

A prehistory of statistics on science and technology in France.

From inventories to statistics

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Reading historians, we know that the production and the use of statistics are the result of a long term complex socio-historical process. In the field of science, technology and innovation (STI), such a long term process has been shown recently and *in extremis* so that one can celebrate today the “one hundred years of STI indicators”. The recent socio-historical studies of Benoît Godin on STI indicators have shown that before the 1950’s and the 1960’s, that is to say before the National Science Foundation (NSF) and the Organization for Economic Cooperation and Development (OECD), usually seen as the starting point of STI indicators, countries like United States, Canada and Great Britain (the “forerunners”) already had a long experience in the development of science and technology “official” statistics which goes back to the First World War (Godin, 2002; 2005[a]). Paying attention to “academic” statistics on STI, we also learn that the project of the measurement of science occurs not after the Second World War, as it is widely believed, but in the third quarter of the Nineteenth century with Alphonse de Candolle and Francis Galton and that the latter, Galton, inspired his student James McKeen Cattell, the editor of *Science*, who published in 1906 the repertory *American Men of Science*, which was updated every five years and exploited for statistical survey on American scientists (Godin, 2005[b]). When an historian explores the Science Citation Index (SCI), first published in 1964, he discovers that the concept of citation indexing that inspired the SCI originates in the area of American legal publishing in the second half of the Nineteenth century (Wouters, 2006).

In this context of new socio-historical studies on STI indicators, the same pattern occurs when one investigates, as I’ll do here, the history of STI statistics in France. As in most industrialized countries, the French State began to produce and use statistics on science and technology on a regular basis at the beginning of the 1960’s. But this is the visible part of the iceberg and a too short history of the beginnings of official statistics on science and technology in France. In fact,

the “prehistory” of statistics on science and technology in France goes back to the First World War, at least, as it does in countries like the United States, Canada and, later, Great Britain. This prehistory of official statistics in France is taken here as the main subject. Although many of those concerned such as industrialists and intellectuals could be considered, this study focuses exclusively on official statistics or “prestatistics” and is driven by the two following purposes: a) identifying and describing the main characteristics (ideological, institutional, material) of this prehistory; b) understanding the long prevalence of a logic of inventory until the Sixties. It is question, in sum and to use a turn of phrase adapted and borrowed from Jean-Jacques Salomon, of the weight of ideas, interests and values that overwhelmed the production of inventories on science and technology (Salomon, 2005). In this perspective, particular attention will be paid to the discourses that accompany the production of inventories as well as to their institutionalization with the aim of comprehending rather than to criticizing their relations with the knowledge produced.

The prehistory of statistics on science and technology covers almost half of the last century, going from the First World War to the Sixties. From the First World War to the Second World War, the production of inventories on science and technology by the French State is driven by the context of scientific mobilization and by its ideal of a coordination, at the national level, of the scientific and technical resources. The production of inventories is carried out not by a specific institution but by the national research centers in charge of the scientific mobilization that keep the files secret and unpublished. The inventories produced focus both on the researchers and on the laboratories and do not serve to produce numbers. They are in fact instruments used exclusively by the Administration for the management of the scientific and technical resources. It is only in the Sixties, as we will see in the second part going from the end of the Second World War to the Sixties, that a quantitative exploitation of inventories is observed, that is to say a year before the first systematical statistical surveys on science and technology. It will take in fact almost fifteen years to convert into a civil context the production of inventories on science and technology. The need and the prescription of such inventories will come in the Fifties from an economic institution, the French Plan, as well as the prescription of another type of knowledge on science and technology, the “*conjoncture scientifique*” by analogy to the “*conjoncture économique*”. A neoliberal conception of the production of knowledge on science and technology emerges and is embodied in the Délégation générale à la recherche scientifique et technique (DGRST), a permanent interministerial organism responsible of the production of the national inventories in science and technology, created in 1958. By reference to economy, science

is seen as a field of public interest that needs a policy in terms of actions and decisions as well as in terms of means of elaboration. Knowledge about science and technology here is not limited to the Administration and its diffusion among certain fields, mainly scientific and economic fields, becomes integrated to its production. Although the quantification of this knowledge becomes a stake, it is in 1963 that the DGRST takes a statistical turn using the conventions of the *Frascati Manual* developed by the OECD.

A. Five inventories, from the First to the Second World War

Between the First World War and the Second World War, the words “statistic” and “indicator” are mostly unused by the French administrators concerned with the knowledge of scientific and technical resources of the nation; they use the words “*inventory*” (“*inventaire*”) and “*census*” (“*recensement*”). This language is mirrored into practice. In fact, this period is mainly characterized by the production of records, the “founding act” of every modern statistical work (Desrosières, 2000), but not by the production of numbers and conventions on STI. The term “prehistory” applied to this period refers to the fact that while the French State has carried out five inventories of scientific and technical resources of the country (see Table 1), the production and use of numbers are not the purposes of these inventories, not even a side effect. These inventories are: a) instruments of the scientific mobilization developed in a military context; b) tools of management for the coordination of scientists and laboratories secret and unpublished.

Table 1

**THE FIVE INVENTORIES OF SCIENTIFIC AND TECHNICAL RESOURCES BY THE FRENCH STATE
FROM FIRST WORLD WAR TO SECOND WORLD WAR**

Institution	Ministry	Year	Inventory consulted
1. Direction des inventions, des études et expériences techniques	Ministère de l'Instruction publique et des Beaux-arts [1915]/Ministère de l'Armement [1916]	Probably during the first World War	No
2. Office national des recherches scientifiques et industrielles et des inventions (ONRSII)	Ministère de l'Instruction publique/Ministère de la Défense nationale	1929	No
3. Office national des recherches scientifiques et industrielles et des inventions (ONRSII)	Ministère de l'Instruction publique/Ministère de la Défense nationale	1933	No
4. Centre national de la recherche scientifique appliquée (CNRSA)	Ministère de l'Éducation nationale/Ministère de la Défense nationale	1938-1939	Yes
5. Centre national de la recherche scientifique (CNRS)	Ministère de l'Éducation nationale/Ministère de la Défense nationale	1941-1942	No

A. INVENTORIES FOR THE SCIENTIFIC MOBILIZATION

The idea of scientific mobilization emerged during the First World War and it encouraged the French State to make an inventory of the scientific and technical resources in the country. From the First World War to the Second World War, such inventories are conceived as tools for a proper use of the scientific and technical resources in case of military conflict and are produced under the patronage of military authorities by national research institutions tied up with the ministère de l'Instruction publique or the ministère de l'Éducation nationale.

The idea of “scientific mobilization” appears when Paul Painlevé, Ministre de l'Instruction publique et des Beaux-arts, creates in 1915 the Direction des inventions with the argument, as mentioned in the decree of creation, that “*the industrial mobilization has to be completed by the scientific mobilization of the country*”¹ (quoted by Roussel, 1989). The mission of the Direction consists of using, for war needs, the scientific and technical resources (human and material) of the country in order to offset the weaknesses of the Administration de la guerre in the field of invention (Roussel, 1989). In this context, according to its director Jules-Louis Breton, the Direction des inventions has carried out during the First World War the inventory of the scientific and technical resources. Answering in 1922 the questions of the Conseil supérieur de la Défense, Jules-Louis Breton evokes it: “*This census would be very useful. It would moreover be all easier to carry out*

¹ “la mobilisation industrielle doit être complétée par la mobilisation scientifique du pays”

*since it has already been performed by the Direction des recherches et des inventions that has elaborated, and carefully updates, a set of files on all existing public and private laboratories, their orientation, their special competence, their scientific equipment, the questions they are the more qualified to study and resolve”*² (Jules-Louis Breton, 1922).

During the interwar period, the inventory of scientific and technical resources continues to accompany scientific mobilization. In fact, inventories are now carried out with the aim if *preparing* in period of peace, the scientific mobilization in case of a war. The idea of an inventory reappears in 1925 in an *Instruction sur la mobilisation scientifique* of the Conseil supérieur de la Défense nationale. The instruction allows: “*an inventory as complete as possible of the national resources: 1) by consultation of the several State services which by their nature could have some in their possession; 2) by survey to the private organisms, industrial or commercial groups, big industrial firms, etc.*”³ (quoted Conseil supérieur de la Défense nationale, 1925). The Office national des recherches scientifiques et industrielles et des inventions (ONRSII), a civil research organism which follows the Direction des inventions in 1922 to fulfil the needs of the public services and to serve the public interest. Directed by Jules-Louis Breton, it carries out in 1929 and 1933 two inventories as prescribes in the ministerial instruction. Both inventories concentrate only on public laboratories tied up with the ministère de l’Instruction publique. The argument is that most of the scientific and technical resources in France are linked to this ministry (*États des travaux...*, 1934; *Lettre du ministre...*, 1926).

It needs the imminence of a second conflict and the increase of public investments in applied research to see inventories focus also on other ministries and industry. In ONRSII’s wake, a fourth inventory is carried out in 1938-1939 by the Centre national de la recherche scientifique appliquée (CNRSA), headed by Henri Longchambon and founded in May 1938 to develop applied research in France. When the law on “*l’organisation de la Nation en temps de guerre*” is adopted the 11th of July 1938, the ministère de l’Éducation nationale is putted in charge of the scientific mobilization and the CNRSA takes it on (Picard, 1990). This implies an inventory that will be updated in 1941-1942 by the Centre national de la recherche scientifique (CNRS) but only in universities.

² “Ce recensement serait des plus utiles. Il serait d’ailleurs d’autant plus facile à effectuer qu’il a déjà été réalisé par la Direction des recherches et inventions qui a élaboré et tient soigneusement à jour, un jeu de fiches sur tous les laboratoires publics et privés existants, leur orientation, leur compétence spéciale, leur outillage scientifique, les questions qu’ils sont les plus qualifiés pour étudier et résoudre.”

³ “un inventaire aussi complet que possible des ressources nationales : 1) par consultation auprès des divers services d’État qui par leur nature pourraient en détenir ; 2) par enquête auprès des organismes privés, groupements industriels ou commerciaux, grandes firmes industrielles, etc.”

Thus, between the First World War and the Second World War, the French State has carried out its five inventories of the scientific and technical resources within a specific institutional arrangement. In fact, from 1915 to 1942, these inventories are instruments of the scientific mobilization. The military power appoints for this task the ministère de l'Instruction publique or, latter, the ministère de l'Éducation nationale, and their main research organisms.

B. TOOLS OF MANAGEMENT FOR THE COORDINATION OF SCIENTISTS AND LABORATORIES, SECRET AND UNPUBLISHED

If mobilizing science implies knowing science, what kind of knowledge about science is produced in the context of a scientific mobilization and what for? Inventories of scientific and technical resources are management tools produced by, and for, the national research organisms responsible for the scientific mobilization. Their protagonists see inventories as the requisite means for the “coordination” of scientific and technical resources. In such circumstances, they concentrate on two units of analysis, the scientist and the laboratory. Kept secret and unpublished, the questionnaires filled by scientists are rather “files” on scientists and laboratories that permits to manage and to follow up the scientific mobilization rather than to produce statistics.

The research organisms ensure the scientific mobilization, not only by doing research themselves but also by coordinating the scientific and technical resources of the nation. It is this ideal of coordination, in the name of the public interest, that legitimate the production of the inventories. Besides research, the agents of the scientific mobilization are a sort of dating agency of research actors, trying to match the demands emanating from administration with the supplies of research. In the Thirties, Henri Longchambon describes its mission in the following terms: *“to look for and distinguish the valorous personalities or centers of research, wherever they are, public or private organisms, Parisian or provincial, [...] encourage them, [...] develop them within the capabilities of the men at their head, [...] orientate them towards problems of their competences that could have a primordial interest for the Économie nationale or the Défense nationale”*⁴ (Henri Longchambon, note, AN 80/284) Protagonist of the coordination, Henri Laugier, the first head of the CNRS in 1939, has stigmatized in 1942 the *“tradition of total liberty, of frantic fantasy, of an unrestrained individualism in the choice of the problems to be*

⁴ “rechercher et distinguer ces personnalités ou foyers valeureux de recherche, en quelques lieux qu’ils se trouvent, organismes publics ou privés, parisiens ou provinciaux, (...) les encourager, (...) les développer à la mesure des hommes placés à leur tête, (...) les orienter vers les problèmes de leur compétence pouvant avoir un intérêt primordial pour l’Économie nationale ou la Défense nationale”

treated”⁵ of the academic research, the “*the similar researches conducted by ignoring themselves*”⁶ within the ministries as well as the industry “*juxtaposing within a compartmentalization methodically organized the material and human resources totally heterogeneous*”⁷ (Henri Laugier quoted by Emmanuelle Picard, 1995). He claimed for a “*vertebrate structure, seizing men and things in a network of connections, of commands, for war and peace action and ensuring to the one and the others the best yield*”⁸ (Henri Laugier quoted by Emmanuelle Picard, 1995). The instrument of such coordination is the inventory.

One can have a good idea of this “coordination regime” of the inventories by paying attention to the questionnaires themselves and by analyzing how they were constructed and used by the CNRSA during 1938 and 1939, the only and precious inventory found in the archives (*Fiches de l'inventaire de 1938-1939*). In charge of the scientific mobilization, the CNRSA kept in its office all the questionnaires filled for two units of analysis: the researchers and the laboratories. For the latter, it classified them into the following categories: 1) the laboratories of higher education organized by city; 2) the laboratories of others ministries organized by ministry; 3) the laboratories tied up to private institutions of higher education, to municipalities and to departments and organized by city or department; 4) the laboratories from the private sector and organized by department. Except the private sector, the blueprints of the institutions and the lists of “*scarce and costly equipments*” are attached to the questionnaires. As figure 1 illustrates, the questionnaire on laboratories concentrates on four types of information: a) an identification of the laboratory; b) a description of each scientific and technical personnel of the laboratory regarding the military situation; c) a description of the laboratory regarding its institutional and military situation and its fields of competences; d) a description of the equipments (premises, general services, scientific equipments and resources in the neighborhood).

⁵ “tradition de liberté totale, de fantaisie éperdue, d’individualisme effréné dans le choix des problèmes à aborder”

⁶ “les recherches analogues se poursuivant en s’ignorant totalement ou presque”

⁷ “juxtaposant dans un cloisonnement méthodiquement organisé des ressources en matériel et en hommes totalement hétérogènes”

⁸ “structure vertébrée, saisissant les hommes et les choses dans un réseau de liaisons, de commandements, en vue de l’action de guerre ou de paix et assurant aux uns et aux autres le rendement maximum”

Figure 2

**THE SCIENTIFIC MOBILIZATION AND THE INVENTORY
OF THE SCIENTIFIC AND TECHNICAL PERSONNELS
AN INDIVIDUAL FILE BY THE ONRSII FINDED IN THE CNRSA'S ARCHIVES**

1180

(118)

MINISTÈRE DE L'INSTRUCTION PUBLIQUE ET DES BEAUX-ARTS
OFFICE NATIONAL des Recherches Scientifiques et Industrielles et des Inventions.
1, avenue: Maréchal-Joffre, 4, Bâtiment (Seine-et-Oise).
TELEPHONE: 1. Vaucluse: 07-25, 07-60, 07-61
2. Bâtiment: 2-84

MOBILISATION SCIENTIFIQUE

FICHE INDIVIDUELLE

I. — Renseignements sur l'état-civil:
Nom et prénoms.....
Date et lieu de naissance.....
Situation de famille (1).....

II. — Renseignements universitaires:
Titres scientifiques et universitaires.....
Fonction tenue dans l'enseignement et dans le laboratoire.....
Aptitudes particulières.....

III. — Renseignements militaires:
Classe de mobilisation.....
Bureau de recrutement du domicile.....
Numéro matricule de recrutement.....
Grade dans les réserves et date de la nomination à ce grade.....
Affectation à la mobilisation (2).....

IV. — Proposition d'affectation en cas d'une nouvelle mobilisation (3).

(Signature.)

M. J. J.

CONFIDENTIEL

(1) Marié, veuf, divorcé, célibataire. — Nombre d'enfants.
(2) Indiquer le corps de troupe ou le service à rejoindre par l'intermédiaire de, si possible, l'emploi actuel.
(3) Indiquer les affectations qui permettraient d'utiliser au mieux les aptitudes particulières de l'intéressé. Indiquer en premier lieu l'affectation demandée par l'intéressé.

Once filled and centralized in the services that take the scientific mobilization on, the questionnaires permit the services to manage the use of the scientific and technical resources. Many inscriptions leaved by the CNRSA on these files give us an idea of the managerial or administrative use of inventories. The Centre notes, for instance, that a professor of mathematics married with one child has been “required by the Centre” (“requis par le centre”) for a certain period, “until the first of September 1940” (“jusqu’au 1^{er} septembre 1940”), in the group of Parisian laboratories supervised by Frédéric Joliot (“G1”); that a physician of the Faculty of Science at Dijon could be mobilize (“MOB”) by the Army in the first reserve B or that another can not be mobilize (“N.M.” for “non mobilisable”) and that he is in fact required by the CNRSA; that a physician of Strasbourg, exempted from military service, has a “special appointment by ministerial decision” (“affectation spéciale par D. M. [décision ministérielle]”) and is at the Centre’s disposal. In the context of scientific mobilization, the files are kept secret and are the exclusive instrument of the Administration. (See Figure 3)

Figure 3

**THE SCIENTIFIC MOBILIZATION AND THE INVENTORY
OF THE SCIENTIFIC AND TECHNICAL PERSONNELS
INDIVIDUAL FILES USED BY THE CNRS**

The figure displays four individual files from the CNRS scientific mobilization inventory, arranged in a 2x2 grid. Each file is a form with various sections for personal and professional information.

Top Left File: Header includes 'Ministère de l'Éducation Nationale' and 'Université de Dijon'. The form is titled 'Requis par le Centre National de la Recherche Scientifique pendant la Guerre' and 'Jusqu'au 1er Septembre 1940'. It contains sections for 'RENSEIGNEMENTS SUR L'ÉTAT CIVIL' (Personal Information), 'RENSEIGNEMENTS UNIVERSITAIRES' (University Information), and 'RENSEIGNEMENTS MILITAIRES' (Military Information). The 'MILITAIRES' section is marked with an 'X' and contains handwritten notes: 'à Paris jusqu'au 16 nov 1939', 'à Paris du 16 nov 1939 au 10 oct 1940', and 'à Paris du 10 oct 1940 au 10 nov 1940'. A stamp 'G 1 S 2 L 2 P R L' is visible.

Top Right File: Header includes 'Faculté des Sciences de Dijon - Physique' and 'Ministère de l'Éducation Nationale'. The form is titled 'MOBILISATION SCIENTIFIQUE' and 'Fiche Individuelle'. It contains sections for 'RENSEIGNEMENTS SUR L'ÉTAT CIVIL', 'RENSEIGNEMENTS UNIVERSITAIRES', and 'RENSEIGNEMENTS MILITAIRES'. The 'MILITAIRES' section is marked with an 'X' and contains handwritten notes: 'Classe de mobilisation: 1935', 'Bureau de recrutement du domicile: Centre de Mobilisation, Dictionnaire, n° 8 - Dijon', 'Numéro matricule de recensement: 2011', 'Grade dans la réserve: 2e Lieutenant', 'Date de la nomination à ce grade: 15 nov 1939', and 'Affectation à la mobilisation: Officier d'Armée'. A stamp 'G 1 S 2 L 2 P R L' is visible.

Bottom Left File: Header includes 'Ministère de l'Éducation Nationale' and 'Université de Dijon'. The form is titled 'Requis par le Centre National de la Recherche Scientifique pendant la Guerre' and 'Jusqu'au 1er Septembre 1940'. It contains sections for 'RENSEIGNEMENTS SUR L'ÉTAT CIVIL', 'RENSEIGNEMENTS UNIVERSITAIRES', and 'RENSEIGNEMENTS MILITAIRES'. The 'MILITAIRES' section is marked with an 'X' and contains handwritten notes: 'à Paris jusqu'au 16 nov 1939', 'à Paris du 16 nov 1939 au 10 oct 1940', and 'à Paris du 10 oct 1940 au 10 nov 1940'. A stamp 'G 2 S 3 L 2 P R L' is visible.

Bottom Right File: Header includes 'Ministère de l'Éducation Nationale' and 'Université de Dijon'. The form is titled 'MOBILISATION SCIENTIFIQUE' and 'Fiche Individuelle'. It contains sections for 'RENSEIGNEMENTS SUR L'ÉTAT CIVIL', 'RENSEIGNEMENTS UNIVERSITAIRES', and 'RENSEIGNEMENTS MILITAIRES'. The 'MILITAIRES' section is marked with an 'X' and contains handwritten notes: 'Classe de mobilisation: 1935', 'Bureau de recrutement du domicile: Centre de Mobilisation, Dictionnaire, n° 8 - Dijon', 'Numéro matricule de recensement: 2011', 'Grade dans la réserve: 2e Lieutenant', 'Date de la nomination à ce grade: 15 nov 1939', and 'Affectation à la mobilisation: Officier d'Armée'. A stamp 'G 2 S 3 L 2 P R L' is visible.

It is thus the scientific mobilization and its ideal of a coordination of the scientific and technical resources that justifies the production of inventories on science and technology by the French State from the First World War to the Second World War. During this period, the scientific mobilization leads the French State to carry out five inventories kept secret and intended for the exclusive use of the Administration for the management of the researchers and of the laboratories.

B. The inventory of scientific and technical resources in a civil context after the Second World War: a long conversion

The idea of coordination by the State of the scientific and technical resources of the nation still prevails after the Second World War as well as the idea of their inventory. The CNRS officially holds the task of “*developing, orientating and coordinating every kind of scientific researches*”⁹ (Ordonnance n° 45-2632, 1945). It conserves also the official mission of “*carrying out surveys to the public and private laboratories on the researches that they pursue and on the resources that they use*”¹⁰ (Ordonnance n° 45-2632, 1945). But apparently, this is easier to say than to do. In reality, it will take almost fifteen years to revive in practice the national inventories on science and technology. Why did the inventory of scientific and technical resources need fifteen years to be effective? The idea of the State coordinating scientific research, as was the case within the scientific mobilization from the First World War to the Second World War, is far from being taken for granted after the Second World War. It is in the Fifties, within economic institutions like the Conseil économique and the Commissariat général du Plan, that the knowledge of the scientific and technical resources of the country becomes again an issue. The idea of coordination associated with an inventory is still defended but it is the emergence of a new economic institution, the French Plan, that stimulates the production of inventories. A neoliberal conception of the production of knowledge on science and technology inspired by the reference to the economic field takes place. With the creation of the DGRST in 1958 such a production becomes institutionalized at the interministerial level and aimed of administrators and members of the civil society, mainly scientists and economists. The publication thus becomes part of the process of production and the quantification of the knowledge, a stake that will be effectively systematized in 1963 on the base of the very new conventions of the *Frascati Manual* developed by the OECD.

A. THE INVENTORY OF SCIENTIFIC AND TECHNICAL RESOURCES: A STAKE IN THE FIFTIES FOR ECONOMIC INSTITUTIONS

Although the CNRS holds the task of coordinating the researches at the national level and of carrying out surveys, its institutional legitimacy to perform these missions in a civil context is called into question after the Second World War. Since 1946, public authorities have in fact

⁹ “*développer, orienter et coordonner les recherches scientifiques de tous ordres*”

¹⁰ “*organiser des enquêtes dans les laboratoires publics ou privés sur les recherches qu’ils poursuivent et les ressources dont ils disposent*”

underlined the institutional incapability of the CNRS, under the supervision of the ministère de l'Éducation nationale, to perform such missions. Since research, in this ministry, is not as concentrated after the Second World War as it was before it, but expanded in many others (19 instead of 7 planned by a report in 1948) particularly with the creations of national research centers outside the supervision of the CNRS (Office de la recherche scientifique coloniale [1943], Centre national d'études des télécommunications [1944], Office national d'études et de recherches aéronautiques [1945], Commissariat à l'énergie atomique [1945], Institut national d'hygiène [1946], Institut national de la recherche agronomique [1946], etc.), its coordination by the CNRS becomes a problem (Prost, 1988) as well as the surveys. Henri Laugier wrote in 1953: *"It is not possible that a servant of the Éducation nationale, however distinguished or backed as he might be, has the authority to go and carry out surveys to the public and private laboratories"*¹¹ (Henri Laugier in Conseil économique, 1953). But until the Fifties, the absence of coordination and of national surveys are, as Antoine Prost wrote, *"well supported deficiencie[s]"* (*"lacune[s] bien supportée[s]"*) (Prost, 1988).

Both themes reemerge within economical institutions in the Fifties. In 1952, in the name of economic growth, the Conseil économique is interested in *"The problems of scientific and technical research"* (*"Les problèmes de la recherche scientifique et technique"*) and it reaffirms the necessity of a national coordination of scientific and technical research and of an inventory. Among the scientists-administrators consulted, Henri Longchambon and Henri Laugier, both in charge of the scientific mobilization in 1938 and 1939, defend the idea of coordination at the national level of research and also of an inventory. They argue that this coordination is a necessity that consists in leading the scientific mobilization in peacetime, as well as in wartime, and that implies the inventory of the resources: *"[...] one needs to know the elements of the problem, says Henri Laugier. To know the elements of the problem, one needs to know the elements to coordinate, the laboratories, their personnel, their material, their funds; this is that one needs to ensure the effectiveness."*¹² (Henri Laugier in Conseil économique, 1953). In the same spirit of the scientific mobilization, Gérard Dupouy, head of the CNRS, proposes: *"To define this scientific research policy, a rational method could be the following: defining the problems considered as the most important in the actual state of things; drawing up a priority or a hierarchy of urgencies; gathering together the men and the means to solve the problems and this would lead us to carry out an inventory of the resources consisting of: a) resources in personnel, the heads, the team of researchers and technicians;*

¹¹ *"il n'est pas possible qu'un fonctionnaire de l'Éducation nationale, si distingué soit-il, si soutenu soit-il, ait l'autorité pour aller faire des enquêtes dans les laboratoires publics et privés"*

¹² *"[...] il faut connaître les éléments du problème. Pour connaître les éléments du problème, il faut connaître les éléments à coordonner, les laboratoires, leur personnel, leur matériel, leurs crédits ; c'est à cela qu'il faut assurer l'efficacité"*

b) the laboratories; c) the equipments. [...] One would need a document that would make know the “researches capital of the nation”¹³ (Gérard Dupouy in Conseil économique, 1953).

Besides this conception of the inventory as the instrument of the coordination of the scientific and technical resources inspired by the scientific mobilization, the Conseil économique claims in the report for an inventory for its own needs. Camille Soula, a scientist reporter for the Conseil économique wrote in fact in his report: *“The information of the country and the clarity of our debates should have required that we could at every moment refer to an exact situation of the scientific and technical research in France and in the French Union. Such a situation should include, beside the complete repertory of all research organisms, whatever the object and the juridical status, an inventory of the material resources that they use, as well as an inventory of the financial means, in order to know the amount of money, that in our country, are finally allocated to the research. What best characterize the state of lack of coordination of research in France, is that such an inventory is absolutely impossible.”*¹⁴ (quoted Soula, Conseil économique, 1953).

As in many other fields of the statistics (Desrosières, 1994; Fourquet, 1980; Girard, 1987) (although “statistics” is an inappropriate term in the case of science and technology in the beginning of the Fifties in France), the French planning had a decisive influence in the Fifties on the institutional development of the official knowledge on science and technology. After the first plan (1947-1952) that concentrated solely on six “main sectors” (“secteurs de base”) of the economy, the second plan (1953-1957) and the next include STI as a field of the French Planning. Although the first Commission de la recherche scientifique et technique, headed in 1953 by Henri Laugier, is created in an institutional desert regarding science policy (Papon, 1973), the plan becomes after integrated within the science policy. In 1954, a Conseil supérieur de la recherche scientifique et du progrès technique (CSRSPT) is created. Headed by Henri Longchambon, the CSRSPT supervises the report of the second commission (1958-1961). In 1958, with the new institutions of the fifth Republic, a Délégation générale à la recherche scientifique et technique (DGRST) is created and a

¹³ “Pour déterminer cette politique de la recherche scientifique, une méthode rationnelle pourrait être la suivante: définir les problèmes considérés comme les plus importants dans l'état actuel des choses ; établir une priorité ou une hiérarchie des urgences ; rassembler les hommes et les moyens pour résoudre les problèmes en question et ceci nous conduirait à établir un inventaire des ressources comprenant : a) les ressources en personnel, les chefs de file, les équipes de chercheurs et de techniciens ; b) les laboratoires ; c) les équipements. (...) Il faudrait un document qui ferait connaître le “capital recherches de la nation”

¹⁴ “L'information du pays et la clarté de nos débats eussent exigé que l'on puisse à tout moment se référer à une situation exacte de la recherche scientifique et technique en France et dans l'Union française. Une telle situation devrait comporter, outre le répertoire complet de tous les organismes qui effectuent des recherches, quel que soit l'objet de celles-ci et le statut juridique sous lequel ces organismes fonctionnent, un inventaire des moyens matériels dont ils disposent, ainsi qu'un inventaire des moyens financiers, de façon à connaître le montant des sommes, qui dans notre pays, sont finalement consacrées à la recherche. Ce qui caractérise le mieux l'état d'incoordination de la recherche en France, c'est qu'un tel inventaire soit absolument impossible”

Comité consultatif de la recherche scientifique et technique (CCRST). The DGRST, until its dissolution in 1981, has the mission to prepare the work of the commissions and its reports, and its Délégué is general reporter within the commissions. The twelve members of the CCRST, an instance of advice for the government, are also members of the commissions of the plan and the president officiates as president of the commissions.

Both commissions of the Plan in the Fifties plea for an inventory, for its permanent production and for its publication as well as for the creation of an inter-ministerial institution that could take this on. The 1953 Commission expresses the following wishes: *“a permanent inventory of research organisms (...)”, “a general file of research laboratories, their means in terms of premises, material, personnel (...)”, “make public, a) list of laboratories and research centers, name of heads, research projects, means”*¹⁵ (Présidence du Conseil, 1954). Wishes are not yet reality when the second commission elaborates its report. The report vigorously complains about this state of affairs evoking two different types of arguments. Firstly, it underlines that the work of the commission should have been based on this inventory, that not one of the many ministries having research institutions under its supervision has done this inventory for itself, except the ministry of industry. As the report argues, this places the commission in an embarrassing situation, for “material” reasons by obliging it to interrogate 2000 laboratories as well as for “psychological” reasons with regards to the ministries’ supervisors by forcing them to get in touch directly with executants. Secondly, the report of the commission prescribes the inventory of scientific and technical resources by militating in favor of an alignment of the field of science on the field of economy. The report argues that, while economic policy in most of the liberal countries are based on the permanent study of the system of production and of its evolution, on the definition of its orientations and of its means, science, a field of national interest as economy, would need the same policy in terms of content and in terms of means of elaboration. *“It is necessary at the level of the Présidence du Conseil to institute a service “Files and enquiries” that will carry out permanently the complete and precise study of the resources allocated to scientific and technical research, an essential knowledge for a national research policy”*¹⁶ (Présidence du conseil, 1957).

¹⁵ *“un inventaire permanent des organismes de recherche” (...) un fichier général des laboratoires de recherche, leurs moyens en locaux, matériel et personnel (...) que soit rendue publique, a) une liste des laboratoires et centres de recherche, nom des dirigeants, projets de recherche, moyens”*

¹⁶ *“Il est nécessaire qu’au niveau de la Présidence du conseil soit institué un service “Fichier et enquêtes” qui aura pour objet de poursuivre d’une façon permanente l’étude complète et précise des ressources consacrées à la recherche scientifique et technique, dont la connaissance est essentielle pour une politique nationale de la recherche”*

This adjustment of science to the economic field is accompanied by new representations on the knowledge of science and technology. In fact, the report distinguishes the inventory of scientific and technical resources seen as the “*most simple form*” (“*la forme la plus simple*”) of knowledge and the knowledge of the “*content of the scientific activities*” (“*contenu des activités scientifiques*”) and of the “*scientific situation*” (“*conjoncture scientifique*”) in reference to the study of the “*economic situation*” (“*conjoncture économique*”). “*The economic situation, says the report, is settled by gathering together information of every nature related to all important forms of activities, and in function of a reasoned appreciation of the interdependencies and of the interactions from sector to sector*”.¹⁷ According to the report, this should also be applied to science.

B. THE DGRST: FROM INVENTORIES TO STATISTICS

The Délégation générale à la recherche scientifique et technique (DGRST) is created in 1958 with the official mission of preparing “*an inventory of human and material resources of scientific and technical research*”.¹⁸ In order to accomplish this mission, a service named “*Inventory and Statistics*” (“*Inventaire et statistiques*”) is founded in 1960 at the DGRST. The coexistence of the words “inventory” and “statistics” is the signature of a period where the production of inventories gives precedence to the production of statistics.

When the first studies are carried out by the services of the DGRST in 1962, the “inventory tradition” as settled during the scientific mobilization still prevails. In fact, the Inventory and statistics service is in charge of a national inventory of the scientific and technical resources. The forms concern both the researchers and the laboratories, as in time of scientific mobilization. The information collected is now published since the DGRST also has the mission to diffuse information among a certain public: national and international scientific community, industrials, administrators and economist. The first publications are two repertoires. The first one, the Repertory of the French researchers (*Répertoire des scientifiques français*) states the information on the researchers’ career, their field of competence and their main publications. The first repertory is edited in 1962 and concentrates on the field of pure mathematics. The second one, the National repertory of Laboratories (*Répertoire national des laboratoires*) states the information such as the juridical status of the laboratory, its head, its scientific personnel, its equipments, etc. The first

¹⁷ “*La conjoncture économique s’établit grâce au regroupement des informations de toute nature relatives à toutes les formes importantes d’activités, et en fonction d’une appréciation raisonnée des interdépendances et des interactions de secteur à secteur*”

¹⁸ “*un inventaire des moyens humains et matériels de la recherche scientifique et technique*”

repertory of this collection edited in 1962 concentrates on the laboratories in agronomy. As these repertories are not effectively the instrument of the scientific mobilization, what are the motives of the DGRST for their production? The rhetoric of the coordination of the scientific and technical resources by the State disappears leaving place to the idea of a “rational science policy”. Also, the repertories now edited are seen as instruments of information about (and to) the researchers and their colleagues, of the visibility of the French research and of relations among researchers, laboratories and clients, in France and in other countries (Guieysse, 1964).

Besides these repertories, the data collected in the national inventory are used by the services of the DGRST to produce, with its mecanographic equipment, quantitative data on the resources of the laboratories, their structure, their equipments, etc. for and needed by ministries and, above all, by the Plan (Guieysse, 1964). These beginnings in the production of quantitative data derived from inventory are followed in 1963 by the first statistical survey carried out by the DGRST and renewed more or less each year during the Sixties within the collection *Statistical studies on research and development* (*Études statistiques sur la recherche et le développement*). This survey and the following use the new conventions of the *Frascati Manual* developed by the OECD and inaugurates the statistical turn of the DGRST. In fact, the French delegation that participated in the 1963 Frascati Meeting observed the advancement of the statistical works in the United States and in Great Britain and claims “an urgent need of global statistical results for France as well as for other nations of the European continent”¹⁹. Statistics are thus seen as the quintessence of instruments for planning and science policy and their development implies for the DGRST to give the priority to statistics instead of inventory. “The acceleration of the works in progress at the DGRST (in particular at the Service Inventaire) is going to be considered. The means that we have at our disposal being limited, it is possible that we will be obliged to give a priority to statistical studies instead of to inventory studies (elaboration of the complete repertories of laboratories and researchers), so that we can have statistical results from 1964 for the preparation of the fifth Plan”²⁰ (quoted *Compte-rendu du Colloque...*).

Therefore if it is no doubt that France, as most of industrialized countries, produced and used statistics on STI on a regular basis in the Sixties by collaborating with OECD, the production of numbers succeeds a long tradition in the inventory of scientific and technical resources by the

¹⁹ “un besoin urgent de résultats statistiques globaux pour la France comme pour les autres nations du continent européen”

²⁰ “L’accélération des travaux en cours à la DGRST (en particulier au Service Inventaire) va être envisagée. Les moyens dont nous disposons étant limités, il est possible que nous soyons obligés de donner une priorité aux études statistiques par rapport aux études d’inventaire (élaboration de répertoires complets de laboratoires et de chercheurs) afin que nous puissions disposer de résultats statistiques solides dès 1964 pour la préparation du Cinquième Plan.”

State that goes back *at least* to the First World War. *At least*, one must insist, since the history of the knowledge on science and technology in France is just been born. The history I proposed here is far from being complete and treats the question from the perspective of study of science policy. However, what about universities, industries, associations, ministries? Also, what about in the field of academic statistics?

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