

The intricacy of demography and politics: the case of population projections

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The purpose of this paper is to sketch the common lines of development of both the scientific elaboration of world population projections and the international political debate that prepared the ground for such projections and encouraged their development. A partial history of the elaboration of world population projections has already been written. International population debates from the XIX^o and XX^o centuries are also under scrutiny. But the link between these two developments has not been fully established. The link between projections and politics work both ways. In one direction, projections can contribute to a rationalization of government in the area of economic development, urban planning and so on. They provide societies with a partial view of their future. In the other direction, population projections cannot be undertaken without the help and support of governments and major international organizations. They rely on accurate and detailed censuses. They are costly and time consuming. At both end of the spectrum, there is a need for a global consensus not only within the scientific community and political arenas for population projections to be computed, received and considered as legitimate. More than many other instruments of demographic analysis, the history of world population projections demonstrate these linkages.

The most used method of population projections developed in three different stages, which match three very different historical periods. At first, they emerged in Great Britain at the turn of the XIX^o century and did not attract much attention; probably because their author, E. Cannan, clearly demonstrated the foreseeable decline of the British population, a prospect that contradicted other political interest. In a second phase, between the two World wars, other demographic instruments, especially the various reproductive rates computed by Kuczynski, and the stable population theories, were good demographic instrument to analyse national population growth, especially in countries where data were incomplete. There was little interest for the “world population” as such. On the contrary, many were interested in the comparison between demographic trends among European countries or between Europe and Asia. It is only in the last phase, after World War II, that world population projections fully developed. The newborn United Nations organization took responsibility for such achievement along with the

implementation of successive censuses rounds. The scientific minds, and only partially the political ones, were set: the development of the demographic transition provided a framework for understanding recent European history, an understanding to be generalized afterwards to countries to be named later the “Third World”. These were supposed to follow an analogous path. Both in the United States and Europe, the minds were also set for “social engineering”, state and political planning. In this context, population projections, and world population projections, had become not only possible to realize but also a most needed instrument.

This sketching of three periods of developments for population projections match a general understanding of world politics according to which the two world wars led to a profound reshaping of visions and institutions. It is true that both the League of Nations and the United Nations were supportive of an international debate on demographic issues and very instrumental in its organization. Between the two wars, the closing to migration of United States borders in 1924 had risen even higher the level of concern for “lebensraum” in areas where population growth were very high (Poland, Germany, Japan) as it appeared in the two world population conference.

Scientific discussions on population growth and dynamics dominated part of the demographic scientific arena during the whole period. Three general trends can be identified. Before WWI, the population question is still in the hand of social statistician, of populationnists in France and eugenists in Great Britain. The former are heavy contributors to the production of national statistics. The latter, especially in France, are driven by the political debate. In the next period between the two wars, attention to theoretical issues appeared predominant. In particular, Kuczynski and Lotka contributed to a better formulation of the respective contribution of both mortality and fertility to population growth. Mathematical demography, or pure demography (*démographie pure*), as the French used to say, often imbedded in the more general frame of statistics, gained attention. After 1935, the reverse is to be said when an empirical shift became more obvious. The development of surveys at Princeton University, Glass ‘s *Struggle for population* (Glass, 1936), prior to the War, survey undertaking at la Fondation pour l’étude des problèmes humains, or the development of the population division at the United Nations and of Ined in Paris, are good illustration of this shift.

If they have not been fully combined, the two developments of population politics and ideologies on one side and of demographic concepts have been already partially documented. (Spengler, 1979) remains the best documented history of French populationism (Symonds and Carder, 1973) provides a full account of the international debates on population at the League of Nation and later at the United Nations, during the first world conference. (Hodgson, 1983)

studies of the demographic transition paradigm, of the birth of Population Association of America are notable source of information. (Girard, 1986) on Ined and (Drouard, 1992) on Alexis Carrel's foundation provide other insights on the birth and development of French demography after WWII. (Le Bras, 2000) attempts to trace back the concept of "population", a concept that he finds most needed for Lotka's stable populations are more controversial, because they are very connected to a classical French controversy on the political usage of demography.

Population projections will remain the principal focus of this study. Instead of documenting the full reshaping of demographic trends and ideas about world population growth, we will examine different attempts to foresee population future starting with Cannan first projections of Great Britain population, moving on to national projections of the thirties, - Sauvy's presentation (Sauvy, 1932b) for the French population and Whelpton for the American -, and ending with the development of world population at the UN.

The first attempt by E. Cannan.

The British professor E. Cannan is the first identified statistician to have used the cohort-component approach for evaluating the future of a national population. His work was published in 1895 and did not gain much acceptance. Under the title "the probability of a cessation of the growth of population in England and in Wales during the next century", he projected a downsizing of the British population within reach. "it will be seen that the increase of population, large at first, becomes less and less, till it is trifling in 1941-51. It would continue, but always growing less and less, till about 1995, when the last survivor of the period before 1891 would disappear, and the population would then stand at its maximum of 37,376,000" (p.513). Because of his results, but also his methods, E. Cannan appears as a precursor. His assumptions and thesis did not gain attention before three decades later.

At the time of their publication, E. Cannan' results brought controversy within the British scientific community. Douglas V. Glass offered several examples by quoting two statisticians, who intervened at a meeting of the Royal Statistical Society: " Dr Ogle said that "The population of England and Wales is, as we all know, growing in a most formidable manner; and though persons may differ in their estimates of the time when that growth will have reached its permissible limits, no one can doubt that, if the present rate of increase be maintained, the date of that event cannot possibly be very remote.' And he was supported by another statistical expert, Dr G. B. Longstaff." E. Cannon's projection echoed discussion about prohibiting birth control. But, as noted by Symonds, "Malthusian thinking, however, remained dominant. A League of National Life was founded in 1926, but its propaganda, unlike that of pro-natalist bodies on the

Continent, made virtually no impact and the League soon went into demise". It is not until the end of the thirties that first governmental measures will be taken to encourage natality in Britain. Then, many more projections had been realized.

In his own work, E. Cannan made no attempt of bringing up strong ideological arguments. Instead, he insisted on the importance of accurate population forecasting for better government. Careful data analysis is opposed to direct extrapolation from past trends into the future. At a time of urban reform and city planning, he stated that "there is not a builder nor a town council in the country that is not obliged to prophesy every month what the growth of population in a particular district is likely to be, and it was the speculations of the Metropolitan Water Commission as to the population of London in 1931 that inspired me to make this contribution to the literature of the subject. The real question is not whether we shall abstain altogether from estimating the future growth of population, but whether we shall be content with estimates which have been formed without adequate consideration of all the data available, and can be shown to be founded on a wrong principle." In this sense, Cannan's argument is more empirical than theoretical.

In a method most familiar to demographers, Cannan decomposed population growth into life events identified as birth, death and migrations. He refused to extrapolate past growth rates into the future. "The Registrar-General's method in forming what are called the 'official estimates' cuts the knot by disregarding all the decades except the last. The only conceivable argument in favour of this course is the allegation that the immediate past being nearer the future than the long past, affords a better basis for estimating future probability. By itself this would justify the *reductio ad absurdum*, 'if the last ten years are better than the last ninety, the last year must be better than the last ten, 'but 'the temporary fluctuations' have of course to be considered, and it may perhaps be asserted that ten years is sufficient, while twenty is more sufficient, to give an average unaffected by such fluctuations. Instead, he prefers to sketch the trends more specifically. "The truth is that every estimate of population, past, present, and to come, ought to be founded on a consideration of the factors on which the growth decline of population is dependent – birth, deaths, immigration and emigration. The assumptions are quite straightforward. Mortality and migration are to remain stable overtime. He assumes that after an increase in the birth rate due to a larger cohort born prior to 1895, a subsequent fall is to happen.

In many aspects, Cannan's estimates appeared technically more accurate than those frequently used by the pro-natalist advocates of the European continent during the same period. Re-known demographers often compared birth rates and death rates and did not "projected" the population forward. For a man like Jacques Bertillon (1897), this choice is probably in part

rhetorical. The concept of birth shortage is easy to grasp by a large audience. 'For France to maintain its current rank, its birth rate should reach 38 as it is among its neighbours. Because its population reaches 38 millions and half inhabitants, it needs 1 464 000 births, a figure that exceeds its current figure by 630 000' (p13). The whole argument is built on birth and birth rates. No reference is made to the age structure of the entire population or to its past and future trends, and to the relative impact of birth and death on population growth.

Surprisingly, at the end of the XIX^o century and the beginning of XX^o, in this period where France was largely pre-occupied by its future population and by military and economic consequences of the current trends, little effort was made to estimate its growth and size. Cannan's attention to city planning and rational government in many ways prefigure future concerns expressed either by Whelpton in the United States or Sauvy in France or later at the United Nations. But at the time when this shift happens, nationalist considerations will also gain in importance. The new tools provided by Kuczynski and Lotka to estimate the rate of "natural increase" will help build large international comparisons.

National population projections as a prelude to Global projections

During the inter war period, a fierce demographic debate developed under the auspices of the League of Nations. French, English and American demographers were among the leading contenders. As the debate developed, the German were excluded from the League. The protagonists focused on the future growth of their national population in comparisons with their neighbours. At the same time, national projections were developed in Great Britain, France, United States but also in Germany or in the Netherlands¹. Because of their role in the debate, we will focus only on some English, French and American national population projections. The purpose of this section is not to examine each national project but to suggest the main research directions and political visions that will develop after the WW.II as well as to try to understand why no global projections were produced prior to the world conflict.

Most national projections relied on Cannan's methods and used the cohort component approach. In France, the discussion held at the Société de Statistique de Paris after Sauvy's presentation in 1932 was quite illustrative of the different political approaches to the question of population. It opposed those who desired to favour large family size through economic and financial incentives and those who wanted to develop hygiene to reduce infant and adult

¹ See work developed under the auspices of the Max Plank institute, Rostock for Germany, and the work of Henk A; De Gans *Population Forecasting 1895-1945, the Transition to Modernity: European Studies of population*, V. 5, 1998.

mortality. Meanwhile, a greater sense of urgency developed within the international arena. International comparisons reflected nationalist interests. Franco-German relationships and the fear of a disappearance of the “white race” were raised as flags. Because of this interest for international comparison, the two approaches to fertility and population growth developed respectively by Kuczynski and Lotka competed because of their simplicity with the development of demographic projections. Estimates of fertility rates and crude growth rates were easier to achieve. At the 1937 population conference, the debates over population trends led to a more empirical approach to population questions

British demographers were the first to return to demographic projections. Progressively their work gained more attention. In 1924, Bowley (Bowley, 1924) estimated the population of Great Britain to reach a maximum of 48,8 millions inhabitants in 1971 (as opposed to the 38 millions of Cannan in...). He assumed birth rates to remain as high as they had been between 1921 and 1923. In 1934, Leyboun (Leybourne, 1934) projected a decline of the British population to 28,7 millions after reaching a peak at 40 millions in 1940. Enid Charles extended this work in 1935 and was the first to compute different estimates based on three different assumptions deriving three scenarios. In the first set, fertility and mortality rates are kept at their 1933 level. In the second set, fertility falls up to 1985 and mortality up to 1965. In the last set, mortality falls continuously and fertility rises to the level of 1931. As a consequence, the three scenarios provide with three very different estimates of the British population size in 1995. In the first case, it reaches thirty millions in 1995, in the second twenty millions, and in the third 39 millions. In all instances, the Great Britain population starts ageing at different path.

Published only two years later, Glass' comments on Charles projections help understand the illustrative power of population projections. The intensity of the ageing process suggests the following difficulties: “the population will suffer from a much higher degree of invalidity and the burden of state health insurance will be greater. So, too, will be the relative cost of old age benefit. On the other hand, this large section of aged and therefore unemployed people will have to be supported by a relatively much smaller proportion of able-bodied persons. That is, proportionately, the amount of taxation per head will rise, while the ability to bear it will fall. Moreover, the position of industry is likely to be more difficult.” (Glass, 1936)(p.14-15). Clearly departing from the Malthusian perspective, the British commentator envisioned a large range of difficulties deriving from “depopulation”: from taxation, social security to the decline of ‘mass-production’ damaging to consumer wealth.

Almost at the same time, Alfred Sauvy presented in France two papers that led to a discussion driven both by theoretical and policy oriented consideration. His heavy computation received institutional support from l'Alliance Nationale pour l'accroissement de la population. In 1928 and 1932, Alfred Sauvy (Sauvy, 1928, Sauvy, 1932a) developed projections of the French population reaching at first the year 1956 and then 1980. In the first instance, he estimated a slow decline to reach 38 millions, and in the second, he designed two hypothesis, one with stable fertility and a slow mortality decline, an other with declining fertility. For the former, the total population reaches 38,9 millions, in the second 29 millions. In both cases, it reaches a maximum before a regulary downfall.

As always, Alfred Sauvy justifies his enterprise with a large political vision that fitted well within the agenda of his sponsor, the Alliance nationale. In 1932, he envisioned that population should be part of a vast plan of action. As he noted, the French assembly had voted financial incentives to encourage births or to develop hygiene in order to facilitate a mortality decline. But, for him, none of these small political measures reaches a satisfactory level. A population policy needs to be "global" in scope. In a second section of his 1932 contribution, Sauvy proposed different scenarios to stabilize population trends. Comparing the net effects of a slight increase of the number of births or deaths, he concluded that only births should be encouraged by political measure. "A decline in mortality, while welcome, has a pernicious effect: its masks the true situation and encourages false hopes"². The situation is described with a dramatic tone: " Like a piece of coal that burns without any volume reduction, the French population burns slowly, until the time when the country at last becomes aware of its state and decides to impose upon himself measures that are simple to conceive but difficult to admit. Unless it is already too late". However, the statistician did not go as far as to suggest measures to stop this population decline.

In 1932, the discussion reported from the Société de Statistiques de Paris focused on the use of projections versus other methods derived from stable population theory. Aside from this more technical note, present members agreed on the robustness and seriousness of Sauvy's enterprise. Some hygienists maintained that encouraging births rather than preventing deaths is a better approach to encourage population growth. In fact, Husson, the president of the Société de statistiques strongly encouraged the development of projections for technical reasons even though he had himself introduced Lotka's work in France in 1931.

According to Husson, Lotka's method, extrapolating from the present situation a rate of natural increase and projecting the current population into the future is a powerful instrument is

weaker because it does not allow for time varying assumption in mortality. However Kuczynski's "net reproduction rate" and Lotka's "rate of natural increase remain of considerable interest because they are quite easy to make and open to numerous international comparisons. Glass referred to Kuczynski's computation to draw international comparisons (Kuczynski, 1928-, Kuczynski, 1936). Sauvy in *l'Encyclopédie universelle* (Sauvy, 1936) and Landry (Landry, 1945) in his demographic manual still prefer to introduce the two methods and only mentioned the possibility to compute demographic projections. Sauvy (1936), for instance, reproduced a table published in 1935 that compared net reproduction rate estimated for Sweden, Germany, France, Austria, Italy, Ukraine, Berlin, Stockholm, Vienna, Paris and Oslo for the years 1890, 1913 and 1933. He also lamented over the possible decline of the white race. A decade earlier, Thompson had already warned of the *Danger Spots in World population* (1929). After the war, the American demographer's pessimism had not vanished when he published *Population and peace in the middle East*. As noted by Symonds and Carter, this movement toward comparisons fitted well within the international agenda of the time. When the 1937 World conference opened, claims for territory expansions because of population growth had become a very burning issue.

During the same period, Whelpton, while working for the Scripps foundation, published a series of projections of the US population with the purpose of encouraging more rational forms of government. As in the case of Sauvy's work for the *Alliance de la population*, the institutional and financial support of the Scripps Foundation for Research in Population Problems was very instrumental. It helped both develop large scale computation and attract political attention to the future of the US population.

Whelpton and Thompson expanded the population projection methods. In 1936 Whelpton presented a series of different scenarios related to three sets of assumptions on fertility, mortality and migration trends. In 1943, Whelpton and Thompson estimated twelve different scenarios. But more interestingly, the publications decomposed the US populations into two racial groups estimated projections for the two groups with different fertility calendar and mortality life tables references, and then re-aggregated the two groups into one single population. While introducing this new step cannot be considered as major breakthrough, it opened the path to wider generalization of the same process. United Nations projections of the World population have been made using the same method.

Whelpton and Thompson contributed to the public debate with their statistical enterprise, with the help of the Scripps foundation. The newspaper publisher E. W. Scripps and Thompson

² « La baisse de la mortalité, éminemment souhaitable, exerce ici un effet pernicieux par le masque qu'elle

had shared interests in population and in the future of Asia. Two years after the foundation was born and placed within Miami University, Thompson attracted Pascal K. Whelpton. Together, they regularly published sets of population “forecasts”. According to Clyde V. Kiser, “the two men quickly attained national prominence as forecasters of the national population. They took an assignment with President’s [Hoover’s] Research Committee on Social Trends and this resulted in the book *Population Trend in the United States*, published in 1933”. The two men contributed also to the Bureau of the Census and the Division of the Vital Statistics. The 1943’s estimates had been published by the National Resources planning board which is an office of the United States Government.

Interestingly, the 1943 publication ends with a summary of policy implications of population changes. The two authors focused both on global and local issues and primarily on economic consequences of an ageing population. They call for anticipation and transformation of the US economy: “it therefore seems probable that whatever economic adjustments to the altered population situation may be needed can be made without any period of sudden and difficult transition provided that they are envisaged and allowed for” (p.35). Federal and local government should develop planning: “City planning will have to proceed more cautiously, for there will no longer be the same assurance of continued growth. There will be less justification for the construction of permanent or semi-permanent facilities, such as schools, water supplies, and sewerage systems, in excess of present needs on the assumption that they will eventually be brought into full use by a growing population... The per capita burden of long-term indebtedness will not be lightened as in the past by an increase in the number of taxpayers. Public utility systems will have the prospect of more nearly constant number of customers. Economic and social consequences need also to be considered: “There can be little doubt that these changes in the relative importance of different age groups will alter considerably our productive enterprise in the future. There will similarly be changes in amusement and recreational preferences. Diseases and infirmities of later life will come to demand a greater share of medical services, and there will be an expanding need for institutional facilities for the care of the aged. The changing age distribution will be directly reflected by the demands made on the Social security system” (p.37).

At the end of this interwar period, only one out the three pre-conditions enumerated by Frejka for the development of long-range world population projections is met. In fact, the methodology aspect is well-established: “a methodology which usually consists of (a) a separate

assessment of an initial age structure and separate projection of the two motor forces of demographic dynamics in a closed population – mortality and fertility (the combination of these elements yields the so-called component projection of a population) and (b) a separate assessment and projection of national and/or regional populations, which when aggregated, yield global projections or which provide a check on separately computed global projections” (Frejka, 1994). Two other pre-conditions are not quite met yet : “an explicit or implicit *theoretical framework*” and “a wealth of accumulated *demographic data* which serves as the empirical base for the framework”.

At the same time, political or social considerations that provides legitimacy and support to this tedious computation enterprise have already been proposed both by Sauvy in France or Warren and Thompson in the United States. This justification will provide wider support after the war when the Population division undertakes its first projections. The political and scientific debate followed by incentives is just starting at the end of the period under the auspices of the 1937 World conference.

World population projections

In 1949, the Population Division of the United Nations published its first population projections under the auspices of Notestein who had undertaken a similar project some four years earlier while he was still at Princeton University. Before the 1958 estimates, the current world population size and growth were probably underestimated. The political, institutional and scientific conditions were progressively set for a full development of the method. It is, however, very difficult to differentiate the relative impact of each of this new set of conditions. The World population conference held in 1937 had encouraged the empirical studies of demographic situations around the world along with the development of research institutions (the Princeton project, the Population division). Other countries, such as France, had followed an analogous path. The crafting of a concept, like “demographic transition” had also opened the path for freer considerations of the world population future. The adoption of wider Keynesian policies, oriented toward an analysis of demand- along with the wider acceptance of social engineering, had encouraged various demographic assessments of national populations for the sake of better government. In other words, research and debates made it theoretically and practically possible for population projections to be developed.

Paradoxically, the inconclusive debates that took place during the 1937 world conference set the path for wider empirical demographic studies and consequently for the preliminary steps leading to the development of the ‘demographic transition’ paradigm and of population

projections. While countries already with low birth rates such as France opposed those with high population pressure and differed on the course of action to be followed, the Second Committee ‘recommended that the Assembly request the League Council to ‘take the necessary steps to draw up a scheme for the study of demographic problems³’ (Symonds and Carder, 1973)(p.18). In 1938, given disagreement between Poland and other countries on the economic consequences of population pressure, the Assembly resolved that ‘a special committee of experts’ gather to study demographic issues. This committee was nominated in 1939 and included besides Alexander Carr-Saunders experts from India, Egypt, Argentina, Brazil and Poland. The beginning of the war prevented the committee from meeting. However, under the direction of Frank Notestein, the Office of Population Research at Princeton University had offered its services and prepared a series of demographic monographs on Europe (Princeton University, Office of Population Research, and Notestein, 1944, Kirk and others, 1946), Soviet Union (Lorimer, League of Nations, and Economic, Financial, and Transit Dept, 1946). Aside Frank Notestein, a number of leading American demographers, such as Irene Taeuber, Dudley Kirk, Ansley J. Coale, Wilbert E. Moore, Frank Lorimer, Louise Kiser, Clyde V. Kiser, and Kingsley Davis, took part in this project (Hodgson, 1983). These researchers contributed to the elaboration of the demographic transition theory. A bridge is also to be established between this group and the new Population division first directed Frank Notestein.

The formulation of the “demographic transition” within these institutions was also a keystone for the development of population projections based on the Cannan-Whelpton method. The scientific enterprise has been already analyzed with great insights by Stretzer (Sztreter, 1993) and Hodgson (Hodgson, 1983). More than any other method used to forecast the future of populations, population projections need explicit assumptions on mortality, fertility and migration. For world projections, a comprehensive historical conceptual framework was clearly lacking in the immediate aftermath of World War II.

Contrary to short range forecasting and direct extrapolation of current situation via stable population modelling, population projections require a definite set of assumptions. Their strength is precisely there; they allow for time-varying birth rates and death rates and also for geographical differentials. Most national population projections, based on industrialized nations, had predicted before the war a progressive population downfall: the sharp mortality decline that happened prior to the war was not anticipated nor was the full scale of the “baby-boom”. Sorts of hill-shaped

³ Records of the 18 th Session of the Assembly, 1937, annex 5, report of the Second committee, p.127.

curves were designed: industrialized countries were to experience slight population increase during ten to twenty years followed by sharp declines. Further, there was no possibility to differentiate trends by duration or magnitude.

The uncertainty over the future of the developing world was also of key importance for the crafting of world population projections. Population projections contributed to a better understanding of the drastic changes that were unfolding. The global population was increasing at a very fast rate. How long would this increase last? In 1945, what were the prospects for mortality in the developed countries? And what about fertility in developing countries? What was the future of India or China likely to be? There was no immediate response. Was the developing world going to follow the path set forth by industrialized countries? Soon, an explanation emerged and is nicely summarized by Hodgson: “The explanation, nearly identical in each case, contended that where traditional societies experienced colonial domination, an attenuated, onesided modernization experience produce mortality decline, population growth, but no fertility decline (Hodgson, 1983)p. 8. Such explanation does not provide a time frame to foresee the slowing down of population increase. In fact, American demographers, such as Notestein or Davis, were quite pessimistic at first. The colonial system, in its very nature, could not offer a direct solution to population pressure. The question became soon whether development and/or the implementation of family planning can alter the course of events.

Despite this uncertainty on the timing of demographic transitions around the world, the conceptual framework explained both the direction of the changes to be expected and suggested the need for successive re-assessment of reality. Already in 1943, Notestein described a “vital revolution” sweeping Europe (Notestein, 1943). Moreover, countries all around Europe were soon classified into three groups: Societies with high and static fertility were in the initial stage of demographic development, “high growth potential.” Evidence of fertility decline was *the* demographic trait that indicated that a population had progressed to the stage of ‘transitional growth’. A low level of fertility was *the* demographic trait indicating movement into the final stage of demographic development, “incipient decline”. One essential generalization was the basis of transition three’s stage framework: a society that industrializes will undergo fertility decline.”(Hodgson, 1983) (p.9). This grouping provides a scaling to assess the different stages of a linear process. All changes were supposed to happen in the same direction: fertility is supposed to fall at some point. At the world level, it also allows to estimate how much of the changes have already been completed by numbering the countries in each of the three groups. Hence, as data become available, it also becomes possible to re-assess the magnitude of world population growth along with the level of remaining uncertainty and heterogeneity across country.

Looking at other scientific approach to demographic forecasting can help assess the strength of the linkages between the two scientific concepts of «demographic transition» and «population projections». As we have seen, the two “concepts” reinforce each other. Starting in 1924 and pursuing his efforts in subsequent years, Raymond Pearl extrapolated global population growth using a logistic curve to fit data assembled from 1660 onward. His estimated equation in 1939 was :

$$y=444.5+\frac{2200}{1+8.7349e^{-.2273x}}$$

where y is the world population in millions and x is time in 10-year intervals, from the 1800 as origin. The asymptotic limit of the current cycle reaches about 2,645.5 millions, and estimated to be within range in year 2600. Of course these estimates were quite off-track. Pearl had over anticipated the fertility decline because of his ideological concern for the “world carrying capacity” and his mathematical assumptions. The opening of new spaces had freed men from the land constraints that dominated Europe before the 1700th century. His interpretation presupposed two kinds of homogeneity. First space homogeneity: he implicitly assumed that available land in one area is a perfect substitute for an other piece of land in an other area so that migration can regulate the over-flow of population growth. Second, he also supposed population homogeneity across the world. Population growth changed at different speed in different continent: because of the population momentum, a 10% decline in world population growth originates from a country with “high growth potential” or slow growth potential.

Both the development of an institutional setting oriented toward empiricism and the very existence of a “ready to use” conceptual framework conditioned the population projection enterprise that developed within the United Nations under the auspices of Frank Notestein. It is also worth noting that both population projections and data collection developed on parallel lines. Each project reinforced the legitimacy of the other. The first population projections were soon criticized by the data that revealed the extent of world population growth. The “risks” revealed by the projections had to re-assessed because of the uncertainty toward the future that they were bringing.

Between 1950 and 1960, each revision of the UN population projections was made upward. In 1949, the Population division, published its first “World Population Trends, 1920-1947”, linking the past with the future of the world population. As for Notestein 1945 estimates, their results did not take fully into account both the decline in mortality and the persistent high

level of fertility. The projections were presented in 1954 to the World Population conference. They were then revised and published again in 1957. In 1958, the United Nations projections were the first set to provide estimates close to what the reality was in the target year 2000. Earlier United Nations projections did not provide estimates after 1980. In 1958, Woytinski extrapolated these projections to 2000 and provided two sets of estimates. The first was based on the 1951 estimates and was 3.8 billion. The second, however, was 4.3 billion and was based on the 1954 re-assessment.

The reason for the improved “performance” of the United Nations projections seem to be to a large extent better data. The techniques of projections were the same. In 1947, data were only available from areas where about 40% of the world lived, a figure that significantly improved during the next decade. Rates of increase, fertility and mortality are difficult to measure because of very poor vital registration. In 1960, the demographic yearbook of United Nations reassessed the quality of data. “For the middle of 1959, the number of human beings in the world was estimated as 2,907 millions of 412 million over the estimate for mid-year 1950. “One-half of the world population... is accounted for by the population of four countries: China (mainland), India, the Union of Soviet Socialist Republics, and the United States of America.” Noting that the accuracy of the world population estimates rely heavily on the accuracy of the estimates provided by this countries, the Yearbook studies each case separately and suggest that results for China and India should be appreciated with greater caution: “Accordingly, the population of the United States in 1950 may have been anywhere between 153 and 154 million; that of India in 1951, between 365 and 367 million; that of China (mainland) in 1953, between 553 and 612 million; and that of the USSR in 1959, between 209 and 21 million”. The uncertainty of the estimated rates of increase between 1950 and 1959 fall within the same range: between 1.2 and 2.3 for mainland China, 1.5 and 1.7 for India, 1.7 and 1.8 for USSR, 1.7 and 1.8 for the United States. China’s situation cannot fully be evaluated at that time and bears great consequence on the estimated level of world population size.

Finally, part of the scientific success of population projections is also related to the resetting of economic and political visions that developed during the 1950s. The projections were developed and promoted as a good instrument for governance. This sort of low profile was made possible because of renewed interest in the “demand” side of economics, in social engineering and also because of the political uneasiness surrounding “birth control policies”. At the United Nations, the political body governing population issues, the Population Commission, had undergone major fight over policy orientations because of a fierce opposition between United

States and the Soviet Union. The major issue that remained on the table for a long time, was the consequences of population pressure. As a result, “the projections were prepared ostensibly as an aid to member states and to the Specialized Agencies in their forward planning and as an exercises in methodology” (Symonds and Carder, 1973)(p.78). Their technical aspects as well as their political usage were emphasized while their actual implications, the “revelation of a large population growth in many areas of the world” were somewhat downplayed.

This choice fitted well within the politics of the time in most of the western world. Both in the US and in France, demographers had already justified their implication in the political debate by developing rationales that were in very good accordance with the economic Keynesian school. As we have seen, by insisting on demographic changes, they insisted on the need for more public investments ‘adjusted’ to actual population change. Their vision of industry and business was also driven by “demand”. The larger the market, the better it is for the consumers. Far from declining, this state of mind developed even more during the next period and found support among research who developed the “demographic transition paradigm” (Szreter, 1993). In Europe, and especially in France, Alfred Sauvy developed analogous rationales to encourage population forecast(Sauvy, 1959). For the French demographer and economist, the link between economics and demography is to be encouraged, especially to understand better the labour market: demographers can help explore its development and the need to encourage migrations.

The history of world population projections provides a fairly good example of a common reshaping of international politics, economics and sciences. For obvious reason, the period during when the projections developed at the United Nations is paradigmatic of such public debate. Social scientists and international institutions were major actors of a re-understanding of the world, at a time when this world “needed” to be different. The “demographic transition”, for instance provided a re-understanding of a phenomenon, population pressure, that had also been world politics issue, and a violent one, for more than a century in Europe. When Landry interpreted it prior to the war, he did not attract much attention. Things became much different after the war. The crafting of population projections probably made it clearer that the fertility decline, a wide spread phenomenon was not so much a revolution, as Landry had labelled it, but a transition.

At the same time, even if this appears as a truism, it is worth noting that not everything happen at once. Instead, even if the focus was on international projection, we described their development in three stages: A first elaboration by Cannan, then the development of national

projections, and only at last the development of world projections. This movement is no surprise: the scientific paradigm becomes more general and universal as it develops. At the same time, a development appeared always "prepared" by men and institutions. A common understanding of the World War II as time of profound and drastic change in the world institutions, visions and politics, should not mask the ground work that was laid. In Europe and in the United States, the men of the re-construction era were not "providential". They had worked together prior to the war, confronted their ideas and projects, they were able to develop them in its aftermath.

Reference List

Bowley, A. L. "Population and Births." *Economic Journal* (1924).

Bertillon, Jacques *Le problème de la dépopulation*, Armand Colin, Paris, 1897

Drouard, Alain. *Une Inconnue des Sciences Sociales - La Fondation Alexis Carrel*. Paris: Maison des Sciences de l'Homme, 1992.

Frejka, Thomas. "Long-Range Global Population Projections : Lessons Learned." *The Future Population of the World, What Can We Assume Today*. Ed. Wolfgang Lutz London: IIASA, Earthscan publications ltd, 1994.

Girard, Alain. *L'Institut National d'Etudes Démographiques - Histoire et Développement*. Paris: INED, 1986.

Glass, Douglas V. *The Struggle for Population*. Oxford: The Clarendon Press, 1936.

Hodgson, Dennis. "Demography as Social Science and Policy Science." *Population and Development Review* 9, no. 1 (1983): 1-34.

Kirk, Dudley, Princeton University, Office of Population Research, League of Nations, and Economic, Financial, and Transit Dept. *Europe's Population in the Interwar Years*. Series of League of Nations Publications, 1946. II. A.8. Geneva: League of Nations, 1946.

Kuczynski, Robert Rene. *The Measurement of Population Growth Methods and Results*. Text-Books of Social Biology, Ed. by Lancelot Hogben. New York: Oxford University Press, 1936.

Kuczynski, Robert René. *The Balance of Births and Deaths by Robert R. Kuczynski*. New York: The Macmillan Company, 1928-.

Landry, Adolphe. "La Démographie Pure." *Traité de Démographie*. 487-516. Paris: Payot, 1945.

Le Bras, Hervé. *L'Invention des Populations. Biologie, Idéologie et Politique*. Paris: Editions Odile Jacob, 2000.

Leybourne, G. C. "The Future Population of Britain." *Sociological Review*, no. April (1934).

Lorimer, Frank, League of Nations, and Economic, Financial, and Transit Dept. *The Population of the Soviet Union History and Prospects, by Frank Lorimer*. League of Nations. Series of Publications. II.

Economic and Financial. Geneva, League of Nations: 1946.

Notestein, Frank W. "Some Implications of Population Change for Post-War Europe." *Proceedings of the American Philosophical Society* 87, no. 2 (1943): 165-74.

Princeton University, Office of Population Research, and Frank W Notestein. *The Future Population of Europe and the Soviet Union Population Projections, 1940-1970*. League of Nations. Publications. II. Economic and Financial: Publications of the League of Nations, financial. 1944. II. A. 2. Geneva: League of Nations, 1944.

Sauvy, Alfred. "La Population Française jusqu'en 1956. Essai de Prévision Démographique." *Journal de la Société de Statistique de Paris*, no. 70 (1928): 321-29.

———. "Calculs Démographiques sur la Population Française jusqu'en 1980." *Journal de la Société de Statistique de Paris* (1932a): 319-47.

———. "Prévisions sur l'Avenir de la Population Française." *Journal de la Société de Statistique de Paris* (1932b).

———. "La Vitalité ou le Pouvoir D'Accroissement d'un Peuple. (Ch V) in L'Espèce Humaine (3° Partie). Le Point de Vue du Nombre." *Encyclopédie Française*, 8810-8816. Vol. VII. Paris: 1936.

———. "De la Prévision Démographique à la Prévision Économique." *Population*, no. 1 (1959): 89-104.

Spengler, Joseph J. *France Faces Depopulation : Postlude Edition, 1936-1976*. Durham, NC: Duke University Press, 1979.

Symonds, Richard, and Michael Carder. *The United Nations and the Population Question 1945-1970*. New York: McGraw Hill book compagny, 1973.

Szreter, Simon. "The Idea of Demographic Transition and the Study of Fertility Change: a Critical Intellectual History." *Population and Development Review* 19, no. 4 (1993): 659-701.