manners” – “after having drunk some wine, offered another round to a group of labourers who were in the tavern. The two individuals fraternised with the labourers, and then left with them after they had finished dancing”. There is no mention of the Marseillaise in the police report. The substance, however, remains: “offered wine in return for pizzas . . . , political conversations with the labourers . . . , slurs about Italian politics (in comparison to the French) that continued on the funicular bound for the Vomero”. Then the arrest, described by the federal secretary of the Fascist party: “by virtue of the authority of Public Security their arrest was immediately effected. Caccioppoli, during the final interrogation, showed signs of mental imbalance and thus, after having been examined by a psychiatrist and diagnosed as insane, he was admitted to an insane asylum”. The police report uses the same tone, “said person having shown signs of mental imbalance during the course of interrogation. . . he was diagnosed as demented”.

Caccioppoli's anti-Fascism was well known. Earlier the police in Padua had put him under “suitable political observation”, even though in a document dated August 1933 it was admitted that “given the subject that he teaches he certainly cannot use it to make his ideas known, but with his close friends he expresses himself violently against anything that has to do with Fascism”. In Naples, there is no doubt among those in the police force: “Caccioppoli, aside from his unassailable value as a scientist, because of his immoderate use of alcohol in his private life, shows himself to be abnormal and without any social values”. After the episode of the “Marseillaise” – if indeed there ever was such an episode – the newspaper of Italian expatriates in Paris, *La voce degli italiani*, ran an article under the headline “Prof. Caccioppoli

arrested, tortured, driven mad” in which it was reported that the mathematician was “tortured so severely that he is currently in a mental hospital”. On 25 April 1939, the rector of the University of Naples, requesting an extension of Caccioppoli’s leave of absence from the Ministry for Education, wrote,

Prof. Caccioppoli is considered to be affected by an imbalance (which we hope is quite temporary) and thus does not possess full control of his faculties and cannot adequately perceive and evaluate the various contingencies and occasions of social life, a condition often found in those whose intelligence has taken over and who, completely absorbed in the study of arduous disciplines that require intellectual polarisation and particular dedication, are almost completely estranged from the rest of life’s circumstances. With regard to this, the recent case of Prof. Maiorana naturally comes to mind. And it is neither out of turn nor beside the point to recall that these are young men, indeed almost lads, who were given university chairs at an age in which other young men are only in the middle of their education, and thus they found themselves in positions of responsibility as university professors, completely unprepared to face the studies and the requirements of an environment from which they had been completely estranged during the period of relentless and all-absorbing studies which led to their being given the chair.

The episode of 1938–1939 was not the only time that Caccioppoli was arrested. A similar thing happened in 1952, this time the work of the police of the Italian Republic. It was during the post-war period. Caccioppoli had worked in favour of the Republic during the 1946 Referendum. Later, he formed closer relations with the communists in Naples, the only viable alternative to the crudeness and superficiality of the supporters of Achille Lauro. He was a faithful supporter of the Italy’s Internationalist Communist Party, although he never officially joined. He was involved in the events of the *Gramsci group*. He joined the “peace partisans”. It was as a pacifist and firm opponent of American intervention in Korea that he was arrested on 16 June 1952. The official report this time says:

On 16 June 1952, the day before the arrival in Naples of Gen. Ridgway, Prof. Caccioppoli . . . having gathered about 200 students from his course and others led them to the central building of the university, where he gave a speech protesting against the aforementioned general’s visit to Italy and in favour of peace. This speech gave rise to a vehemently hostile protest in the form of invectives thrown in the direction the American seamen who were housed in the hotel in front of the university and against American automobiles passing by.

The reaction of the Minister for Public Instruction, Antonio Segni, lead to Caccioppoli’s being severely reprimanded for having incited the disturbances that followed his speech, and for behaviour that constituted an obvious “infringement of the disciplinary rules of the University”.

Traces of Caccioppoli’s political and pacifist leanings can be found in his correspondence with Mauro Picone, housed in the archive of the IAC, the *Institute for Applications of Calculation* founded by Picone in Rome, and recently published in *PRISTEM/Storia* (no. 8/9, 2004).

In a letter dated 11 August 1953, Caccioppoli wrote that,

. . . idiotic problems with the police have forced me to renounce going to Poland. Can you believe that after weeks of stalling, they gave me back a . . . passport that had been annulled for all countries (even France!) but . . . extended for Poland and “countries of transit” (?)

until 6 September, *the opening day of the congress*. This after having transcribed all of the information from the telegram inviting me. With this kind of “passport” it would be hard to get past Tarvisio. To add insult to injury, it permits “one trip only”!!

In a letter dated 20 August 1958 he mentions a demonstration that took place in Naples:

In effect, I didn't take part in the peaceful demonstration in Via Roma that provoked the usual hail of blows by riot police with batons, unannounced and equitably distributed between demonstrators and simple passers-by. I followed the trial because it interested me politically and because among the principle defendants were some of my best friends.

The correspondence is interesting for more than this, however, primarily because of the fact that it sheds light on the relationships between the two mathematicians. Picone (1885–1977) is known in the history of Italian mathematics for some valuable works dealing with partial differential equations, but above all because he founded a school that produced some of the greatest Italian analysts of the second half of the twentieth century. The instrument that led to the founding of this school was the INAC, the *National Institute for Applications of Calculation*, later renamed simply IAC, or *Institute for Applications of Calculation*.

Founded in Naples in 1927, and then transferred to Rome a few years later as a part of the National Research Council, the IAC soon became a significant new presence on the horizon of Italian (and not only) mathematics. It represented a new numerical mentality. It was no longer sufficient to prove an existence theorem, or even one of uniqueness, but it was necessary to outline the procedure for effectively calculating the solutions. In other words, it required that the same attention and the same rigour be applied for determining the numerical algorithm, the proof of its convergence and the upper bound of the error of approximation. The objective was the synergy with applications for experimental disciplines, for the study of “their” mathematical problems, and the numerical determination of the solutions. It was the first time that mathematical research had been organised outside of the closed academic circuit. It was the first time that young people could be started on a path that led to a considerable number of possible jobs. It was the first time that mathematics became a subject and object of consulting, opening new professional relations and giving rise to team research. It was the beginning of a road that would culminate in the UNESCO conference in Paris in 1951, which nominated Rome and the IAC as the headquarters of the *European Centre for Calculation*.

That Picone was sympathetic towards Fascism is a known fact, and was evident long before the need to support and manage the INAC led him to curry favour with political authorities. He himself said that he was “a black shirt from the very beginning”. On 5 June 1923 he wrote to Giovanni Gentile, who had just joined the Fascist party,

Your illustrious and venerable Excellence, permit me to express my most heartfelt pleasure at Your Excellence's joining the National Fascist Party, of which I too am a member. This newest member of the fascist party – so prominent – and the considered statements contained in that letter, will overcome the hesitancy of many Colleagues and bring new, pure blood into the robust veins of the party that will reconstruct and renovate the Nation!



Not even later would Picone deny his enthusiasm for the Fascists, not would he express any self-criticism or try to distance himself from the two decades of Fascist policies, except for one brief exception, when, years later commemorating Terracini, he spoke of his “painful exile in Argentina”.

Given this situation, the correspondence between Caccioppoli and Picone brings quite a few surprises. Caccioppoli – “communist” and deeply committed to a democratic system – had no problem in continuing to correspond with the “fascist” Picone, in a post-war period that in any case was characterised by opposing sides in strong contrast. Indeed, his letters to Picone are quite sincere and infused with a deep affection and heartfelt esteem. He never refers to previous – and embarrassing – political positions supported by Picone. On the contrary, in some way he wants to help to put them in a proper perspective, reducing them to a pragmatism that is inevitable “pro-government”: “you don’t get involved in politics, I know, and maybe, devoted as you are only to your work, you may be willing to tie the donkey up where the owner wants you to; but not me” (letter dated 19 July 1954).

The first element that emerges from a reading of the letters is the almost filial affection that Caccioppoli shows towards Picone – expressed, naturally, given his temperament, without any sugariness or fawning. And Picone surely returned both the affection and esteem. He writes of “a great mathematician who, alone in Italy, is master, by dint of critical sense as well as invention, of the foundations and the advances, of all three of areas of analysis, topological, real and complex, as well as of their applications and concrete problems”. He doesn’t hesitate to declare more than once that the student had surpassed the teacher. And what lengths he went to in the effort to make sure that the merits of that student were acknowledged by the scientific community! There was the time in 1951 that he tried to ensure that Caccioppoli was awarded the *International Feltrinelli Prize*, followed by a second attempt in 1956, as well as the campaign to have him elected a *national member* of the famed *Accademia dei Lincei*: “instead of receiving honours, he has for some time now been persistently subjected to the most vulgar and unjustifiable slur campaign on the part of some quite reputable mathematicians. Here . . . the *Accademia dei Lincei* has the obligation to intercede, since they are above all the fervid upholders of the nation’s values, disavowing those vulgar denigrators”. And how furious he became with Gianfranco Cimmino, another one of his favourite students, when in a first draft of the preface to the collected works of Caccioppoli his role in the formation of the mathematician was neglected:

I must however complain about the complete absence in your preface of any mention whatsoever of the influence that I undoubtedly had in orienting Renato early on towards studies of functional analysis and the modern foundations of the theory of functions of real variables that it is based on. This influence is undeniable and can be proven. When in long ago 1925 I arrived at the University of Naples I found Renato in his third year of university in the throes of his thesis on Pfaffian systems, disgusted with mathematics and undecided as to whether to continue studying it or to change to a career as an orchestra director. He attended my classes in higher analysis in which I discussed Lebesgue’s integration theory and I remember quite well that he showed me what he had in him during a lesson in which I assigned my students the task of finding an example by virtue of which a hypothesis formulated about a certain theorem was shown to be essential. When I finished the lesson

I was chased by a shaggy young man, shabbily dressed, who stuttered out that he had found the example I had asked for. I invited him to come into my office and he showed me a very elegant example that completely fulfilled the conditions I had set. This was Renato, and we had a long conversation. I sensed his powerful genius right away and from then on I was tied to him by a friendship that was never to dim. We began to see each other almost every day and I talked to him about modern functional analysis and its applications to problems of the integration of differential equations. His mother learned about this friendship and came to see me one day to tell me how grateful she was for the interest I had shown towards her son, who, to her great relief, appeared to have given up the idea of abandoning mathematics to become an orchestra director. She also told me that Renato called me the “Stravinski of mathematics”. Naturally, when Renato set out on the new path that I had opened for him, he made giant strides, and I have to admit that within a short time our roles were reversed, that is, he became the master and I the disciple. But by God, I swear this is the truth: I was the one who saved dear and much mourned Renato’s formidable genius for mathematics.

Another element that explains why the relationship between Caccioppoli and Picone continued uninterrupted and cordial in spite of their many differences is that they both belonged to the mathematics community. Perhaps in this case, for this generation and for Caccioppoli in particular, the term *community* is not unfitting. It is not rhetorical, nor does it refer to a merely sociological fact. It means a common rationality, a common sensitivity, and common values – to be sure, not shared by all mathematicians. Caccioppoli was quite far from an indiscriminate appreciation of his colleagues; in fact, these values came to count almost more than did political leanings (to which even Caccioppoli was quite tied). On the other hand, this was the very stance that he had taken during the time of the dismissals in the convulsive stages that followed the events of 25 September. The steps taken by the rector Adolfo Omodeo, president of the *Commissione per l’epurazione*, the Commission for Purification, affected – among the mathematicians – only Giulio Andreoli. The letter notifying him of his dismissal, dated 7 October 1943 (all of the professors in question were reinstated during the summer of 1945) contains an implicit reference to the case of Gaetano Scorza: “You were always an accomplice of the Fascists. . . . For years you have taken aim at students and colleagues for political reasons, and sometimes so harassed some famous professors of the department of mathematics of the University of Naples that they were forced to request transfer to other universities”. Caccioppoli was naturally on the side of Omodeo and the Commission, but his letter dated 15 March 1944 betrays a certain lack of enthusiasm for acts that will inevitably strike some colleagues: “It would seem a refusal on my part to recognise your efforts aimed at restoring the liberty and dignity of our university if I were to deny my concurrence in a part of it that is as necessary as it is painful”.

What Caccioppoli could not bear – be it in the case of the supporters of Fascism, or the case of the supporters of Achille Lauro, although he is more indulgent towards his mathematical colleagues – is the arrogance of ignorance, that is, the union of the two. I don’t think that we can speak of snobbery in Caccioppoli’s case: he was an intellectual who, through nearness to and keeping company with the Italian communist party, is still legendary with the working class and who – in actual fact, during the war years – gave his all to organising a strike of transportation workers. His is rather the decided aversion to what Gerardo Marotta identified

as the lower middle class's most aggressive and vulgar instincts and its pettiness. He simply could not live with a milieu that is so apathetic and intellectually lazy.

This is the theme that provides the key to his solitude. Genius or immoderation? The mad mathematician? Beyond some consequences for his temperament and of a tendency – this too, in any case, not at all natural – towards isolation and solitude are the aspects that progressively emerge in his life. And too, these explain his “attachment” to Picone. Just think for a moment of the outcome of his marriage to Sara who, we recall, shared in the experience of the “Marseillaise” (and also shared pizza and wine with a group of workers). These are feelings that emerge in the letter to Picone dated 19 July 1954 that was quoted from earlier:

I wrote you some months ago that I would *not* be going to Amsterdam, explaining why. You answered me, saying that you “don’t accept”, which I took as a impulsive show of your generous temperament which, believe me, no one appreciates more than I do. But if anything your “don’t accept” should have been said to the Scelbas, or the Fanfanis, or to any of the many Italians we can recognise them in, and not to me, who, like so many, if not actually an “enemy of the nation”, are at least among those citizens who are discriminated against, that is, those who don’t enjoy the full rights guaranteed by the constitution. The borders of our “liberal” nation can be crossed by a [word missing] acknowledged drug smuggler but not by Prof. Renato Caccioppoli, suspected rightly or wrongly of smuggling ideas.

These feelings of solitude and others were his unhappy companions up to the tragic event of 8 May 1959.

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