Statistics and industrial death. Manufacturing the number of victims of silicosis in coalmines in France from 1946 to the present

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STATISTICS AND INDUSTRIAL DEATH: Manufacturing the number of victims of silicosis in coal mines in France from 1946 to the present.[1]

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In demography there is a tendency to objectify the effect of public policies by the use of quantitative assessments. This paper will invert the reasoning and use statistical series collected after the *Liberation*, so that they can reveal the amount of work done by coal mines in order to minimize the sanitary and demographic harm caused by silicosis, and therefore reduce the costs associated with their reparation.

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Working on the causes, the patterns and the social effects of manufacturing biased statistical series, will also offer the chance to test "post-Foucauldian" common sense related to social control, to control over modern individuals by institutions who regulate and surround their existence by focusing on their transparency. In the field of workplace health, as is the case with many other public policies, what is surprising, on the contrary, is the gap between the social and institutional importance of the issue, and the impossibility to measure it, even if it is through orders of magnitude. How many workers died of silicosis in the 20th century? In spite of the political challenges (particularly that of re-thinking the issue of asbestos in the present), and even if the question is reduced to the coal mine sector, we will attempt to prove that it is impossible to answer that question rigorously. A much underestimated figure of 40,000 miners may be offered, from the time at which the disease was officially acknowledged in 1945. Far from the famous "panoptic approach" made fashionable by Michel Foucault one generation ago, we intend to prove that strategies of statistical opacity, implemented by the coalmining industry, undergird the minimization of the tragedy of silicosis.

Finally, the case of silicosis permits one to review the contemporary use of statistical data in social sciences. Two or three decades ago research on the history of population, such as the one we propose today, would have conformed with reconstructing and making general remarks on statistical series, thus rebuilding the evolution of the disease over time. After a time of "deconstruction", focused on the genesis of the analytical categories lysis, current historians intend to produce reflective knowledge which blends the critical analysis of the production of figures with a "positive" procedure which detects the studied phenomenon without naturalizing it (Rosental, 2006)[4]. In

4 For some examples of such principle see specially Simon Szreter (1996), Bourdelais (1993) and Brian (2001).

short, the idea is to study the scope of silicosis without reducing it to its apparent statistical evidence, but rather, integrating it closely into the game of institutional, social and political forces determining its definition and its measurement.

A negotiated disease

Even though it tends to vanish in memories, silicosis was the great work-related disease in France during the 20th century, with at least as many current sanitary consequences as those associated with asbestos. In fact, the history of these two diseases is closely related: in many aspects, the institutional treatment of silicosis constitutes the matrix for the one applied to asbestosis. These two diseases, medical and legal neighbors due to their common inclusion in the category of pneumoconiosis, blend two characteristics which bound them to become the two greatest causes of death at the workplace[5].

From the "social" point of view, due to the amount of workers exposed to risks, both diseases have led to important successive challenges for the diversity of economic sectors involved[6]. The case of coal, a great mass industry and a strategic sector for consumption and for the rest of economy, is a good example from this perspective: at least until the 1960s it can be said that the cost of silicosis was reflected indirectly upon

5 It was necessary to wait until the decree of August 31, 1950 was passed to establish legal separation between the two diseases. The results were detailed by Drs. Mazel and Champeix, Projet de tableau de l'asbestose professionnelle, July 7, 1949, CAC 880597, art. 22. It should be reminded that only in 1987 the number of cases of asbestosis acknowledged as professional diseases by the general regime of social security is higher than that of silicosis. See Le Bacle et al. (1995).

6 Infinitely more widespread than could be imagined, silicosis stroke by 1990 on metallurgy, building, public works, (rock and clay) quarries, where it can traditionally be found; but also in the wood, rubber-paper-cardboard, food and trade sectors. Only the book sector is free from it. See Le Bacle et al. op. cit.

the French economy and society. From a medical point of view, the complex nosology and etiology of these two types of pneumoconiosis has restricted research projects from reaching a medical consensus: the variable latency period, even decades long; incurability; difficulties for clinical and, in their early stages, radiological detection; the variability of the conditions of exposure, which makes the identification and weighing of the triggering elements more difficult; the frequency of associated diseases, superinfections and complications, which favors attributing the illness to other causes[7].

The mix of the cost of "repairing" silicosis and the complexity of the pathology both led employers, beginning with the coal mining industry, to actively attempt to remove their financial liability, while making it easier for experts to blame the cause on other ailments. Particularly significant was the step, which emerged towards the end of the 19th century, taken from the Ramazzian model which classified diseases according to profession[8], to the universalism implied by the microbial model, which led to the "de-professionalization" of pneumoconiosis. The discovery of Mycobacterium tuberculosis led to experts presenting silicosis as a complication of Tuberculosis, and simultaneously, as a disease derived from living conditions external to work (housing, alcoholism), accused of favoring morbidity and mortality associated with inhaling silica dust[9].

This type of focus, more or less a long-standing approach based on the types of compensation of the disease according to country, has hindered the acknowledgement of silicosis as a

7 For a synthesis on medical silicosis, review Catilina and Roure Mariotti (2003).

8 A presentation of Bernardino Ramazzini's proposal may be read in Carnevale y Mendini (2005).

9 See Markowitz and Rosner (2005). For classical explanations of professional diseases by reference to the environment and/or the workers' habits, see Alain Cottereau (1978) and Farge (1977).

professional disease, a process which began in the Anglo-Saxon world in the 1930s, and whose appearance in Belgium did not occur until 1963. But the main thing is that such obstructions have left long-standing traces. In the French case, the Ordinance acknowledging silicosis, on August 2, 1945, which was introduced as a great workers' conquest during the *Liberation*, was in fact a commitment achieved after a lengthy negotiation under Vichy's regime[10]. A minimum commitment which opened room for strategies plotted by the employers' spokespeople in order to downplay, and even refute, statistical and epidemiological data, and to offer counter-diagnoses or point to alternative diseases, so that the burden of compensation could be transferred to the social security system.

One particular case, completely exceptional if compared with the 1919 law on professional diseases, is the fact that acknowledgement of silicosis as a work-related disease is conditioned to a five year period of exposure. Such a clause goes beyond the exclusion of the rights of rookie miners; it imposes on the most senior workers the obligation of establishing their employment history, a task that is often hard in the practice. It drags the criteria negotiated with employers, and the equivalence of duration of exposure advantageously agreed upon, into the never ending spiral of the burden of proof[11].

At the beginning of the 1950s, such mechanisms were institutionalized in the North through the creation of special commissions consisting of a medical consultant representing the

10 In this regard, see Devinck and Rosental (2007)

11 In this way, in the circular letter of October 8th, 1947, while the CGT (French acronym for General Workers Confederation) is still linked to its direction, French coal mining companies admit that given the fact that their personnel's exact *curriculum laboris* was hard to establish, "a worker who has worked for twenty years in carving has been busy in dangerous jobs for an average of five years and can invoke their right to a silicosis pension". Archivos del Centro Histórico Minero de Lewarde (ACHML), (1947).

Union Régionale des Sociétés de Secours Minières, URSSM (Regional Union of Societies for Miner Relief), a physician leading the Labor Accident and Professional Disease Service (AT/MP after its French acronym) of the mining companies from the Nord Pas-de-Calais mining area, and a professor from Lille's School of Medicine. These "three-physician-schools" have the right to provide any silicosis victim with a pension if they comply with the medical requirements, but not with the administrative ones, as long as they meet a permanent predetermined disability rate. Officially sanctioned and extended throughout the national territory by decree 18 of October 1952, the "three-physician-schools" make coal mining industries both judges and defendants of the fate of the claim for the acknowledgment of silicosis (ACHML, n.d.).[12] Besides, enforcing the decree is paradoxically so hard in Nord Pas-de-Calais (cradle of acknowledgment, given the backlog of cases), that they decided, from 1955 onwards, to return to a reduced version of the "trade commissions" manned by the URSSM medical consultant and the AT/MP physician both from the coal mining industry. In spite of opposition by the Ministry of Labor to such a brutal addendum to the legislation, which reinforced its submission to coal mining interests[13], "two-doctor-commissions" operated until 1988.

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12 Research by the chief engineer in the coal mines, February 29, CAC 19920443 art. 31. To get some idea of the importance of silicosis treatment in Nord Pas-de-Calais, this ex officio commission treated 1,272 out of the 5,755 files presented between September 23, 1950, and December 31, 1951, and only dealt with 602, that is, 47%. This commission played an important role in making more difficult the attribution criteria. The rejection rate, which in 1949 was only 12%, increased to 25% in 1951 and to 40% in 1956.

13 In regard to this creation, see the assessment by the URSSM management council in Nord Pas-de-Calais from January 22, 1955, CAC 19920443 art. 46; as well as the *Note du directeur régional de la Sécurité sociale au ministre du Travail sur le fonctionnement des collèges de trois médecins dans la région du Nord et du Pas-de-Calais*, on October 21, 1955 (same reference). Between 1955 and 1960 out of 6.332 dossiers [files], 5.489 were dealt with by this two-physician ex officio commission.

In general terms, the acknowledgement of a professional disease under certain conditions triggers chain reactions to unprecedented problems. What to do with those sick employees who are excluded from the right to financial reparation? In the case of "acute temporary manifestations", how to deal with miners with silicosis, diagnosed through x-rays, who comply with the period of exposure but who, thanks to the latency phase, do not show chronic functional disorders? The latter were denied, via a decree of 17 November 1947, a daily subsidy and their right to medical assistance in the case of work interruption. In practice, the decree alleviates the burdens on mining companies, most of them nationalized, by transfering the costs to social security funds.

Rather than multiplying the examples, let us synthesize the general guidelines in this regard. The 1945 acknowledgment, resulting from lengthy and difficult negotiations, due to its conditional nature, opened all kinds of loopholes for employers to reduce reparation to the minimum in cases of silicosis. Due to the reduced length of the present paper, we will focus on a particularly decisive loophole, underreporting. Departing from the broadening of the "exceptional normal" (Grendi) case of silicosis, the present work will be a chance to reconsider an essential aspect of the history of diseases in France. It is a history whose structural feature, from one century ago, is its approximate nature and the unfortunate quality of its quantitative data[14].

By way of demonstration, the main focus will be the mining sector, accounting for the highest amount of quantifiable

14 It is important to clarify that this does not intend to be a retrospective value judgment, but to reference the appreciations expressed by contemporary sources. Given the lack of reliable, quantitative data, one part of the inter-war period legislation was built after foreign statistics. Still in the mid-2000s, official reports produced by IGAS, the Court of Auditors and the Senate continue to criticize the massive lack of reporting of professional diseases. See Buzzi, Devinck and Rosental (2006).

victims. In fact, as will be gradually shown, it is not possible to observe the effects of silicosis directly, by relying on the available statistics. After it was legally acknowledged as a professional disease in 1945, silicosis has been the object of such a complex process of institutional framing and construction that only sector by sector is it possible to approach it seriously, at the expense of an extremely precise contextualization. Here is an example which allows reasoning on institutional organization (miners' social security management by coal mining companies). During the period between 1946 and 1987, statistics on health services in mines show 34,000 deaths caused by silicosis, while statistics by cause of death, in spite of the social protection regimes, show 16,806 deaths caused by "coal miner's pneumoconiosis", that is half as much[15]. As will be seen later, due to reasons related to law and practices, none of these two estimates would contribute more than one order of magnitude by default, and probably way below reality.

Given the ambiguity of legal devices and the difficulty of enforcing them, available estimates can only occult or undervalue, both massive processes (the expelling without rights of all foreign miners to their countries of origin, the Polish during the inter-war period or during the *Liberation*, and the Moroccans at the end of the postwar *economic boom*), and the micro-dynamics of interaction between miners and coal mining companies in the acknowledgement of silicosis and, if it comes to that, its complications, and of course receiving economic compensation. It refers to a mix of social processes, in themselves a

15 Rubric 500 of CIE 9. The difference is explained by a dilution of silicosis into other lung diseases (pulmonary tuberculosis, for instance) and its study could justify conducting an ad hoc research. We would like to thank France Meslé for kindly sharing this estimate, from the information provided by the INED database regarding causes of death in France from 1925. See http://www.ined.fr/fr/ressources_documentation/donnees_detaillees/causes_de_deces_depuis_1925/, database she authored together with Jacques Vallin. For international classification of causes of death, see Meslé and Vallin (1988).

reflection of power relations between the different institutions involved in the social protection of mines and the very workers, who produce indicators by objectifying, and simultaneously concealing the sanitary and demographic effects of silicosis: morbidity, disability and mortality.

The provision of pensions, an instrument for personnel management?

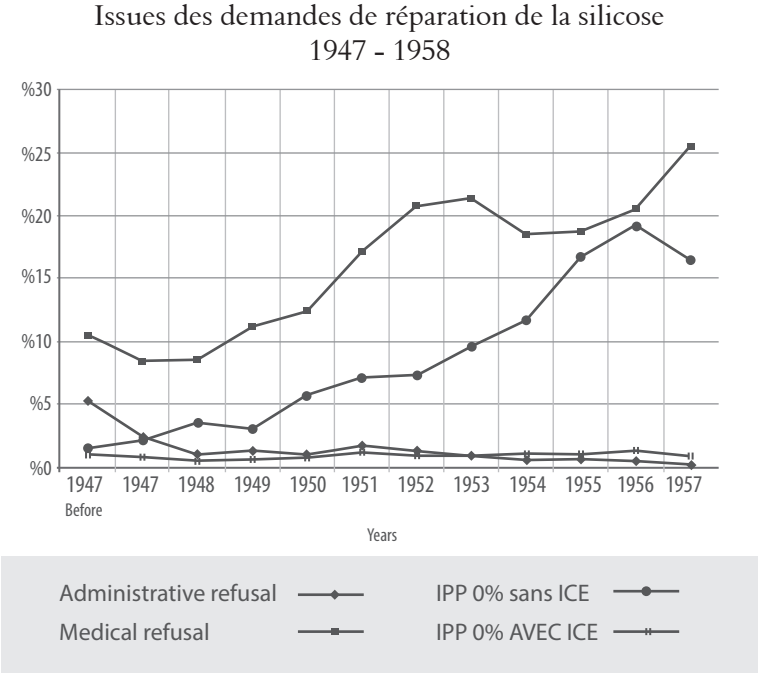
Rejections and acknowledgments

We will examine the modalities and effects of such a process of concealment focusing, principally, on the period of the Fourth Republic (1944-1958). The first variable to consider is the response given to the insurance claims put forward by miners from February 4th of 1946, the date of enforcement of the ordinance of August 2nd of 1945, to December 31st of 1958. Coal mining statistics show a total 78,775 claims during this period, out of which 75% come from the Nord Pas-de-Calais mining area. Along the annual flow of claims, three clear periods may be distinguished: after the 1946 peak of 7,870, linked to the "readjustment" generated by the acknowledgment of the disease[16], stabilization close to 5,000 legal actions between 1947 and 1954, which grew to a figure close to 7,500 in 1958. On that date, this figure represents 5% of workers hired during that year. What happened to those claims? Graphic 1 gives a first idea of the effects of the institutional organization of the statistical measurement of silicosis.

16 But it also included reparation of silicosis in Lorraine, under certain conditions, since 1941, as prescribed in German legislation.

Graphic 1

Results of compensation claims due to silicosis (1947 – 1958)



Source: Statistiques concernant la réparation de la silicose du début de la réparation au 31 décembre 1958, tableau D1 [figure D1], ACHML, B7 384.

Captions: IPP: invalidité partielle permanente [permanent partial disability]. ICE: indemnités de changement d'emploi [compensated through change of job]

Therefore, after the initial regularization period, the rejection rate decreased to less than 10% until, in 1948, acknowledgment was made by URSSM, whose management councils consisted of two thirds of the workers' representatives, and whose

personnel were linked to miners by strong bonds of solidarity[17]. The threshold of rejection reached until that moment was never surpassed. The deficits of the funds, the struggle against absenteeism, as well as political and labor tensions related to the Cold War led to the approval, on September 18 of 1948, of the Lacoste decrees, in which the Minister of Industrial Production tilted the balance of control over temporary disabilities to favor coal mining industries, so that the collusion between miners and the physicians from coal mining mutual insurers could be avoided. In a particularly tense social and political context, such measures played a crucial role in the violent strikes that broke out in October 1948, which left eight dead and dozens injured and led to 3,000 convictions and 6,000 laid off miners. After this, nationalized coal mining companies started "to manage themselves the risk of temporary disability, in order to reduce absenteeism", as well as the risk of labor accidents and professional diseases (AT-MP, after their French acronym). Although it was conceived as a temporary measure, this disposition lasted for 40 years, until the enforcement of a decree on March 27 of 1987, which restored the management of these risks to the coal mining social security system.

Control exercised by coal mining companies becomes immediately evident in the statistics provided in Graphic 1. If administrative rejections, widely associated with the enforcement of the ordinance, decrease, medical rejections start increasing almost without interruption as of 1949 (they were almost 14% of the claims in 1950, and over a fourth in 1957). As a result of such development, almost 13% of employees were acknowledged as being sick with silicosis in 1958 (ACHML, n.d.).

17 On November 27, 1946, a decree organized nearly 200 mutual aid funds existing in coal mining companies under the form of miners' social security; it officially became operative on January 1st, 1948. Its local and regional funds manage, together with the subordination of workers, massive hiring, especially among coal mine employees, and give the new personnel the same status as miners.

The first sign of such development is clearly less associated to the epidemiological evolution than to instructions given by physicians dependent on coal mining companies; the changes in medical rejections were closely associated with what we will call by the convenient name of "white acknowledgments": null rate of permanent partial disability (IPP after its name in French), without payment of compensations for change of job (ICE, after its French acronym). We will return to this singular *a priori* category, which registers medically and administratively acknowledged cases of silicosis, but does not give the least access to compensation.

After this short phase of parallel hardening (1949-1950), coal mining companies used both tools in a complementary fashion: the phases of the acceleration of medical rejections (1950-1952, 1956-1957), corresponded with a slowdown, even a decrease, in the *white acknowledgments* and vice versa. Clearly, those phases in which possible silicosis was denied, alternate with those in which it was acknowledged without any immediate financial expenses. We will later return to what is nothing less than a management option.

Other factors reinforce the idea that compensation for silicosis is the result of a guideline set out by coal mining companies, rather than of the sole evolution of such a disease. From the start, regional diversity shows the existence of true "compensation regimes" (Table 1), completely different from one mining area to the next. For instance, during the whole period, medical rejection shows a fourfold variation (from 12.7% in Nord Pas-de-Calais, to 44% in the Cévennes); and the rate of white acknowledgments displays a variation of 35 times (0.3% in Dauphiné to 10.5% in Nord Pas-de-Calais).

Table 1

Number of claims of acknowledgment of silicosis according to mining area (1947-1958)

Medical Rejection			
% of white acknowledgments	Weak (< 15%)	Medium (form 15 to 25 %)	High (+ de 25 %)
Weak (< 5%)	Dauphiné	Lorraine, Blanzy, Aquitaine	Provence, Auvergne
Strong (>= 5%)	Nord Pas-de-Calais	Loire	Cévennes

Source: Statistiques concernant la réparation de la silicose du début de la réparation au 31 décembre 1958, chart A.

But beyond this regional variation, which could also be related to differences in the geological environment and working conditions, depending on the mining areas in question, temporary discontinuities are hard to attribute to anything different from the management instructions of coal mining companies. That is why, in the mining area of Nord Pas-de-Calais, where the statistical predominance of the number of employees became evident, it could suddenly be seen that decisions concerning the assignation of compensation payments increased from less than 40% in 1954 and 1955, to two thirds in 1956.

Disability rate

The count concerning the assignation and rejection of compensation payments, understood globally, is just part of a broader policy. In order to understand the politics of silicosis management by coal mining companies, it is also important to enter into the realm of the recognized permanent partial disability rates (Graphic 2). We realize then that, during the period in question, most cases of silicosis were acknowledged at the *minimum* amounts: the almost parallel increase of weak IPP rates (between 0% and 19%) corresponds to the collapse of intermediate rates (20-49%) and the perfectly continuous erosion of rates above 50%. Therefore, the policy of coal mining companies has, structurally, consisted of progressively adopting an extensive regime which gradually acknowledges more cases of silicosis that are supposedly disabling only to a small degree, but which also hinders access to the IPP rates, while it approaches or exceeds the general disability rate (65%). In such extreme cases the compensation paid to miners, for a rate equal to or above 80%, fell from 8% in 1948, to 1% in 1957.

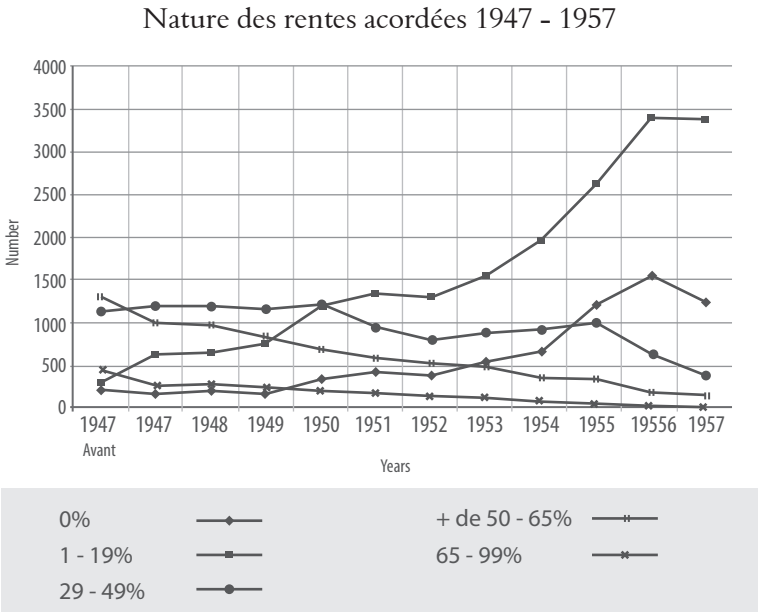
It is hard not to see, in this evolution, an accounting logic aimed at reducing the reparation costs associated with silicosis; weak IPP rates result in compensation levels that may seem low, given the effects of the disease (500 francs a year in 1975, for example, for a 5% rate, that would be the equivalent, currently, of 300 Euros)[18]. Complex nosology of silicosis, as well as imprecise legislation, suggest a negative answer to the question of whether the collapse of high inability rates results in sanitary progress. In fact, there is no official scale to accurately determine the degree of work-related disability. The rates of compensation granted became an essential management tool for coal mining companies, as they explicitly reminded chief-physicians

18 "The main concern (of labor physicians) is detecting silicosis –or even minimizing the extent of silicosis, so that compensation for the miner is reduced", wrote Bognar (1954:606).

that "one single 100% pension represents [for them] a supplementary amount of annual contributions to the order of 70,000 francs, and this for a duration of three years" (ACHML, n.d. a).

Graphic 2

Number of silicosis compensations granted (1947-1957)



Source: Réparation de la silicose, tableau II, Service de la sécurité sociale et de l'action sociale, ACHML B7 384

In fact, at a moment when the accounts register deficits, the cost of silicosis-related obligations does not stop growing at a pace that makes French coal mining companies uneasy[19]. In

19 At the beginning of 1946, French Coal Mines (CDF, in French) thought that "if specialist physicians should, and this is their essential duty, protect workers' health and offer them fair compensation for the damage

1953, the annual amount of compensations and pensions paid to survivors reached 1.33 million francs on December 31, and it more than tripled in the course of five years, progressively reaching about 4.5 million on December 31, 1958. In an even more revealing fashion, such a burden corresponds to 5.9% of wages liable to withholding tax in 1958, compared to the 3.5% amount three years before. Still in 1958, reparation for silicosis alone absorbs over a third of AT/MP's compensation-related expenses[20].

But regardless of their strength, the politics of the coal mining industry cannot be reduced to mechanical reasoning. Besides the cost reduction policy, the strategy of granting compensation represents, for coal mining companies, a real labor management tool. There is every reason to believe that such a policy was quickly integrated by miners into the management of their careers. To understand this, it is necessary to separate, within the whole of wage-earning positions in coal mining industries, those who work "deep inside" and those who work "in the light".

Silicosis and career management

Being acknowledged as a silicosis patient is not enough to be exempted from work in the coal mines. Indeed, in 1950, coal mining companies managed to stop a project of law which was heading in this direction. At the end of 1958, out of the 23,000

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suffered, they cannot ignore the consequences their decisions may have over production" [si les médecins experts doivent, et c'est leur devoir essentiel, protéger la santé des travailleurs et leur offrir la juste réparation du dommage subi, ils ne peuvent ignorer les conséquences de leurs décisions sur la production], ACHML (n.d. b). Regarding the global evolution of coal profitability, see Philippe de Ladoucette (2004), who was then the general Director-President of CDF (Charbonnages de France).

20 That is 5,978 million Francs in 1958 for 17.43 million, the total burden over permanent and temporary disability.

employees hired by coal mining companies in France who were acknowledged as silicosis patients, nearly 20,000 worked "deep inside the pits". In the sole mining basin of Nord Pas-de-Calais, by far the most important, over 21% of *deep inside* workers had a permanent partial disability rate. There were even one hundred miners with rates over 65%, which is the threshold of general disability. It is true that the administrative calculation of the duration of exposure is not based on the number of years actually spent *deep inside*, but on the official measurement of the assumed relative danger of activities, which no independent research had assessed[21]. Indeed, Dr. Even, CAN's (French acronym of the National Autonomous Fund for Social Security in Coal Mines) medical consultant claims that, according to the official equivalence, one year of rock mining would be equivalent to two years of wall sawing or ditch digging, and to three years of coal mining[22]. It was necessary to see Decree of May 4th of 1988 passed, while the Nord Pas-de-Calais mining area was closed, as well as social, early retirement and reconversion plans, to consider that all of the jobs undertaken *deep inside* were likely to generate silicosis. Meanwhile –we will get back to it-, it is true that miners with silicosis were withdrawn from *deep inside* activities more and more precociously, especially in the 1980s.

But this apparent lack of regularity should not conceal the complex relation between employment and disability. Graphic 3 does its best, not without errors, to approach such relations by contrasting the fate of compensated wage-earners with those

21 These equivalences are formalized by Decree of October 17, 1957. Annie Thébaud Mony's research (1991) gives an idea of the consequences by the end of 1980. Among the files she had access to, only two mentioned seniority in *deep inside* work. For the first one, 29 years in the mine became 7 years, 3 months and 5 days exposed. For the second, 38 years *deep inside* became 8 years and 21 days exposed.

22 While, according to Dr. Even (1975), for instance, prevention is more difficult in coal mines

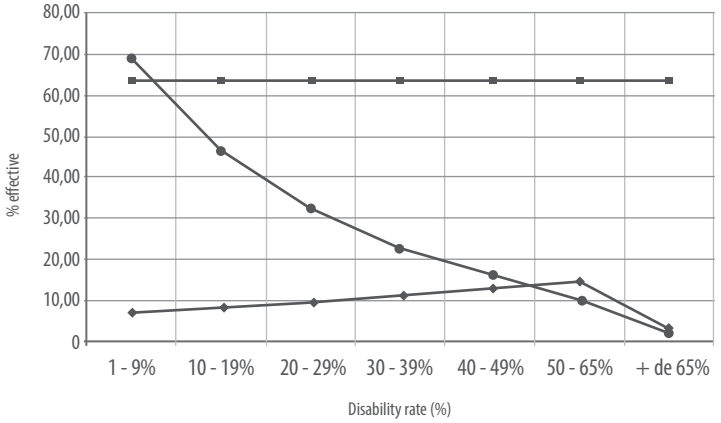
who were not compensated (including those whose IPP rate is 0%, but who get some kind of compensation)[23]. Among the latter, almost two thirds work *deep inside* (*ligne continue jaune* at the top of the graphic, given as a reference for comparison). In contrast, it is apparent that only wage-earners with silicosis whose IPP rates are above 20% benefit from the "favorable treatment", consisting of bringing them out *in the light*. It is true that the relation between the two figures is declining, as it does not bear in mind each respective population's age structure. A broad order of magnitude should be considered, rather than a rigorous relation. It could not establish accurately, at a given age, the threshold where disability becomes a criterion to leave the mine.

23 Percentages of activity, either *deep inside* or in the light, of workers with silicosis, are deduced from the records of coal mining companies, by trying to relate the ill wage-earners to the total population with silicosis (including those who are not able to work, which is why total percentages are always below 100). A limitation of these estimates is the lack of age structure in the available data, to what extent the effect that has been made evident (the decline of *deep inside* labor, with an increase in disability) is actually linked to the evolution of seniority? The following developments (Graphic 4) attempt, imperfectly, to offer a better understanding of such an issue.

Graphic 3

Deep inside work rate according to the disability rate associated to silicosis

Taux de travail au fond selon le
taux d'incapacité liée á la silicose



Nevertheless, Graphic 3 clearly shows that the issue of high disability rates goes way beyond sole compensation. In regard to coal mining companies, they stress structural recruiting difficulties aimed at performing work *deep inside*. For miners, disability rates offer the chance to go out *in the light*, as they accelerate, following an absolutely undetermined pace, the protective effects of seniority. So, the question becomes, how should one reconcile these two perspectives? How can we understand why miners and their unions, instead of rebelling against the reduction of IPP rates, acknowledged in the 1950s (Graphic 2), supported them with their passivity which observers criticized so often?

Annie Thébaud Mony sees in such weak opposition to a fearsome disease, according to a classic research project she directed years ago, a form of miners' dependence on the medical system implemented by coal mining companies:

> To them, coal mining companies are responsible for their health management through physicians provided by the companies and their AT/MP service. It is the physicians from coal mining companies who determine if a pneumoconiosis medical certificate should be given. Miners are following a logic according to which they are being assisted. Such logic is only questioned by them when they get worse, lose confidence in the miners' social security physicians, and resort to private physicians. Nevertheless, they think then the expert will not acknowledge them as sick with pneumoconiosis (1991:266)

It is of course interesting to consider the weak mobilization of silicosis related demands as a perverse effect of an integrated health system, which greatly engages unions in its management, but is biased in its implementation, due to coal mining companies' involvement in the management of a pathology implying massive financial challenges.

Nevertheless, as is usual in social sciences, prudence is convenient when dealing with the argument concerning the inaction or irrationality of the main actors involved (Thébaud-Mony, 1991). Immediate material considerations may have induced such relative passivity. Poor miners may be reluctant to lengthy and expensive procedures, requiring medical visits and counter-visits (Thébaud-Mony, 1991) and, given the case, legal resources. Although it is also true that such an explanation does not account for the relative silence of labor unions. To take the analysis a bit further, reference should be made to the statistically-validated confirmation of some kind of evasion in regard to a disease, which was not well known during the Liberation period, but soon gained the status of a terrible scourge.

If most miners ignored silicosis and its consequences by 1946, it was not the same one decade later[24]. The anguish implied by the acknowledgement of an incurable disease, the perspective of suffering and death for a period which could be fast or, on the contrary, darken life's horizon over several years, the kind of social shame that some may fear, leads a considerable number of miners to avoid medical visits. During the first large scale campaign to diagnose the disease, at the beginning of 1955, the HBNPC (French acronym for the Coal Mining Companies from the Nord-Pas de-Calais Mining Area) physicians confirm that 15% of personnel refused to allow their examination. In addition to the fear of being diagnosed with silicosis, there was no medical communication of the results of the test, which according to opinions among the very directors of the medical service, constituted an additional demoralizing element (ACHML, n.d. c). During the second great x-ray detection campaign, between September 1955 and June 1956, over a third of the 100,000 people tested had an abnormal image. Still, an average of 18% miners, or even 22% or more in Mining Areas such as Douai and Valenciennes, refused to have the test done; such a percentage confirms the practice, and the concerns of miners regarding the diagnoses.

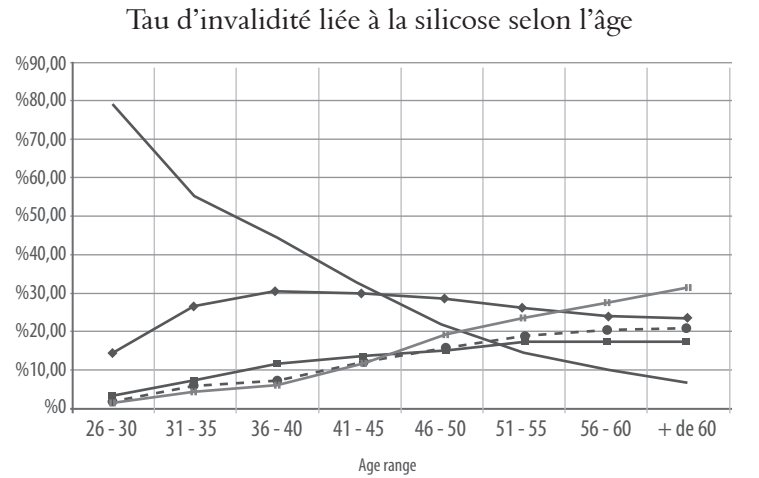
But there is more. After 1946, silicosis is rapidly interiorized by miners as a foreseeable event in their careers. Once the miner is acknowledged as a silicosis patient, that is, as a carrier of an incurable disease whose rhythm of evolution and effects are somehow unpredictable, he is likely to attempt to advance in the compensation system, which undoubtedly freezes within the decade, but which assures, beyond a certain threshold, the payment of a pension to his beneficiaries in the case of death (see the later, final section), and a high likelihood of leaving the mine. In other words, the compensation method may have been interiorized by miners as some kind of increase of the "ad-

24 See M. Pierre's testimony in Thébaud Mony (1991).

vantages" associated with seniority, as a hopeless and powerless "strategy" to face the restricted possibilities of evolving both within and outside coal mining companies.

Graphic 4

Disability rate associated with silicosis by age range



The articulation of contradicting *a priori* perspectives, both of wage-earners and coal mining companies, was only possible through such a mechanism. The companies, by reducing compensation and checking the rhythm of progress (Graphic 4), stimulated a micro-transaction system in the fashion of annual re-negotiations of disability rates between miners and the physicians from the industries. The expressions "transaction" and "negotiation", employed throughout the analysis, should be understood as under the minimum levels. In an accepted

theoretical stance, derived from ethno-methodology, they simply refer to the fact that, in the face of having their silicosis acknowledgement rejected, the attitude miners adopted consisted of insisting on the demand for at least a year, until a satisfying response was provided[25]. The handling of this confrontation constitutes, even in its most narrow sense, a kind of pressure to which medical management from coal mining companies could respond at its own pace. As such, the dynamics found, until the 1980s, in the core of a nationalized company, oscillated between deferential inquiry and discretional response. This corresponds to the most classic definition of paternalism.

We will progressively show that the characteristic of the systems of acknowledgement and compensation of coal mining companies featured an opaque and vertical relation. Both the miner and the physicians he must face (the labor physician, the general doctor and the pneumoconiosis expert) are part of an administrative chain ruled by a financial logic of which they are nothing but the weakest links, that is, the least defining. The rationality of miners and their physicians requires, from the very beginning, the implicit acceptance of such a system, and of its absolute lack of transparency. First, besides the adequate medical evaluation, the role of physicians is foreseeing, by considering the common and regular criteria, which files have a chance of being accepted by the medical services of coal mining companies (that is to say, to have IPPs either acknowledged or increased)[26]. Second, it is also having miners understand, if

25 It seems that such mechanism operated for a long time. Around 1990, Annie Thébaud Mony observed comparable dynamics, which as she notes "substitute the complaint process laid down by the legislation" (1991:266). In general terms, we will show how our observations, based on a statistical approach and cast in a long timeframe, articulate with the conclusions of the interviews made by Thébaud Mony and her team at the end of 1980.

26 After the Decree of October 17 of 1957, the acknowledgement of silicosis as a professional disease, its complications and its role in the assignability of death, are prerogative of pneumoconiosis experts certified by coal mi-

necessary, that disputes are not beneficial to them as they jeopardize the acknowledgement of silicosis, the revaluation of disability and, as will be seen later, the payment of retributions to the recipients in case of death[27].

Explanations related to rules for interpersonal behavior are directly objectified by statistics. Whereas at the beginning of 1950s the cost of revaluation was lower than that associated with the opening of compensation, in 1958 it was almost three times higher[28]. In the face of a devastating disease, which, according to the estimate made by the official registry, corresponds to an eighth of their wage-earners; by the end of the 1950s, coal mining companies made great savings through an extremely greedy compensation scheme, while miners, used to the annual renegotiation of benefits, simply included it in the calculations of their careers. Industries managed to trap their employees in a minimalist system which, nevertheless, in both a laughable and tragic way, offered perspectives (premiums, leaving the mine, protecting family interests in case of death). By the end of this argument, it may be possible to explain the existence and pertinence of a category of disability of 0% without compensation, which at first seems at least intriguing. If *white compensation* makes sense to miners, it is because it reaffirms their incorporation to a "statute", and allows them to foresee some kind of "progression of disability" which, given the nature of the disease and the academic knowledge concerning it, the difficulty

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ning companies or by the three-doctor-schools. Annie Thébaud Mony mentions forms of "physician self-censorship by agreeing with expert opinion standards" (1991: 56, 266).

27 Therefore, we intend to bring back the remark made by Thébaud Mony according to which "physicians warn miners about the use of their resources, because otherwise they risk being assigned a more strict jurisdiction and being classified as "whiny" by the medical services in coal mining companies" (1991: 267)

28 The amount of the respective net openings and revaluations went from 168,512,000 F and 121,445 F in 1954 to 275,539,000 F and 717,767,000 F four years later (ACHML, n.d. d).

of understanding the signs and of dealing with the progression of the disease, objectifies the fact that silicosis is the object of both administrative and medical treatment. This progression of the IPP rates, under the influence of the annual process of renegotiation with the physicians of coal mining companies, operates as a device which somehow accelerates the advantages of reward and work usually associated with seniority. Again, in this case, the other feature of the compensation regime, which remains impossible to understand from a strictly medical point of view, is accounted for from within a social logic: the setting of a disability rate of 1%, "bound to increase throughout the years to 2, 3, 4… %" a precision whose scientifically unbelievable nature is pointed out by Dr. Even (1975:284).

A professional disease with no wage-earners? Silicosis and the closure of mines

Besides miners to attain immediate financial advantages, the implicit call for them to show patience and the creation of real administrative backlogs for silicosis patients bought coal mining companies some time[29]. It is clear that throughout the Fourth Republic the decline of mining became evident. Its perspectives continued to be cloudy, due to France's and the CECA's[30] energy policies, which favored oil and its derivatives. This situation resulted in the collapse of mining work: from 330,000 coal mining company employees in 1950, two thirds of which worked *deep inside*, the number fell to 230,000 in only eight years.

A new era started in the early 1960s with the *Jeanneney* plan. Concern for the gradual reduction of mining activities gave way to the immediate foreseeing of the closure of mines, which was scheduled almost unavoidably. The consequences of silicosis

29 On the idea of *paper careers* see Alexis Spire (2005)

30 CECA : Communauté européenne du charbon et de l'acier

management from the end of the post war *economic boom* will be examined. This analysis reveals that such a moment is more than an extension of the previous period. Given that it leads directly to the present, the question of demographic balance also needs to be made: in total, how many miners died since the acknowledgement of the disease, in 1945? Especially, considering that there was no quantification, not even an imperfect one, of silicosis cases prior to this date. If both files, the one concerning the methods by which coal mining companies managed the disease, and the one concerning the number of victims, should be dealt with directly it is because they rest on three common evolutions:

1. The increase of the efficiency of prevention.
2. A new kind of resort to foreign labor.
3. The misbalance in the proportion between active and retired workers.

Prevention

In 1946, following the experiences of the 1930s, systematic detection of silicosis began in the mines, but it found it encountered difficulties which hindered its expansion. By 1949, no public works company had organized its own medical service, "silicosis was ignored almost everywhere, even by physicians, and this caused many victims, frequently behind the loaned mask of tuberculosis". Doctor Teaudale, author of this balance, stigmatized "the fearsome incidence of performance premiums which, since they invited workers to earn more, they also led them to neglect their sanitary protection"[31]. In the mines and at the construction sites, "piecework pay, supplementary premiums granted both to workers and foremen, in terms of the advance of the digging tasks at tunnels and galleries, created

31 Report by Dr. Teulade for Cantal's Department Primary Social Security Fund [Caisse primaire départementale de Sécurité sociale du Cantal], 1949 (CAC 19920443 art 50).

some sort of psychosis around the greed for profit; it led workers to carelessness in their use of personal protection devices which may interfere with the physical work they have to do".

Rather than total inaction, mention should be made, according to industrial sectors and companies, of the significant degree of inequality in awareness and action. By the end of 1945, the medical bodies of French coal mining companies focused on the density of particles of pure quartz in the atmosphere. After sending a delegation to England to study their strategies in their struggle against silicosis, a first attempt at water injection, clearly insufficient, was made in the Valenciennois[32].

But the general average of coniotic indexes progressively decreased after such a difficult start, due in part, although not exclusively, to the effect of the prior sprinkling of water[33]. The average fell from 6,000 particles of pure quartz per cm^3 in 1945, to 4,000 in 1953. This figure was picked up by the Decree of December 21, 1954, as the admissible limit of dust particle concentration ticles. The struggle against dust accumulation intensified. In this way, by the first semester of 1958, the average rate had been divided by six and decreased to 250 particles of pure quartz, an amount considered to be tolerable in different

32 When interrogated by Evelyne Desbois, Yves Jeanneau and Bruno Mattéi (1986), Léon Delfosse, CGT's spokesperson before coal mining companies, in the *Liberation* times, calculates that after a period (following the expulsion of CGT representatives) when it was overlooked 1947-1953, prevention re-gained importance under the heavy burden of compensations as of the mid-50s. If the claim is made by a strongly "committed" witness, it corresponds to the chronology of evasion, by coal mining companies, of a financial burden which gradually became more coercive under the Fourth Republic. This may be seen in more detail in the next section of the present chapter.

33 Besides humidification techniques, prevention of the risk of silicosis requires all measures susceptible of controlling and decreasing the effects of dust formation: air flow, at-source extraction, substitute products, and individual protection equipment, according to the not exhaustive list proposed by Le Bacle, Bouchami y Goulfier (1995).

countries[34]. In the following decades, the density of particles continued decreasing at a pace that, nevertheless, was affected by the deceleration of activity. Financial burdens and the resort to foreign labor hired temporarily, to which the most dangerous tasks were reserved, discouraged investment in prevention. In the 1980s, the value limits of the fund had been widely exceeded (Thébaud Mony, 1991)[35].

In many establishments different from mining, the situation is even worse, as shown by dust samples taken by CRAM's (French acronym for Regional Health Insurance Funds) prevention services at companies under its control (34,000 between 1950 and 1975). Half of the institutions with a risk of silicosis do not comply with the exposure limit determined by the Ministry of Labor[36]. Even though it is true that rules change according to the ministries and activity sectors, they are merely indicative[37].

In mines, the general improvement directly reflects on the epidemiological level. The first indicator is that of incidence, that is, the proportion of new cases of silicosis acknowledged throughout the year. After oscillating between 1 and 2% of workers between 1964 and 1976, it decreased after 1977 and fell to 0.5% in 1980, and to 0.4% in 1985 (CDF,1982)[38]. Of course

34 In regard to these issues, see, especially, the minutes of the *Journées françaises de pathologie minière, 22-23 octubre 1958* (particularly Dr. Jarry's intervention, p. 122); Claude Amoudru (1972), and Amoudru and Nadiras (1966).

35 On the measures of *deep inside* personnel exposure to dust formation taken by the medical service management of French coal mining companies in the 80s, see CDF (1982).

36 See Lardeux (1989).

37 In this regard Thébaud Mony's work (1991) contains (p. 62 and p. 277 ss.) a monograph of a rock grinding plant which, in 1988, is 33 times above the limits suggested by the Ministry of Labor; the company responded to health problems with ultrafast worker rotation.

38 The change comes mainly from the Nord Pas-de-Calais mining area.

the datu is insufficient, as the incidence depends, on the one hand, on the evolution of the acknowledgement rate, and, on the other, on the structural effects such as worker seniority. It will be shown later that the evolution of these two parameters during this period does not seem to affect their relevance.

The number of cases of silicosis acknowledged after less than twenty years of work becomes marginal (less than 50 in 1982). Medical services in coal mining companies see in the "progressive growth of latency time between exposition and identification of the disease […] an evident and notable sanitary progress" (CDF, 1982: n.p.) A clear improvement may also be observed in silicosis related complications, especially the terrible case of "silicotuberculosis"[39]: in the mid-1950s, one third of miners afflicted by this disease died within three years. As a joint result of both detection and vaccination campaigns against tuberculosis in mining areas, and progress in treatments, "the average time separating the initial medical confirmation of the professional disease from the diagnosis of tuberculosis" may have gone from 10 to 20 years between the 1950s and the 1970s. For physicians in coal mining companies, it was the right moment to ask for the reorganization of legislation in the sense of diminishing (especially in the assignation of IPP rates)[40].

Let us underline for now that one effect of these changes is the extension of the "trajectory" of silicotic patients throughout the whole of their professional career and their life cycle. As was pointed out by an official report by coal mining companies' health service, prevention problems tend to be similar, "in terms of aims and models, […] to those used by the nuclear sector, where the goal is not the lack of a carcinogenic effect only

39 Silicotuberculosis affects 1.43% of the whole of silicosis patients in 1962 and 0.64% in 1971. See Amoudru (1972)

40 See Lenoir (1977). It is worth noting that in 1965, with URSSM's participation, 70,000 miners from the Nord du Pas-de-Calais mining area were vaccinated.

during the worker's active life, but the prevention of carcinogenic effects throughout life" (CDF, 1982:20).

New uses of migrant miners: the arrival of Moroccans

Another change of strategy, simultaneously a structural element of personnel management as of the 1960s, and an important element in the measurement of death by silicosis, is the resort to foreign labor, especially Moroccan laborers. Of course, this is far from unprecedented. The percentage of foreign workers dedicated to mining, after reaching its top of 50% in 1930, is still 42% in 1937 and, in spite of crisis related retirements, it is close to 40% in the early 1950s. In spite of the retirement of 3,600 Polish miners in 1946, this nationality is by far the best represented, with over 25,000 wage-earners from HBNPC in 1950. From 1945 to 1962, a new migration wave arrived, within the frame of an agreement between France and Italy which foresaw that in exchange for labor, France should give Italy 150 daily kilos of coal per man.

Nevertheless, in the 1950s, these two nationalities saw their share of the miner population fall by two thirds[41] to give way to the massive arrival of Moroccan workers: 78,000 from 1962 to 1977, only for the Nord Pas-de-Calais mining area, especially coming from the Southeast of the country. If in 1960, Moroccan workers represented only 10.7% of workers hired to work *deep inside* during such year, this proportion increased from 46 to 63% within the next five years. In 1965, they constituted 45% of foreign labor employed in mines, labor which itself represents 24% of all the workers at coal mining companies (Amoudru, 1967). Unlike the apparent continuity with the preceding, this new migration wave took place within the entirely new context of programming the gradual termination

41 See ACHML (n.d. e).

of mining exploitation. The era when it had been necessary, at all expenses, to find miners to work *deep inside*, had come to an end, and coal mining companies resorted to the introduction of foreign-migrant workers into the mining areas. From then on, recruiting resulted in the multiplication of fixed-term work contracts thus allowing the pursuit of a triple aim: avoiding the titling of miners in Nord Pas-de-Calais, adapting to the dangers of production with more flexibility, and closing the excavations and lowering the costs associated with the risk of silicosis.

Secondary literature has shown well how, after a strong sanitary selection made, based on medical visits and "checkpoints" both in Morocco and upon their arrival at the coal mining companies, the chosen miners were submitted to very hard working conditions: high rates of dust, heat, noise, painful positions due to the galleries' narrowness, with important risks of work accidents and silicosis (Amoudru,1967; Thébaud Mony, 1991)[42]. But physicians from coal mining companies devoted their efforts to attribute the "few cases of silicosis appearing during their stay in France, to the mining tasks undertaken outside the coal mines, and to prove that a certain number of Moroccans had prior exposure to coniotic risks in mines in south Morocco (Amoudru, 1967: 15-28)[43].

In any case, temporary contracts hindered most of the Moroccan miners from satisfying the conditions of time of exposure (it should be remembered that it implies five years of acknowledged *deep inside* work) determined by the legislation. It is only after 1977, when immigration aimed at coal mining companies stopped, that Moroccan miners, by then 4,000 in

42 See also Marie Cegarra's (2000) critical perspective.

43 Amoudru, a spokesperson for coal mining companies from the medical point of view, insists that a great segment of the Moroccan miners claiming compensation had caught their silicosis in their country, and that such silicosis had not been detected during the medical visits prior to their recruitment because it was still in its radiological latency phase.

number, could have their work contracts renewed almost automatically, before their status as miners was acknowledged in a strike three years later.

Moroccan miners complained that coal mining companies stopped the acknowledgment of silicosis through administrative red tape, and especially that they had rescinded the contracts of those who had caught it (Cegarra, 1999). Specifically, a Moroccan report released to French authorities in 1978 claims that instead of renovating work contracts for one and a half years through a tacit renewal, coal mining companies imposed an almost four month long break on their Moroccan wage-earners, during which miners diagnosed with silicosis were sent back to their country[44]. Nothing was harder for them than asserting their rights. Once they were returned to Morocco, they faced the lack of a systematic structure for detection, at least in the most distant areas of large cities. The few acknowledged cases were examined by physicians from the Moroccan councils and immediately reported to the French social security agency, on which they were dependent, and which would establish whether or not it acknowledged that pneumoconiosis has been caught in France. To the claims made by the Moroccan government, the social security direction responds that the refusal to hire back a worker who is sick with silicosis "is not within their jurisdiction"[45]. Besides, by virtue of the Agreement of July 9 of 1965 between both countries, migrant Moroccan workers returning to their country could, the same as the French, be officially acknowledged as silicosis patients after being examined by a three-physician-school, in spite of having an insufficient time

44 The report was discussed at an inter-ministry meeting on February 1978, organized in agreement with the commitments acquired by France at the convention of labor signed on June 1 of 1963 (Ministry of Labor, Direction of Population and Migrations, CAC 19920443 art. 50).

45 Response given by the Direction of Social Security to the Ministry of Labor, May 25, 1978 (Ministerio de Trabajo, Dirección de la Población y las Migraciones, CAC 19920443 art. 50).

of exposure. Now, according to administrative agents from the Social Security Center for Migrants, acknowledgments of professional diseases submitted abroad generated profound mistrust among French experts and schools, therefore they are less likely to be successful.

Given that, in terms of professional diseases, there is no statistical data considering the nationality or the site of the claim (France or abroad), neither in the general nor in the miners' regime, it is really hard to have an objective idea of the percentage of rejections corresponding to foreign workers returning to their country (Thébaud Mony, 1991). In 1987, when over 30,000 compensation holders in the Nord Pas-de-Calais mining area were recorded, out of which half were beneficiaries, the general director of coal mining companies, Jack Verlaine, claimed that only 327 former Moroccan miners received compensation due to silicosis, although he did not clarify whether the figure corresponded to all miners and former miners of Moroccan nationality who had worked in French coal mining companies, or only to those returning to their country (Cegarra, 1999). At the moment of such a statement, Moroccan miners (2,500 out of the 7,000 who were still employed *deep inside* in the Nord Pas-de-Calais mines) staged a long strike (out of which they emerged victorious) in order to benefit, rather than merely receive support toreturn home, from a "coal mining permit of leave" after reaching 10 year service (contrasting with the 15 years initially determined by the accompaniment plan for the closure of the last quarries). Acknowledgment of pneumoconiosis for miners who were wishing to go back to their country was one of the conditions of the agreement. Nevertheless, it is hard to assess how effective its application was (Thébaud Mony, 1991).

New demographic and financial management

The third great evolution which began in the 1960s is directly related to silicosis management by coal mining companies.

This situation results, in a rather brutal way, in a much more restrictive acknowledgment and reparation of the disease. As of 1963, the number of newly created compensations, which in a few years had been reduced to a half, was overtaken by the amount of expired compensations. After a strong decrease in their absolute value (from 3,458 new compensations in 1960, they went to 1,965 ten years later), acceptance rates of application files requiring the acknowledgment of silicosis, oscillated annually between 30 and 42% in the 1970s, whereas, by the end of the Fourth Republic, they revolved around 60%.

This period of time was also marked by the decrease in the scale of the established disability rates at the moment of granting compensation. We bore witness, so to speak, to the disappearance of IPP rates at 0% or to their re-emergence above 20%. After 1965, 197 out of the 256 compensations granted by HBNPC, that is 77%, were awarded at a rate of between 1 and 9%, and 17% at a rate of between 10 and 19% (URSSM, n.d.). 20 years later, there are no 0% IPP rates and the ones above 20% do not represent 4% of the total "first payments".

Such transformations could not be reduced to a structural bias: rather than deriving from the evolution of age and the seniority of the population of miners employed *deep inside*, they actually result partially from a series of medical developments. Indeed, such improvements took place at a moment when the ageing of the population with silicosis (both active and mainly inactive), derived from the termination of contracts, aided by seniority and health conditions, on the contrary, should have resulted in the further deterioration of their situation[46].

Even then, medicine is far from capable of explaining everything. Brutal variations of certain statistical series gave enough evidence of the importance of managerial choices in

46 This is a strong argument made by the chief physician of coal mining companies, Claude Amoudru (1972).

the evolution of statistics. Just to cite an example, the prevalence of *deep inside* work decreased to almost half within two years, from 9% in 1980 to 4.7% in 1982 (CDF, 1982). It is hard not to attribute such a fall to the coming into power of the left, in 1981, and to the consequent policy of releasing workers who were sick with pneumoconiosis from their *deep inside* work. If a broader frame of reference is considered for the comparison, the stabilization at a low level of the acknowledgment rate after the 1960s, contrasts with the period of the Forth Republic, as it may show the deliberate hardening of the policy in terms of granting compensation. On the other hand, the prevalence rate by cohort is still high. According to estimates by coal mining companies, corresponding to the last three decades of the 20th century, silicosis affects 20% of miners employed *deep inside* (CDF, 1982)[47].

Medical decisions are, it is worth reminding, always in the hands of coal mining companies, and are still partially derived from managerial choices. They simply changed when compared to those of the 1950s. At that time, it has been said before, it was essential to keep *deep inside* labor, by giving enough prospects to miners, thus leading them slowly, renegotiation after renegotiation, to a disability rate that assured them their return to the mine's surface.

The nature of the problem increasingly changed during the 1960s. The blend of the deceleration of mining activity in basin areas, the decrease in the number of workers, and the resort to temporary immigrant labor, relaxed the need to fix miners *deep inside*. Specially, they stepped from the economic management of active labor, to the social management of former miners who became dependent on insurance companies and collective provisions. Due to the progressive decrease of workers and to

47 In turn, Thébaud Mony (1991:255) offers much higher figures: 52% of prevalence for 30 years seniority or more in Nord Pas-de-Calais mining area.

developments in the struggle against mortality, the period's great transformation is, indeed, the deterioration of the burden rate both among the active personnel in coal mines, and among the retired and disabled miners. In quantitative terms, this investment takes on astronomical proportions. For every 100 active members of the mining social security regime, there were 60 recipients of social provisions in 1950, 100 in 1958, 200 in 1969, 500 in 1983 and 1,000 in 1991 (CAN, n.d.).

Alongside the global demographic effect, there was an institutional mechanism which was added: earlier retirement from mining. During the 1970s, early retirements before the age of 50 occurred, and this directly influenced the respective silicosis rates, both of the active and inactive population, below the age of 51. As has been shown, an almost systematic policy of ascending from the mine when disability had reached a 30% rate was also developed in the Nord Pas-de-Calais mining area (CAN, n. d. a)[48]. That said, early withdrawal from *deep inside*, and even from all mining activity, is associated with the extension of the period preceding the appearance and complications of the disease. Time passed after the first detection, and by the time they developed the gravest problems, the patients were closer to their thirties than their twenties. A shortening of the "trajectory" of the worker with silicosis employed *deep inside* resulted from such double movement: the interval between the moment of the detection and the moment of leaving the dangerous job post was measured in years and no longer in decades. Null IPP rates and the tacit call derived from them did not have the same sense as in the 1950s. A new balance was established: a harder acknowledgment, but a quicker exit from the hard job, even from the activity. This early ceasing of activity did nothing

48 In 1982, among pneumoconiosis compensation holders under 51 years of age, "only" 42% remain active, out of which 40.74% has an IPP rate below 30%, 1.12% a rate between 30 and 39%, and 0.36% a rate between 40 and 65%.

but accelerate the deterioration of the burden rate between active and retired workers.

Such converging evolutions impacted directly, of course, the status of all those suffering from silicosis. Even in 1970, the new acknowledged cases of pneumoconiosis were related to almost 80% of the active, and a little more than 20% of the retired workers, after a regular evolution, these two proportions became inverted within 15 years (CDF, 1985)[49]. As of the 1980s, it could be said that the "trajectories" of workers with silicosis are exclusively related to retired workers. Therefore, the medical problem of silicosis follows a logic which is incommensurable with the one prevailing during the postwar economic boom. It no longer constituted an economic parameter of labor management, but rather a social obligation among others, thus affecting a population excluded from the labor market, in mining areas where there had often been a complete deterioration of this activity. Statistical reports translated the situation directly: as one gets closer to the contemporary age, they increasingly tend to be structured around social provisions. The evolution is reached in the 1990s and can be visually observed in the increasing proportion of the National Autonomous Fund for Social Security in the statistical reports from mines (CAN). Such reports become true small treaties applied to social security law. Silicosis, no matter what its continuous financial importance may be[50], has now become part of a set of socioeconomic problems settled by social security, which attains control once more by 1987. The disease dilutes into a set of provisions (AT-MP insurance,

49 There were, throughout the coal mining areas in 1974, 10,119 active workers with pneumoconiosis, and 41,566 retired ones. In 1985, the figures were 1,681 and 39,659 respectively.

50 Due to the disability expenses it implies, silicosis is still the third most costly professional disease in France, at the moment of the balance made by Le Bacle, Bouchami and Goulfier (1995).

but also retirements, pre-retirements, disability)[51] which allow, one more time, to partially discharge the cost onto the whole of the collective and wage-earners, and to extend their statistical invisibility.

The same thing happened to the problem of former miners reconverted into other activities and other sectors, as the quarries closed. Our preceding reflections on immigration are not reduced to the issue, but they partially cover it; they invite us to wonder about the number of wage-earners who, after starting their careers in coal mining companies, triggered silicosis after the regular latency period for this disease, when they were already working in other sectors. If with the existing data it is impossible to measure directly what is sometimes referred to, regarding those diseases which are not attributable to the previous employer, as the "old risk", rough information available to us allows the assumption of a significant number of cases of silicosis, acknowledged before the general social security regime, which are the result of such trajectories of workers who had previously exited mines. Again, the blanks in the statistical record –in the present case the lack of follow up to wage-earners throughout their professional career- can nothing but blur and reduce the perception of the damage generated by *deep inside* work (Le Bacle et al., 1995)[52].

The number of deaths or impossible statistics

In regard to an incurable disease as fearsome as silicosis, and after exposing workers to risks which are massive as well, it may

51 For instance, beyond a 65% disability, general disability threshold, miners were systematically pensioned from their jobs, which was not the case in previous decades. .

52 Therefore, out of the 6,649 cases of silicosis acknowledged by CRAM between 1977 and 1991 (that is, by the liberal regime outside coal mining companies), 2,270, namely 34%, corresponded only to the Lille region.

have seemed too obvious to ask the question of the number of deaths it has produced from the start. At this point of the argument, we understand that such a question, so legitimate from a historical, demographic and civic point of view, makes no sense at all. All stages of the incredible procedure required to be given the status of "sick with silicosis" and a substantial disability rate are so manufactured and negotiated, that the data related to morbidity can only be taken as an indirect indicator of labor management techniques by coal mining companies, or of social security by CAN.

The difficulty is reinforced by the system's double opacity, both institutional and statistical. Such opacity, partially deliberate, was exposed as such at the time, as it allowed diluting silicosis into other diseases, other social provisions (disability, pre-retirement), and other causes of death[53]. To those expecting to find simple, straightforward and thorough measurements of morbidity generated by silicosis, statistical summaries produced after the 1950s set a series of screens against each other (multiplicity of services producing reports, heterogeneity of statutes, partial incoherence of series throughout time) which dilute the quantitative perception of the issue. How unrealistic would it be to expect an estimate of mortality!

It is very hard to establish a series of numbers likely to be stabilized in time, by taking only one example. For a certain period, the amount of workers sick and deceased due to silicosis

53 At least four different kinds of sources contain statistical data on silicosis: national statistics of the AT-MP branch for wage-earning workers, and the mining regime statistics. These two are related to compensation. One third set is that of compulsory statistics for medical prevention of silicosis, under the authority of the Direction of Mining from the Ministry of Industrial and Scientific Development through an Agreement of April 15 of 1958. And, finally, studies led by the medical services of coal mining companies, especially for Nord Pas-de-Calais. As acknowledged by the very Claude Amoudru (1995): "such disparities sometimes generate doubt and suspicion".

evolved year after year, following the pace of the late acknowledgment of the files: there was in fact a case by case negotiation of the silicosis related origin of deaths, the same as for the very acknowledgment of workers as silicosis patients, an issue that will be discussed again soon. Given that acknowledgment could take longer than a year, an extreme situation of moving statistics resulted from it, as it changed its shape retrospectively every time attempts to recapitulate it were made. Likewise, statistical summaries from the 1980s show thoroughly the structure according to the age of the dead, but according to their disability rate. As such, this situation prevents us from associating the latter with mortality, an element which should be crucial to assess the medical consistency of the IPP levels acknowledged in miners (ACHML, 1980).

It is impossible to determine the number of people who died due to silicosis in a medical (not legal) sense; professional trajectories cannot be rebuilt *ex post* either, and neither can the eventual age at which miners were withdrawal from *deep inside* work. It is also impossible to separate silicosis's own role from that of other co-infections or complications, whether they were officially acknowledged or not. During the postwar economic boom, how many tuberculosis or silicotuberculosis victims, including other pneumoconiosis, did in fact die by silicosis?[54] The shift to foreign labor, submitted to precarious contracts and eventual repatriations, made the scene even more complex. Such a managerial technique, whose structural and not accessory nature has already been outlined, definitely avoids any serious estimate of the amount of victims of coal mining companies. We are then forced, as in the case of morbidity, to produce statistics which, it is clear, can only provide an estimate

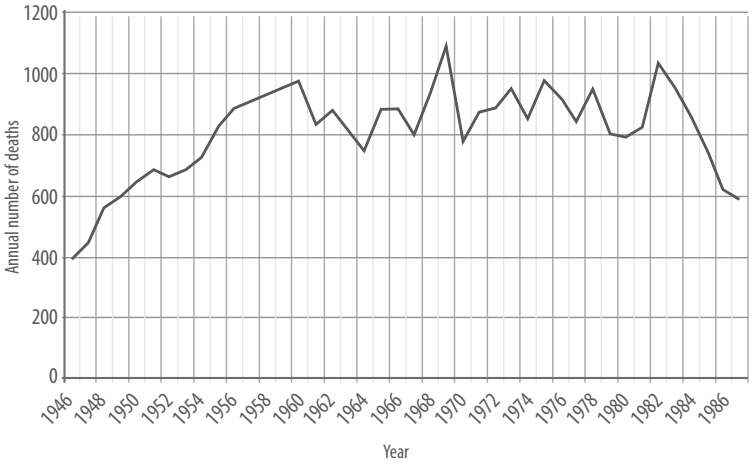
54 Elements could not be found, for example, to distinguish "silicosis" from "siderosis". Even as far as in the 1980s, the distinction between "silicosis" and "coal miner's pneumoconiosis", whose ambiguities are revealed both by Thébaud Mony (1991: 253) and by our lines above, reappeared.

by default, but from which it is strictly impossible to determine to what extent they have been overlooked.

Let us take the official number of deaths by silicosis, as quantified by social security officers from coal mining companies between 1946 and 1987 (Graphic 5). It is the most consistent statistical series to have a basis for the estimate of the number of silicosis victims; it concerns the economic sector which has been most afflicted by the disease and occurs from start to finish, as has been said, in a homogeneous social protection regime.

Graphic 5

Official number of deaths by silicosis in coal mining companies from 1946 to 1987



If deaths during the period are added, we reach the figure of 34,000 miners or former miners who died of silicosis, which is

nothing but the basis for an estimate. From the start, its definition is neither medical nor demographic, but legal. Of course it only corresponds to workers with silicosis in the official sense of the term, the one analyzed in the present paper. But within such a population, from the very beginning restricted to the regulatory level, this statistical series only quantifies the deceased whose beneficiary collected the payment of compensation. In other words, it quantifies the amount of deaths officially attributed to silicosis after an investigation, sought by the families, which obtained a positive response, a condition evoked by CAN's annual statistical reports.

The first restriction, this definition clearly excluded those deaths which were not investigated to determine their imputability. Such an omission, confessed by coal mining companies, concerned at least 20% of the victims (ACHML, n.d.). If such a percentage is taken into account, the amount of silicosis victims of coal mining companies goes from 34,000 to over 40,000, but the limits of such reasoning are clear. After considering these evident biases, confirmed by coal mining companies themselves, the account immediately slips into an estimate.

The great difference between the number of deaths and the amount of processes does not only come from the deceased who did not leave beneficiaries. One part of the families is reluctant to enter into a frequently frustrating process, or ends up quitting it. The first obstacle to overcome is the duration of the process. As acknowledged by CAN: "the issue of imputability to pneumoconiosis of the deceased occurred during one year is, practically in every case, decided solely within a two year period" (ACHML, 1980: 13). In practice, the recount of the social security statistical charts in coal mines often shows even longer delays: by 1993, 190 files submitted in 1990 were still pending; and 188 in 1989, that is, a total of 551 acknowledged deaths throughout the year. Waiting can be painful;

many families refused to have an autopsy performed, especially when it was frequently required one year after death[55]. It is definitely uncertain. Whereas the rate of rejection of imputability by CAN was 30% for the whole of the Fourth Republic (3,673 rejected applications, out of 12,210), and 37% (only in Nord Pas-de-Calais) from 1959 to 1965 (that is 3,205 out of 8,769), it reached 59% in 1984 (1,221 out of 2,080) and then two thirds in 1991 (981 out of 1,479).

One of the difficulties faced by beneficiaries, on whom the burden of proof of a cause/effect relationship between silicosis and the deceased is placed, is that death is likely to come many years after exposure to risk. Files of cases of death by silicosis are, even up until recent dates, submitted to an Opinion Committee on Pensions (COP, after its name in French), after being assessed by the medical consultants of both the coal mining companies and URSSM, and they decide on the case's imputability without appeal. Experts are used to the idea that people with silicosis cannot die of such a disease, unless their compensation is above 50%. Such a practice reveals another difficulty arising from the "transactions" the sick miner will have conducted throughout his life, in regard to his acknowledged IPP, with the appointed expert in pneumoconiosis and the two-doctor or three-doctor-schools. In order to safeguard his family's rights he had to reach a minimum disability rate as soon as possible. For coal mining companies, symmetrically, such a habit becomes an additional reason to withdraw miners from *deep inside* before their disability rate was too high, the opposite of what

55 Article L 177 of the social security code states that "the fund must, if the victim's inheritors require it, or even with the very victim's authorization, should it be considered convenient for the emergence of truth, ask the justice of the peace in whose jurisdiction the accident took place, to have an autopsy performed in the terms prescribed by Articles 303, 304 and 305 of the Code of Criminal Procedure".

occurred in the 1950s when there was a great need for workers in the mining pits.

A study on the 1973-1981 period established that the likelihood of families changing COP's initially released concept is almost none (Desliers, 1984). Throughout this period, 13,318 applications, or two thirds of the files of deaths officially acknowledged as due to silicosis, were submitted to the Regional Northern Union and Pas-de-Calais's COP. Almost half of the deaths (6,644) are attributed to the disease. Regarding the 6,674 remaining deaths, only 11.6% of families (755) risked resorting to the Administrative Appeals Commission (CRR, after its name in French). After most of them were dismissed, 163 families questioned the CRR's decision through the submission of their cases to the first instance of the commission of contentious issues on social security. 40% of the cases involved corresponded to miners who were holders of a compensation rate above 50%. At the end of such a long process, only 5 deaths were acknowledged as due to silicosis. Summarizing, out of the 6,649 deaths finally attributed to silicosis, 99.92% were acknowledged in the first test by COP, and 0.08% as a result of a claim put forward by the beneficiaries.

Such proportions, in their own way, realize the principle of silicosis treatment on the coal mining companies' side: a hierarchical system instilling obedience and patience in miners, which does not hesitate to call any attempted deviation to order. Additionally, it was a system which assured the conditions of its own statistical opacity, thus making it impossible to measure, even roughly, the number of victims. Rather than attempting a superficial evaluation, we can do nothing more than detail its components.

In regard to measurable workers, between 1946 and 1987, 34,000 deaths were acknowledged; besides these, according to the coal mining companies themselves, 6,000 more miners

should be added, who did not leave any beneficiaries. On the other hand, deaths which are not officially attributable to silicosis amount to 7,500 between 1946 and 1965[56], and their amount could not be established in our sources after this period, except for the 1980s, when they averaged 1,000 per year. The set represents tens of thousands of rejections, out of which it will never be clear, from a medical point of view, how many were attributable to silicosis, which was sometimes understood as the sole cause, and sometimes as a trigger of complications.

In regard to non-measurable workers, miners dead either by "tuberculosis" or by "silicotuberculosis" before the acknowledgment in 1946 (in order to only consider 20th century terminology) should be included, the same as should be done for a part of foreign miners employed by coal mines from the inter-war period to the 1980s. One part is not measurable at all, due to the lack of nationality of the statistics, due to these miners returning to their countries of origin and, during the Fourth Republic, to precarious employment contracts and to the impossibility of following up their medical trajectories after they left the coal mining companies. But indeed, for a substantial part -if consideration is given to those foreign miners who were purposefully assigned the most dangerous jobs, from a medical point of view- it is indeed, more and more pronounced over time, one of the initial reasons of recruiting them.

In the end, it is worth remembering that, for this article we only consider, morbidity and mortality associated with silicosis in coal mines. One reason was opportunity (coal mining companies, especially Pas-de-Calais, concentrate the highest num-

56 Besides, there were 3,673 rejected applications of imputability until 1958, and 3,205 rejections in the Nord Pas-de-Calais mining area between 1959 and 1965; they were increased in 25% in an attempt to reflect, by default, the importance of such mining area within the whole of coal mining companies, an average of 4,000.

ber of victims), but another was the sources. No matter what the interest is, within the non-mining sectors, silicosis data obtained from the general social security regime require the same archive work, after contextualization, as was necessary here. It is pointless to be content with producing gross figures, thus supposing they allow a measure of the human, sanitary and demographic disaster silicosis has implied. Well covered and concealed, this great assassin, which, we should not forget, is still active in France today[57], is ready to reveal neither the details, nor the size of its crimes.

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