

Fascist Autarky and the Italian Scientists

*By Roberto Maiocchi**

This work examines the history of the National Council for research, the most important Italian scientific institute in Fascist years, until World War II. The focus is on the role of the institute in carrying out the autarky project which involved the whole Italian society from 1935 onwards. The National Council for Research would eventually prove to be unable to reach the goals set by the political power.

The official proclamation of autarky – the fundamental fascist political project – appeared in a speech given by Mussolini at the end of the great manoeuvres in Bolzano on 31st August 1935. On this occasion the Duce announced to the World that Italy “would manage alone”^[1]. In fact, the question of economical autonomy of the nation had been discussed in the scientific-technical circles since twenty years, that is, since World War I had revealed the weakness which endangered the foundations of the Italian economy.

The war mercilessly displayed serious lacks in the production sector and the lacks regarding basic raw material – problems which in other countries involved in the war (particularly in Germany) were approached with a decisive help of applied science^[2]. During the conflict there was the birth of an ideology, a “technical-scientific nationalism”, which, by means of conferences, publications, organisational initiatives and political pressure, made an attempt to obtain concentration of resources (including the founding of large national research institutes) and a greater involvement of Italian scientists in research of applied character (which created the basis for a reasonable use of the national resources)^[3]. Those two points of the programme, namely the fight for diffusion and the development of a science that would be useful for the nation, provided cultural background for numerous public and private initiatives, the greatest of which was the creation of a Bureau for Inventions and Research Initiatives by the Ministry of War, initiated in the first place by Vito Volterra, an internationally recognized mathematician^[4].

By the end of the war, also thanks to Volterra, a project aiming at the creation of a public institution detached from the university circles was elaborated. Such a step would permit the opening of a large state laboratory (to be eventually divided into three laboratories, separately for physics, chemistry and biology) and push the Italian science towards studying the questions regarding the economical development and the security of the Nation. This institution

was the National Council for Research. Although the project was faced with many difficulties caused by the political circles, and many times it seemed that it would collapse, the National Council for Research was eventually founded on 18 November 1923 with Volterra as president^[5].

At that moment, however, the cultural atmosphere was changing. The economical post-war crisis was already over and what followed was a period of economical growth which, in spite of a certain slackening, continued until the great crisis of 1929. Such growth resulted from an intensive international exchange which didn't really fit into the idea of decreasing imports, which was so high in precedent years. The scientific-technical debate over the possible economical autonomy of Italy, so intense at the beginning of the 1920s and concentrated particularly on nitrogen fertilizers and combustibles, occupied progressively less and less space^[6].

The National Council for Research, based upon a quasi-autarky programme, remained practically fruitless. During the four-year presidency of the anti-fascist Volterra, the government subsidies were enough only to maintain its existence (175.000 lira per year which today would equal about 110.000 euro)^[7]. In 1927, after the tenure of Volterra's office had expired, the post was offered to Guglielmo Marconi, who had invented the world-famous radio, a business man who led a sort of multi-national society. Marconi was a complete stranger in the Italian academic circles, chosen by Mussolini only because of the splendor he could add to the institution^[8]. During the handing over of the post to Marconi, the Council underwent a restructuring – a work which lasted two years, so that real activity only started in 1929.

Still, the resources at disposal of the NCR remained very small (679.000 lira a year, about 400.000 euro) which excluded the possibility to put into practice even a part of the project regarding the creation of research institutes of national character. Moreover, until 1937 the institution remained without an own head office: it was hence forced to be hosted at some public offices or to rent private apartments, and sometimes it had even to face the necessity to dismiss some of its employees^[9].

This little generosity regarding the funding of the NCR resulted undoubtedly from Mussolini's attitude. At least until 1930 Mussolini had serious doubts regarding the utility of the NCR. He saw it, above all, as a propaganda-instrument dedicated to organizing conferences and exhibitions, issuing publications and popularizing a perfect image of the Italian science abroad. As such, to Mussolini the Council seemed a useless copy of the Italian Academy – a representative body created specially in 1926 to glamorize the culture of fascist Italy. Thus,

Mussolini thought seriously of an opportunity to liquidate the unit and did not feel any need to offer the NCR directives regarding any strategic research project^[10].

With absolutely no hints from the government regarding the course to follow, the direction of the NCR turned on its own initiative towards autarky. In the narrow management group particularly noticeable were, because of their influence, the vice-president, Amedeo Giannini, a professional diplomat involved in science, and Nicola Parravano, Professor of Chemistry at the University of Rome, who had close ties with industry. In their vision, Italy appeared as a country whose economy should be based predominantly on agriculture and which was able to follow an economical development different than the model displayed by states where capitalism was already advanced (England and the United States), that is – which should develop through focusing on industrial production linked to agriculture. Only being aware of this ruralist perspective can one understand the first research projects initiated at the NCR, almost all of which were focused on rational – direct or indirect – use of the Italian agricultural resources. Great attention was granted to the use of wood as fuel, with utilization of gasogene material. Particular attention was paid to the processing of citrus fruit where, in accordance with the Institute for Export, the NCR managed to obtain a patent on a mechanical procedure for extracting lemon essence from lemon paste– the by-product of citric acid production. Among the studied issues there were also glycerine production through fermentation of agricultural by-products, tomato conserves, mineral waters, producing of ethanol from agricultural products and the use of castor oil as “national” lubricant^[11].

In 1931, however, the political and economical climate in Italy started to change. Only during this year the seriousness of the international economical crisis was fully evaluated. Italy made efforts to maintain a free trade foreign policy even after such powerful countries as England had adopted protective measures. Nevertheless, the fascist government would soon recognize that the economical problems would not be solved by turning towards international markets and that the situation required regulation of foreign trade and the increase of domestic production. This decision, which anyhow was to be carried within the two following years, was accompanied by the decision to finally put into practice the reorganization of the Italian production sector through Corporatism which should allow for the government to control effectively the national economy. Corporatism was to be implemented together with the strategic and military resolution to prepare the conquest of Ethiopia^[12]. Therefore, in 1933 a clear political line was drawn – a line that aimed at the mobilization of all national resources,

searching the possibly largest independence from abroad in view of preparing a conquest war. It was the autarky project, even if the term itself was not yet in use.

In this new context this ideology, which I have defined as “scientific-technical nationalism”, and that was at the roots of the initial project of the NCR, regained its power. The Council tried to adapt to the requirements imposed by the historical moment by launching certain initiatives meant to contribute to the economic independence of Italy. Particularly remarkable was the activity of the Committee in charge of the raw materials used in Italian production structures[13]. The president of the Committee was Gian Alberto Blanc, a chemist who was deeply involved in some industrial initiatives. In his speech delivered at the opening of a plenary reunion of the NCR on 7 March 1933, Marconi confirmed that the raw materials issue was the central point of the Council’s programme. The following year, talking at the plenary reunion of 8 March 1934, Marconi came up with what could be called an innovation if compared to his previous public appearances, because of the combining of the usual subject of national resources evaluation with that of imperial mobilization of science^[14].

Mussolini seemed to have decided on the involvement of the Italian science in military preparations: he ordered a considerable increase of the funds for the NCR – while between 1930 and 1934 the average funding was about 1.500.000 lira (ca. 1.200.000 euro), in 1935 almost 6 million lira (5.300.000 euro) were assigned to the Council^[15]. So the assigned money was four times as much as in the previous years! On 18 May 1934 the Duce approved the order which constituted the Co-ordination Committee between the NCR and the army. The Committee’s first session, presided by Marconi, took place on 9 July 1934. Trails of this Committee have been lost: most probably its activity didn’t last longer than 1934. Its inauguration session, however, had a truly solemn tone^[16].

Regardless of numerous official declarations, none of the Government’s representatives seemed to consider the NCR as a useful consulting body. The ministers and the Army preferred to address their own technical offices and evidently considered the NCR a rival of which to be jealous, rather than an instrument of technical and scientific information. The NCR, although it did not have necessary strategic information, had to decide alone which problems were urging most to work on. On 6 March 1935 Mussolini sent a letter^[17] to Marconi in which he indicated problems which should further be considered fundamental in the final stage of the realization of economical autarky in view of the war. At that time, the preparations for the war in Ethiopia, which was to start in October of the following year, were already in full progress.

The Duce pointed at four fundamental questions and asked the NCR to swiftly resolve them:

“It is an absolute need that the NCR should polarize and concentrate its efforts on the following problems in order to find both a national and an industrial solution to them (that is, not just a simple laboratorial one). A) the problem of national fuel (alcohol, rocks and schists, gasogene material etc.). B) the problem of national textiles. C) the problem of national cellulose. D) the problem of the use of solid national combustibles (coal, brown coal etc.). On some of the listed problems there are studies, experience and industrial applications (in initial stage). It’s time to give the Government a ground for large-scale activity”.

The problems brought up by the Duce, as well as other issues, had been discussed for a couple of months by the press, but the NCR did not take them into consideration except for the “cottonization” of hemp [mixing cotton with fibres made of hemp]: for this purpose they rented a laboratory in a technical institute in Naples and left it at disposal of the hypothetical “inventors”. Those were huge problems to which there seemed to be no quick solutions and which could only be reasonably approached if one had much time and vast resources. Mussolini did not concede either to the NCR; however, his directive could not have been ignored.

The NCR’s reacted rapidly and within less than two months the reports expected by the Duce were ready^[18]. Of course, as it might have been supposed, the reports were absolutely useless and sank into oblivion. Never again did Mussolini ask the NCR for anything personally.

Also in Spring 1935 another important sign of a modest growth of interest of the Government for the activity of the NCR was given, namely the creation of the “Inter-Ministerial Commission for Insufficient Raw Material and for Substitutes” (further called CISS). This was the unit expected by the Supreme Commission for Defence, the highest governmental body with military prerogatives, whose head was Mussolini himself^[19]. The task of the Commission was of great strategic relevance. The Commission was to issue a report in January of the following year; the report, which was to be presented to the Supreme Commission for Defence, was supposed to indicate the needs, effective resources, deficits, and ways to obviate the possibly broad variety of raw materials Italy would need in a hypothetical first year of war. In other words, the report was to serve in the evaluation of whether the Nation was able or not to resist a year of war. The Commission was meant to be of permanent character and to issue such an evaluation every year. The Commission represented the most important form of involvement of the NCR in the war preparations.

The Commission comprised technicians representing various ministries, the Armed Forces and the NCR. The latter was also supposed to provide the head office and contribute to the organizational needs. Since the NCR did not possess any unit for publishing statistical data (the data included in Blanc's report regarding raw material would later turn out unreliable), basic numbers for the report on the necessity and availability of raw material were requested from the Committee for Civil Mobilization, a military structure created during World War I to manage the production of economical goods in case of war. The head of the Committee was General Alfredo Dallolio, an elderly officer of a very tough character, who would always make it evident that he considered the CISS a useless and annoying, if not harmful, rival. Still, regardless of these difficulties, the CISS pursued its activity in the following years and would issue its annual report on time. The Commission was gradually broadened: outstanding scientists and technicians from the private industry sector were employed, the work was divided and articulated efficiently, and so the scale, precision and concreteness of the final reports increased noticeably.

It seems that Mussolini paid great attention to the CISS reports, but – unfortunately – also the CISS paid much attention to Mussolini's opinion. In the final discussion about the preliminary works, one can feel a growing worry not to provide an excessively negative picture of the situation in Italy, smoothing the available data in order not to delude too much the expectations of the Duce. In the execution of this preventive censorship Amedeo Giannini, the vice-president of the NCR, was particularly active. What seems to be the most glamorous example of "mending" of data to support Mussolini's strategic choices instead of confronting them with the reality is the case of the evaluation of pit coal included in the report from January 1940^[20].

January 1940 was a particularly dramatic period: several months before Europe had fallen prey to the advancing Wehrmacht and Italy had to decide whether it should enter the war as Hitler's ally or not. The CISS-report was to serve as a reference point for an epochal decision in the Italian history. The report contains disconcerting data on pit coal. It represented the most important import item, reaching about 13 %, in value, of Italian imports. The amount of imported coal gradually increased and in the years 1938-1939 it exceeded 12 million tonnes. The CISS report from 1940 provided a both clear and surprising hint: if, in case of peace, the need of combustibles to import was expected to be of 12.750.000 tonnes, in case of war the estimation was reduced to 8.900.000 tonnes, that is, the amount guaranteed by the secret

agreements with Germany. Thus, it meant that, in case of entering the war, Italy's needs for coal consumption would be reduced! The miracle of reducing the consumption by almost 4 million tonnes of combustibles would have been put into practice by means of a drastic decrease in industrial production: for the industries working in Italy during peacetime there was a reserve of 9,5 million tonnes, but in case of war the industries would have to do with less than 6,5 million tonnes, about 4 million of which were destined to the war industries. It seems more than evident that such a solution, based upon the almost complete paralysis of industry could only be seriously considered in case the war wouldn't last long; indeed, only for a few months could the country survive and fight with its industrial structures barely working or even out of work to avoid consuming coal. As far as the combustibles are concerned, the decision to enter the war seemed to be a bet, a great risk that could only be taken into consideration if one had forgotten all that was written and said on the principal conclusion that should have been drawn from the experience of the Great War during the two precedent decades: modern war was no longer a war of armies but a war of nations which required the complete involvement of all productive forces, the maximization of industrial activity, and certainly not its slackening; to take this risk with trust in a swift solution of the conflict was a dramatic step. Mussolini, though, chose to risk and the CISS report provided data which were mostly welcomed by the Duce. Immediately after Italy had entered the war, the CISS was dissolved: because of the fact that the war was in progress, a body dedicated to predict a future which had become the present seemed to be superfluous.

Let us go back to the period of the Ethiopian war. The already mentioned increase in funds in 1935 was followed by an even greater augmentation in 1936, which raised the disposable financial resources to 10 million lira (more than 8 million euro). The increase grew and immediately before World War II the funding eventually reached more than 25 million lira (almost 17 million euro) per annum. Thus, within five years the real value of the funds of the NCR was multiplied by more than 17^[21]. Mussolini's initiative was fundamental for such large increase. This sudden wealth brought new perspectives to the NCR. It was finally possible to put the original programme into practice, at least partially. If nothing else, the NCR was able to build its own headquarters which were opened in 1937, also thanks to the contribution of many companies which were asked by Mussolini to intervene directly.

The increase of funds didn't come with any new governmental directive regarding scientific research aimed at contributing for Italian autonomy. Mussolini offered generous funding but he did not say how to use it. The NCR thus invented for itself a role as key player

in the process of construction of imperial Italy, often provoking jealousy of various ministries, above all of the Ministry of Education headed by Giuseppe Bottai.

In early 1936, when the victory of the Italian army in Africa seemed already imminent, similarly to many Italian public bodies, the NCR launched an evaluation of the resources that could be found in the conquered lands. The Council wanted to demonstrate with its own diligence that it was worth the fund increase. It proposed, therefore, to co-operate with ministries and bodies like the Italian Academy; the answers, however, were either negative or none at all^[22]. The only thing the NCR managed to do was the organization of a commission of chemists which in 1936 explored Ethiopia in search for industrial structures that later might be further developed. After its return to Italy, the commission painted a depressing panorama which lacked any interesting perspective, and so the final report was absolutely useless. It is worth to underline the fact that the head of the mentioned mission was Henry Molinari, a recognized expert on plant design and installation who, however, was well-known also by the Italian police as a militant anarchist. Because of his political ideas, Molinari was forced to quit university and couldn't obtain a permit to leave the country. It was only due to a personal intervention of Mussolini that Molinari was given a passport so that he could leave for Africa^[23]. Also in the following years Molinari occupied important posts in the NCR. It seems that Mussolini accorded more importance to technical competences than to political fidelity. As for Molinari, not once did he show, regardless of his political anti-fascist position, resistance to the idea of autarky: in his view, from the perspective of scientific research the autarky-project was the most rational solution. This is only one example of the approach that characterized many of the Italian technicians: the autarky-project, interpreted as an evaluation plan of the national resources by means of scientific research seemed to many an absolutely reasonable idea.

The NCR's will to appear as being involved in the realization of imperial autarky met various obstacles. Those were, among others, the determined opposition of the Ministry of Education against conceding to the NCR the legal possibility to realize its own and autonomous research institutes, and Marconi's death in July 1937. In fact, NCR activities in the second half of 1936 and till the end of 1937 remained limited to its basic functions, without any major contribution to the realization of the autarky project, which in this period should have become the axle of all the political activity of the government^[24].

In the years 1938-1939, after the reorganization and the nomination for president of Pietro Badoglio, the conqueror of Addis Abeba and protagonist of military operations that had given Italy an empire, the NCR started to work at full blast. According to the official

declarations, the NCR would have to direct all its forces towards autarky, but in reality things followed a different way^[25].

First of all, a decree stated that the NCR was to use a large part of the funds at its disposal to constitute a national geophysical service and to reconstruct the National Thalassographic Committee – two institutions which were not linked to the autarky-project. Moreover, no political or military body consulted with the NCR about strategies to be followed while formulating scientific research projects of autarkic interest. Mussolini said nothing more, no ministry asked for assistance – on the contrary, the animosities of the precedent years continued and the armed forces, regardless of Badoglio's presence, did not seem to regard it useful to involve the NCR in its own activities. Thus, once again the Institute had to invent itself a role to play. The management of the NCR, however, was formed mostly of people whose background was not scientific and who did not have qualifications (as it had explicitly been recognized) to formulate plans regarding the Italian scientific research. Therefore, since nobody ever created any plan regarding autarky-orientated research, no-one ever indicated the priorities on the endless list of problems brought up into discussion every day by the autarky-construction issue.

All remained entrusted to the initiative of individuals who managed to obtain funding for their own studies due to their personal contacts rather than because of the objective importance of the researched questions. Many of those researchers who now appeared as autarky-constructors put forward the same issues that they had already dealt with in the precedent years and that had previously not gained attention, but that became extremely up-to-date in the new autarkic atmosphere.^[26] These researchers represented the already mentioned scientific-technical nationalism which appeared during the Great War: to them autarky meant the realization of an ideal they had pursued for a long time without success.

Among names that could be enumerated here the most significant is that of Mario Giacomo Levi. Levi, lecturer at the Technical University of Milan, for almost two decades had studied the features and the possible use of Italian coal to replace imported anthracites. With the appearance of autarky, Italy's lack of coal seemed to be the fundamental problem of the production structures and Levi's studies suddenly became famous. In a speech delivered in Autumn of 1937 on the change that came about Levi said:

“In 1931, at the 20th meeting of our Society in Milan I was to speak about a part of the problem, that is, about the technical and economical aspects of the fuel issue. My faith, my enthusiasm and our work did not slacken /.../ but the atmosphere in Italy was sceptical and

fearful: what prevailed were strictly economical considerations /.../ I admit that I suffered during this Congress. I left the meeting discouraged and bothered by the doubt whether it was true that I was obsessed and fanatical about my insistence upon studying problems which to our Country meant neither possibility, nor benefit /.../ And how different is the atmosphere today! /.../ The land cultivated with conscientious faith germinates vigorously, the indifferent have become enthusiastic, the incompetent rushed to study and have become scholars, the industrialists, the technicians, the capitalists are fully mobilized, our 130 publications are being searched, read and sold everywhere. The reasons for such a change are known to everybody: for the third time in twenty years the problem of fuel has recently reappeared in Italy, displaying all its violent gravity – maybe more violent than ever because the whole World has united or has tried to unite against us, when 50.000 Italians were abroad in another continent, conquering the Empire. A brilliant victory or suffocation and humiliation depended on transport, production and weapons; the only really national and really available raw material [is] the heroism of our soldiers of all units and in all ranks, the prophetic clairvoyance and the super-human courage of the Duce”^[27].

In Autumn 1938 Levi was expelled from the University and persecuted by racial laws.

Just like Levi, many other scientists offered their scientific credibility in favour of autarky, even when the latter became a plan of preparing Italy to an exceptionally important war. The public support of scientists for the autarky project was of great propagandistic importance and served to add a touch of “being scientific” to programmes which were all but reasonable.

I will finish my paper with a brief overview of the research conducted in the political-institutional climate I have sketched before.

The produced research was of various levels and of diversified results. First of all I should certainly recall the research which could be conducted only because of autarky and which led to a failure. The group usually referred to in order to describe the particular scientific climate of the period must be divided into two sub-groups. One group is constituted by typically Italian researches like that regarding some substitute textile fibres (Lanital, “cottonized” hemp) or the use of plants like broom as sources of cellulose, while the second group consists of researches which, due to the technologies applied, were to be forgotten but which, in a given moment, could be considered as in line with the international scientific community: such were the studies of gasogene material, to which the NCR dedicated its largest research institute, the Engine Institute (Istituto Motori) in Naples. Reference models for this kind of research were France, Germany, Switzerland, Austria and the research on reinforced concrete with bamboo

cane instead of iron (along the lines of what was being done in Germany) conducted with great intensity in the centre for studies on construction material in Turin led by Gustavo Colonnetti, who at the same time was working also on an avant-garde issue, namely the pre-compressed concrete. Still, along with the efforts which could only be justified by the climate of those days (and they were not limited to Italy only), which were doomed to be instantly forgotten and to which one used to emblematically reduce the whole science of the second half of 1930's, also other typologies were present. Research lines which had already been followed autonomously in the past were resumed by scholars who finally found a way to make their names known and became the centre of general attention in the autarkic climate. This recuperated researches included for example studies regarding the use of national combustibles, the production of aluminium and light alloys, and the extraction of cellulose from annuals. Also new researches, stimulated and made possible by the autarkic conjuncture, were initiated. These studies, which would later be significantly developed, included above all Giulio Natta's research on the production of synthetic rubber supported by Iri and Pirelli. The mentioned research constituted a prelude to Montecatini's achievements in the field of plastic material in the post-war period, as well as to Natta's personal success in the field of polymerization. There were also industrial researches based upon foreign patents without contribution of the University circles, which gave birth to great production realizations such as the hydrogenation of combustibles by the Anic or the production of national magnesium in Bolzano. Also without the contribution of the University original industrial research which brought important results, such as the perfecting of the T4 explosive by Nobel, was undertaken.

This mobilization, rather operational than ideological, of scientists and technicians was not and could never have become sufficient to give any plausibility to the autarky project. The shortages of raw material and of production capacity were too large, too disastrous to achieve the scopes of autarky, even in such a limited and partial shape as it was sketched in fascist plans.

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[2] R.Maiocchi, *L'organizzazione degli scienziati italiani*, in V.Cali, G.Corni, G.Ferrandi (eds.), *Gli intellettuali e la Grande guerra*, Bologna, Il Mulino 2000, pp.209-244.

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- [5] R.Simili, G.Paoloni (eds.), *Per una storia del Consiglio nazionale delle Ricerche*, Roma-Bari, Laterza 2001, vol. I, p.15.
- [6] R.Maiocchi, *Gli scienziati del Duce. Il ruolo dei ricercatori e del Cnr nella politica autarchica del fascismo*, quot., cap.1.
- [7] R.Maiocchi, *Fascism and Italian Science Policy*, in L.Guzzetti (ed.), *Science and Power: the Historical Foundations of Research Policies in Europe*, Brussels, European Commission 2000, pp.179-186; Id., *Scienza e fascismo*, Roma, Carocci 2004, cap.1.
- [8] R.Simili, G.Paoloni (eds.), *Per una storia del Consiglio nazionale delle Ricerche*, quot., vol. I, cap.2.
- [9] R.Maiocchi, *Gli scienziati del Duce. Il ruolo dei ricercatori e del Cnr nella politica autarchica del fascismo*, quot., cap.1
- [10] Ivi, p.26 and ss.
- [11] R.Maiocchi, *La ricerca agraria*, in R.Simili, G.Paoloni (eds.), *Per una storia del Consiglio nazionale delle Ricerche*, quot., vol. I, pp.448-64;
- [12] R.Maiocchi, *Gli scienziati del Duce. Il ruolo dei ricercatori e del Cnr nella politica autarchica del fascismo*, quot., p.37.
- [13] Ibid., p. 35.
- [14] Ibid., p. 39.
- [15] R.Maiocchi, *La ricerca scientifica nel Cnr*, in A.Casella, A.Ferraresi, G.Giuliani, E.Signori (eds.), *Una modernità difficile. Tradizioni di ricerca e comunità scientifiche in Italia 1890-1940*, Pavia, La Goliardica 2000, pp.405-430.
- [16] R.Maiocchi, *Gli scienziati del Duce. Il ruolo dei ricercatori e del Cnr nella politica autarchica del fascismo*, quot., p.39.
- [17] On *Archivio Centrale dello Stato*, Roma, ACNR (Archivio CNR), b. 981, II.
- [18] R.Maiocchi, *Gli scienziati del Duce. Il ruolo dei ricercatori e del Cnr nella politica autarchica del fascismo*, quot., p.50.
- [19] R.Maiocchi, *Gli scienziati del Duce. Il ruolo dei ricercatori e del Cnr nella politica autarchica del fascismo*, quot., cap.4.
- [20] CISS, *Quinta relazione alla Commissione suprema di difesa 1940. Combustibili fossili*, on *Archivio Centrale dello Stato*, Roma, Archivio CNR, b.264.
- [21] R.Maiocchi, *Le istituzioni di ricerca in Italia tra le due guerre*, quot.; Id., *Gli scienziati del Duce*, quot., p.264.
- [22] R.Maiocchi, *Gli scienziati del Duce*, quot. p.115.
- [23] Ibid., p.122.
- [24] Ibid., p.115.
- [25] R.Maiocchi, *Il CNR da Badoglio a Giordani*, in R.Simili, G.Paoloni (eds.), *Per una storia del Consiglio nazionale delle Ricerche*, quot.,vol. I, pp.173-200.
- [26] R.Maiocchi, *Gli scienziati del Duce*, quot., cap.3.
- [27] M.G.Levi, *Autarchia dei combustibili*, in *Atti Riunione SIPS 1937*, p.297.