

NOTES AND DISCUSSION

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NEW TENDENCIES

IN ECONOMIC HISTORY

When I was at the lycée, I listened with passion to the lessons of my history professor and I eagerly enlarged upon his lessons by doing a great deal of reading. On the other hand, I disliked mathematics. For me, equations, theorems and logarithms were no more than cumbersome baggage for the historian I aspired to become. Worse than that, it was an obstacle which inevitably I had to surmount in order to obtain my *baccalauréat*. Having surmounted the obstacle, I symbolically sold my table of logarithms, for had I not freed myself forever of that which for too long had been a nightmare?... Now, about twelve years later, without my ever having deviated from my original course, I find myself once again confronted with mathematics. Of the same sort? Certainly not. What I am now confronted with is infinitely more complicated and beyond my comprehension as I lack the basis which I erstwhile ignored. What then has happened? Why

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is it that the historian that I became in the meantime now needs mathematics today?

MATHEMATICS AND HUMAN SCIENCES

The problem, evidently enough, concerns not only historians but it also does not concern all of them. It is the result of a tendency which seems to affect the whole of human sciences. The result of one tendency alone, in other words, of the direction of research, common to a whole group of disciplines. And yet it excludes neither traditional curiosity nor innovations of another type. This tendency is that of the quantification of observations made. "Quantification" here is to be considered in a general sense because it can define various operations which, in definitive terms, are extremely diverse.

It can be a way of classifying observations or a collection of facts in function, for example, of their frequency brought out statistically. Philologists and linguists make use of quantitative methods so as to give order to the phenomena or objects which they are considering, even when the matter upon which they are working is, by definition, of a qualitative order. The philologist, for example, can study the tradition of an ancient text by considering the "quantity" of variants presented by the manuscripts or the evolution of an author's style by the increasing or decreasing "quantities" of usage of a certain word, image or form. The archaeologist can analyze the production of pottery by studying the "quantity" of forms found on the gathered fragments.¹ But the tradition of texts, style and pottery are, in themselves, qualities and not quantities. It is the technique used by the man of knowledge which is quantitative. It is sufficiently so that in order to accelerate their work they conceived of using mechanographic or electronic classifiers.

But it is also possible that the object under analysis is in itself quantitative in that it can be measured according to a varying number of units. An economist, for example, studies the flux of goods and services which he can measure either in unitary terms

¹ Cf. the examples recently proposed here in this review by Dom J. Froger, "The Electronic Machine at the Service of Humanistic Studies," *Diogenes*, No. 52 (Winter 1965), pp. 104-142.

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or in function of their price or in consideration of still other factors. He is led to combine different measures in order to account for economic mechanisms. Thus he establishes formulae which he can sometimes present in graph form so that they are immediately intelligible. In theory, the measures are represented by literal expressions but these, in principle can easily be replaced by figures, countersigns of concrete, real, historic situations.

It is precisely before such concrete, calculable (if not calculated: that depends on the documentation) situations that the historian finds himself. At least this is true of the historian who is concerned with the integration of economic and social realities with a global explication of history. But this statement, which today is banal (nonetheless, was it so yesterday?), points up that which I must call, because in this way I conceive it, the ambiguity of the historian's position.

History, perhaps the most ancient of all sciences, is backed by a long tradition which is qualitative and hence descriptive. It always has been the science of the event, of the particular, of the individual, of the unique. For centuries people clung to telling about events, describing them, and in the best instances, explaining them according to links of causality with other previous or contemporary events. Certainly some people believed (right or wrong—this is not the question at hand) they had discovered the laws of history because they saw that certain kinds of events repeat themselves. But these laws remained purely qualitative in that they were based on comparisons between a small number of events linked by more or less evident analogies and not at all on rigorous statistical observation. Since the turn of the century, increasing use has been made of the laws discovered in related but more systematic disciplines: geography, psychology, sociology, ethnology, physical or social anthropology, political science. Large areas of historical research are still explored in this manner—not only in the field of the history of ideas or political history—and here there is no question of bringing action against these methods, all of which are useful.

In any case, “events” today have lost the privileged position they once occupied in the concerns of the historians. If many historians continue to devote the best of their erudite efforts to events, others have felt the need to go beyond them in order to

reach, as much as possible, a global but profound knowledge of the societies in which these events occurred. History at this point ceases to be a science of the individual and becomes a science of the collective. And since, on the other hand, it is thought that history should comprise the study of the movement which animates societies throughout time, long term,² it is no longer a science of the instant but of continuous time. Now, the study in depth of the ensembles which constituted societies, both large and small, with all the complexity of their structures and with their temporal dynamism, necessarily implies the need for some way of measuring. The number of individuals and the rhythm of development of populations (historic demography), the social tensions, the relationships of force on all levels, the modes and motivations of behavior, the resources that men dispose of and the manner in which they make use of them, etc. must be measured. Of course, these "measures" are not all quantitative. Theoretically they could be were it not for the fact that the existing documentation never allows one to go beyond making rough approximations. Nonetheless, the historian is called upon to effect such measurements and, combining them together, to propose some dynamic "models" by which he can give a more exact, more subtle and deeper account of the realities of the past.

It is precisely in the field of economic history where this need for measuring imposes itself most evidently. Economic history does not pursue its own ends. It is an integrating and, I believe, an essential part of history in general. This means that it has a part in the vast and unending exploration of the past through which each generation seeks to understand and affirm itself. Its limits are not precise because all in all there are no frontiers. There are no "special" histories as they are still called in certain higher teaching programs. If the aim of economic history is to expose the material incentives in the life of a society, those who dedicate themselves to it are well aware that these incentives cannot be disassociated from others, whatever be the links of causality which one can try to determine. (Obviously, here I am thinking of dialectic materialism). Hence, on the level of its

² Fernand Braudel, "Histoire et sciences sociales: La longue durée," in *Annales*, 13 (1958), pp. 725-753.

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aims, history is one. It is on the level of methods that the more striking distinctions intervene. Which is to say, on the level of the subjects which historians must know and consequently the methods.

Now, the “material” of economic history is of the type which lends itself to measurement, which indeed calls for it. Always, let it be understood, within the limits of the documentation available (but this is not always as deceiving as one would think). For this material is tangible, physically appreciable more often than not. If it is a question of people or of goods, theoretically they can be enumerated; if it is a question of services, of prices, of income they can be estimated in function of a monetary or other value. In practice, evidently it is not quite so easy and often it is even impossible. Later on I shall explain the dangers of confusing economic history with that which is sometimes called quantitative history. Nonetheless it is certain that it is based on measurement, on estimates of quantities, that it seeks to establish relationships between these quantities which tend to make its interpretations more far-reaching than the considerations of a purely qualitative history. For example, what strength can a description of a country’s industries and their development have if at the same time one neglects to consider the lowest level and the demographic movement of that country, the rate of production, its effect on sources of income, etc.? Other example—what difference does it make to know the nature of the merchandise exchanged at a great medieval fair if one does not have the slightest idea of its price, its quantity, the social importance of the clients, etc.? All of this requires not only the careful and critical setting-up of numerical series but also that an appropriate treatment be applied to these in order to give them meaning. It is here that mathematics intervene and not necessarily in its most elementary form. It is also at this point that up until present historians have almost always stopped, seized by fright, without means, faced with the difficulty of a science of which they know only the rudiments.

In truth, an economic historian is not directly confronted with pure mathematics. The problems he wishes to resolve require a form of mathematics which is applicable to economy. Hence it is by means of this other human science that today there is the

unexpected and yet natural meeting of history and mathematics.

Unexpected and yet natural? This paradox warrants some explanation which will take us to review rapidly the steps which led economic history to the conquest of its own methodological autonomy and its sometimes difficult relations with traditional history, on the one hand, and with economy on the other.

BETWEEN HISTORY AND ECONOMY

History, as we said above, is a very ancient science. If, however, one can call science that which was more of a literary and moral genre destined to exalt ethical values by means of edifying examples as well as patriotic sentiment by evoking ancestral traditions; history-object is an invention of positivism or of modern rationalism. Economy too, first a practical and "political" discipline, then was elevated to the level of science at the time of the "classics," from Adam Smith to Stuart Mill, contemporaries of the industrial revolution.

Thus history and economy are more or less contemporary in as much as they are the objects of scientific analysis. But if their birth attests to the same moment of social consciousness, to the same collective need to grasp the meaning of reality, they nevertheless developed independently. Historians and economists did not share the same spirit nor did they pursue the same objective.

Interest in economic history was stirred up in the second half of the 19th century. Certainly, there were earlier traces of some curiosity about the economies of the past, notably amongst the English mercantilists of the 17th and 18th centuries. But no continued interest was shown. It matters little at this point to establish whether the cause was the Marxist interpretation of history proposed after the *Communist Manifesto* of 1848 or if, more probably, it was caused by a sensitivity brought about by the profound transformations within industrial society and consequently animated by the need to know more about earlier economic conditions. The two explanations, on the other hand, do not exclude one another. What is certain is that economic history from the start underwent a parallel exploration by two types of men of knowledge whose main concerns were different and who, save a few rare exceptions, lived in total ignorance of

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the other. This amazing split was to endure for almost a century and it is not altogether healed today.

On one side there were the historians who were the result of the positivist tradition, and with them occasionally some jurists, who painstakingly uncovered and reported the facts or economic institutions they were describing. Backed by their solid erudition and the great art of historical criticism, they gathered together a mass of qualitative observations, much less frequently quantitative. Their publications remain precious for the first hand information they contain. But this information never goes beyond the stage of simple description. These men of learning, more honest than imaginative, never wanted, never thought to organize it with the intent of providing explanations. Above all, in each case, they did not seek to interpret it in the light of economic theory. But, on the other hand, could such a method have occurred to them? It would have been in contrast with a principle which no one doubted: that of the singularity, the uniqueness of facts, which cannot be made to fit into a common scheme, which cannot be part of the same pattern. History could not yet take or borrow from its neighbors, which were strange to it, any of their categories or attainments.

On the other side were economists who no longer found satisfaction in the rigorous and formalist abstraction of the classic school. They felt the need to base their speculations on more concrete matter. Lacking the instruments which would have enabled them to observe the present, they brought their attention to bear on the economic realities of a past period as close to theirs as possible if it was a question of the analysis of detail (this is true of the English economists) or upon as extended a period of time as possible if it was a question of synthetic generalizations (this is particularly true of German economists, from List to Bücher and to Sombart).

Is not the history of economic thought animated by dialectic movement? The school of history, at the same time of Marx, was reacting against the theoretical formalism of the classics. But soon, new generations of economists in their turn rose up against them. With Alfred Marshall, Pareto, and others still, and above all Keynes, economic science was seeking anew its course—but on a different basis and with other objectives in view—in a

theoretical conceptualization of the phenomena of which it was trying to take account. Already, within certain schools, a mathematical formalization had been put to use. Consequently economics committed itself to a very efficacious path no doubt, but which put it even further out of the reach of history with which no link had been established and no collaboration initiated.

Keyne's revolution of economics, in the '30s, revealed a real and profound *crise de conscience* among the economists faced with the discovery of their inability to foresee and then control the most formidable of crises of the industrial era. This crisis proved that the concepts used and above all the method of questioning usually adopted were inadequate for evaluating the situation and even more so for committing governments and those responsible for the economy to a policy which answered the needs of society. But the crisis, hard felt by all men and at all levels of activity, affected only economic structures and thought. The crisis had repercussions, and with what force, throughout the whole sector of science open to research on and reflections about man. It also developed a mentality, provoked a new curiosity. The life of men in society began to appear solidary in its different sectors and this discovery hastened the bringing together of scholars and disciplines which up until then had been strangers to one another.

The science of history could not escape from this basic movement of intellectual life. It too was revolutionized by Keynes, less spectacularly perhaps, but, I think, just as radically. For some historians—there were no more than a handful at first—felt the need to widen their exploration of the past, to seek explanations beyond the simple connection of causality between events, with which others continued to be content. They denounced that which has since been called “consequential” history, and they turned to other sciences, other methods, other ways of reasoning. In France, such were the ambitions of Marc Bloch, and perhaps even more, of Lucien Febvre—one a Medievalist and the other a specialist in the 16th century—historians by profession, that they made of the *Annales*,³ which they founded in Strasbourg in 1929, an instrument of encounter and interdisciplinary experien-

³ Today it is called *Annales. Economies — Sociétés — Civilisations*, a bi-monthly review by Fernand Braudel, Georges Friedman and Charles Morazé.

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ces. Others had preceded them along this path but only as isolated free-lancers. These two were the first to sustain the effort systematically and relentlessly. They did not impose their concept without fighting⁴ and, to be sure, they never imposed their concept entirely. But the modest initial working parties are today numerous troops and efficient historians who strive more than ever for the integration of human sciences to which their teachers gave the initial push.

Nevertheless, and obviously enough, this effort on the part of different disciplines to integrate and cooperate while each pursued its specific objectives could not remain unilateral. It was not to bear any fruit although it was met by a favorable echo, a convergent aspiration in the area solicited. Now, in economy, as we have said, such an aspiration justly ceased to exist. Economic science once again ceased to interest itself in concrete history which had not offered it material upon which to base a satisfactory reflection or construction and so it turned once again towards pure theoretic abstraction. Economic historians could concern themselves with economic analysis, examine it more or less pertinently. They were neither prepared to handle this instrument, nor—and this is more serious—capable of adapting it to the needs of historic interpretation in a manner which was of use to them. Economy, such as it was in the process of becoming, was no more for them than a mediocre prop, often illusory, sometimes even dangerous. Many a recent work of economic history, conscientiously elaborated and solidly documented, are invalidated by an unfortunate recourse to the theories and techniques of the economist who remained indifferent to these efforts. The sorcerer's apprentice could not count upon the help of his teacher.

Therefore it was necessary to wait. Wait for the end of a new oscillation when economic science became interested in the concrete observation of the past. The years of the war and the post-war evidently were not favorable to this long-delayed meeting of sister disciplines which could not take place but on an international level and outside of all ideological or scholastic confrontation.

⁴ Lucien Febvre, *Combats pour l'Histoire*, Paris, 1953 (a collection of earlier *Combats*).

Now, the encounter is finally coming about. Initiated five years ago, ten perhaps, certainly not sooner, we are living it today. The signs of it are numerous. In Stockholm in 1960, then in 1962 and 1965 international conferences of economic history gathered together historians and economists to discuss themes of common interest.⁵ At the time of the last conference, held in Munich, an international association of economic history was founded whose essential aim was precisely to facilitate and broaden these contacts. At the same time an increasing number of publications were devoted to the questions of method which arose because of the collaboration which developed as a result of this association.⁶ But the event is still too recent for us to be able to present a balance and judge the future beforehand. Except for the Anglo-Saxon experiences, which I shall deal with presently, the fruits of this union have not yet been gathered, and without doubt it will be necessary to wait for a few years because research in economic history is not improvised and neither the methods nor the problems are yet ripe. Full of hope, we are left in a state of uncertainty; and this uncertainty has provoked a *crise de conscience* among the economic historians which is expressed in specialized reviews in a series of debates in which partisans and adversaries of such a mixed up history confront one another. For the association of history with economy obliges us historians, if we wish to profit by it, to rethink (or even simply, to think out) our problems, our working methods; in one word, our profession.

This is so much the more true since the association has taken a turn which we had not foreseen. While economic science has been greatly enriched and refined, it has also become highly diversified, divided into many branches, which go back to very

⁵ The acts of these congresses constitute precious collections of contributions to this reunion: *Première Conférence internationale d'histoire économique, Stockholm MCMLX*, Paris, La Haye (Mouton) 1960. *Deuxième Conférence internationale d'histoire économique, Aix-en-Provence 1962*, Paris, La Haye 1962. The acts of the third Congress are being printed and preparations are being made for the fourth Congress in 1968.

⁶ Most often they are articles or groups of articles appearing in reviews. A few will be cited later on but here I wish to point out the significant contribution of Robert W. Fogel, "The Reunification of Economic History with Economic Theory," *American Economic Review*, LV (1965), pp. 82-98; and the special issue dedicated to the problems we are concerned with here published in the new Italian review, *Quaderni storici delle Marche*, Ancona (gennaio 1967).

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different modes of thought and formation. What we are most likely to come upon is less apt to be the whole of this science but rather one specific branch and perhaps the most audacious: econometrics, or more generally, that part of economics which puts into operation the most complicated mathematical techniques.⁷ Hence it is here that the historian refinds mathematics and discovers the utility which they can have for him. Our surprise and our confusion are great; yet there is nothing more logical: econometrics, as its name indicates, concerns the formulation of theoretic conceptualizations based on real measurements and dynamic models constructed on the basis of diachronic observations. Ever since, to pass from a given datum to concrete historic time, there is but one easy step (in theory) which only historic research can make because of the quantitative series it is in a position to set up, give work to the econometricist. In their own interest, econometers and historians must comprehend one another.

There is yet another reason why this encounter took place on the level of mathematics. It is because, in effect, this field, in the present state of science, has become the most efficacious instrument with which to try to resolve the two orders of problems which occupy particularly the economists and the historians, who up until now were on their own: that of economic fluctuation and above all, today, that of the phenomena of growth. For the first question the historians managed for better or for worse, interpreting in their own manner the old theories of cycles—without being in a position to judge precisely their value. But for the second, left to themselves, they were totally disarmed. Inversely, the economists could not approach the problem of growth nor judge the validity of the models which they worked out with no long-range perspective over various centuries which instead the historians could have laid out before him.⁸ Thus, faced with the reciprocal need of satisfaction, the joining of history

⁷ Cf. Jean-François Bergier and Luigi Solari, *Pour une méthodologie des sciences économiques. Deux leçons inaugurales*. (Histoire économique et économétrie), Genève 1965 (Public. de la Faculté des Sciences économiques et sociales de l'Université de Genève, vol. XVII).

⁸ Cf. for example Frédéric Mauro, "Towards an Intercontinental Model: European Overseas Expansion between 1500 and 1800," *Economic History Review*, 1967, p. 1-17.

and economy at last is coming into being and mathematics is the chemical agent. But nonetheless, all is not resolved.

HISTORY AND ECONOMY: OBJECTIVES

We have seen how economic history for a long time developed along two parallel but distinct lines: that of the historians and that of the economists. To a great extent, on the other hand, these developments continue at present because the reconciliation, the circumstances of which we have spoken of, has not yet involved all those working in this field. It is lacking. Thus divided, economic history could not have an autonomous existence, which is to say, it could not have a way of attacking problems and a methodology of its own. For economy it was but a school and for history a branch often considered marginal. In any case, it was not a science.

However, a certain development did take place and recently we have been able to determine that it began in the 30's and became well-defined around 1950. The field open to economic history broadened appreciably and the value and the dimension of the explanations it could bring to history and to economic structures became more evident. Certainly, it never detached itself from the general science of history, from that "total" history, "à part entière" which Lucien Febvre considered ideal and contributed to its recognition.⁹ It is not to be desired in the least that it should ever detach itself because it is an integrant part and ever so necessary to this total history and one contains no truth without the other. But would it not be precisely this development of economic history within general history¹⁰ which enabled it to gain its place as an autonomous discipline by means of a more clearly defined series of problems and an ensemble of methods of its own?

Evidently economic history will always occupy an intermediary position between history and economy. Its object is history and its subject is economics. It differs from economic science above

⁹ L. Febvre. *Pour une histoire à part entière*, Paris, 1962. The title of this posthumous collection of articles and essays is not his but it is in his spirit.

¹⁰ The number of works of economic history has not stopped growing, in proportion, in the course of the last fifteen years.

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all in that it lacks any normative intention. As a rule it does not mold any present or future action; at the most it might partially define the conditions. Recently an Anglo-Saxon historian of economy ably expressed this intermediary position defining present day economic history as a dialogue between certain types of facts and certain conceptual approaches.¹¹ An uncomfortable position which makes it difficult to perceive its limits and its nature. But which at the same time gives it its chance by giving it full liberty in its future choices. And is it not by assuming this congenital ambiguity that economic history can commit itself to ways that are truly new and effective? Enriched because of this double contribution, it must be careful to co-ordinate them and to maintain an equilibrium between them, strict condition of the original value of the results it promises. This synthesis, the realization of which has been within its grasp for such a brief time, will henceforward depend on the orientation which economic history will give to the problems which it approaches and to the choice of the methods it adopts.

It would be out of place here to make an inventory of the problems which, taking account of recent progress, were yesterday and are today favored by economic historians. They are too numerous and too diverse. Assuredly, the lines of force, the major tendencies, we say: the general sphere of problems, tend to break away, but the field is so vast and the wonders so manifold that it would in no way hinder to dwell upon them for a few pages in order to see them in their just light. May I be allowed to make only two observations on this subject, observations which are necessary if we are to judge the methods which we need.

The aim of economic history is to make sentient the economic realities of the past. Hence it must come to recognize them by studying the available documentation, written documentation above all, but also that which is revealed by archaeology (buildings, tools, equipment), numismatics, etc., and then it must explain them. This explanation at the same time is a function of the economic mechanisms proper to the phenomena being considered (the development of a bargain, the setting of a price, the increasing

¹¹ Paraphrased from Barry E. Supple, "Has the Early History of Developed Countries any Current Relevance?," *American Economic Review*, LV (1965), p. 101.

or decreasing demand for a product, etc.), and of the particular—and complex—social situations within which these phenomena are produced. Therefore, it is a double function and this duality is fundamental: for if the mechanisms can be formulated to aid the models (qualitative or quantitative) applicable to the same phenomena in distinct situations (another era, another place), it is not less true that the socio-historic conditions which are different in each case intervene in a decisive manner.¹² For example, the mechanism which presides over the determination of the price of grain on the market of any center of consumption could be applied in a series of cases, places, and at very different times, but each time one will have to take into account, in the utilization of the model, the variables proper to each situation (political and institutional conditions which exercise an influence on purchases, demographic and social structures, habits of consumption, local capacity of production). Hence, it is here, very precisely, that the distinct planes of economic analysis and historic analysis are again split and upon which the economic historian must learn to move simultaneously.

This having been said, economic history can lay claim to two objectives which at first glance seem very different. The first is the dynamic reconstruction of the past. The second, the seeking-out of the historic conditions of the present, which is to say, the lines of force which, with a continuous movement, lead history towards the actual. “To join the past to the actual with the same explanation,” is what Fernand Braudel¹³ proposed yesterday. But all in all, are these two objectives really different? Is not the reconstruction of part of the past, even distant, governed by the questions which are those of our time? Is history closed or is it well opened on the present, on the future? The intention which animates the historian, the meaning which he gives to his mission, are subjective and can vary. But his work and the value of the results he proposes depend on the methods of which he makes use.

¹² Cf. the related precise and pertinent comments of Witold Kula, “Alcuni aspetti della collaborazione fra storici ed economisti,” *Problemi storici della industrializzazione e dello sviluppo*, Urbino 1965 (Publ. dell’Università di Urbino, Serie di economia, vol. VI). This essay by the eminent Polish historian gave much direction to this present reflection.

¹³ *Annales*, 18 (1963), p. 103.

HISTORY AND MATHEMATICS: METHODS OR TECHNIQUES?

Here we are now confronted with the question of the methods of economic history. In the state of incertitude in which this discipline finds itself, having finally reached the cross-roads of history and economy, this question today dominates all others. Since it has been able to impose itself, tardily, in the last thirty years, economic history has wrought itself an apparatus of methods. Certainly this apparatus is not perfect, but it has given many proofs of its qualities, whatever those may think of it who led astray the ways of innovation.¹⁴ It is inspired above all by the solid principles of historical criticism but has expanded to other types of sources hitherto neglected, and among these, notably, the quantitative series. It calls upon a great deal of the knowledge and concepts of other sciences of man, indeed, of nature, but with the timidity and sometimes the awkwardness of neophytes which we have brought into relief in reference to economic science. Having had little experience, it has occurred that it questioned certain trends of thought that specialized research had long ago discarded.

Now today, the apparatus is again being questioned. In the conditions in which we have described it, economic science proposes to the historian the methods which it has forged and which call upon some very powerful intellectual and material means (perforated cards, electronic calculators), which are almost all based on the use of mathematics. It must be recognized: the possibilities thus offered are enormous. A whole series of problems, which one did not even pose oneself a few years ago simply because one did not know how to answer them or because the amount of work foreseen was disproportionate when compared with the results, have been resolved; others will be in the near future. So much so that at this moment nothing seems impossible, as long as one has the basic information.

I have chosen just a few examples from the works completed. A colleague, who is a statistician, and I, coded and transferred elements from a list of homes (families) made up in 1464 for

¹⁴ Cf. for example the ferocious, but a little gratuitous, opinion of Douglass C. North, "The State of Economic History," *American Economic Review*, LV (1965), pp. 86-91.

fiscal purposes which enabled us to analyze in great detail the population of Geneva in the middle of the 15th century in terms of its topographical distribution, its social and professional structure, etc.¹⁵ A study of earlier or slightly later lists conducted in the same manner would permit a dynamic approach to these characteristics. The same perforated cards enabled a French historian, Jean Delumeau, to study very closely the movement in the port of Saint-Malo between 1681 and 1720;¹⁶ and some Russian historians to clarify the structure of property and the rural exploitation of their country in the 19th century.¹⁷ In just a few minutes an electronic machine provided me with the annual rate of growth of the Swiss population since the middle of the last century which would have taken weeks to calculate on paper.¹⁸ Should one be astonished by this? In the United States the most spectacular proofs of these methods have been given. Some historico-mathematical studies have been conducted, combining the strength of techniques and theoretic subtlety, on the effect of the construction of canals and railroads on the growth of the American economy, on the economic feasibility of slavery, etc.¹⁹

Therefore it is incontestable that these absolutely new and largely revolutionary methods renew the possibilities of economic history because they throw into confusion most of the methods used in confronting problems (above all for the more recent periods where evidently the quantitative facts given are evidently more abundant). But it is not certain that at the same time they not bring with them serious dangers. The most serious of these has already made itself known: this is the temptation to confuse these methods with the aim itself of the science, to consider the means the end, to abandon oneself to the excitement of technicality. At this point it becomes abusive. If I ask that some

¹⁵ Jean-François Bergier and Luigi Solari, "Histoire et élaboration statistique. L'exemple de la population de Genève au XVe siècle," *Mélanges Antony Babel*, t. I, Genève 1963, pp. 197-225.

¹⁶ Jean Delumeau et collaborateurs, *Le mouvement du port de Saint-Malo, 1681-1720. Bilan statistique*, Paris 1966.

¹⁷ I. D. Koual'cenko and V. A. Ustinov, "Les calculateurs électroniques appliqués aux études historiques: la vie rurale en Russie au XIXe siècle," *Voprosy Istorii* (1964), translated in *Annales*, 20 (1965), pp. 1128-1149.

¹⁸ Research in progress.

¹⁹ Cf. the examples given by Robert Fogel, *art. cit.*

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limitations be set it is so that we may make full use of this instrument which has been given us. This means that we must also know its limitations. I am going to make an effort here to establish those limits giving two examples.

History that makes great use of mathematics is also called "quantitative history." Recently in France this expression has given way to a lively and stimulating polemic. In a series of publications²⁰ the economist Jean Marczewski has defined it as the retrospective calculation of the national product. This, in the eyes of the author, embraces all of the economic phenomena belonging to a State and its calculation would include all of the quantifiable elements of economic history. I will not put this concept to the test here,²¹ but it will escape no one's notice that it restricts the approach to problems and also time (such calculations are not possible if one goes beyond the 19th century; in any case they become extremely uncertain). Without denying the interest of such research, can one really accept to hold oneself to an economic history reduced to such a skeletal condition? Even if it is "quantitative" it covers an area which is singularly more vast!

The mathematical interpretation of history proposed by an enthusiastic and dynamic group of young American researchers is also ambitious but more stimulating because it does not restrict itself to a unique and global approach to solving problems.²² It proposes to answer some questions which the classic economic history was not able to resolve, by the construction of econometric models. It is a question, one can see, of the most advanced point of the encounter between history and the mathematics of economy.

²⁰ Many of these have been collected in one volume entitled *Introduction à l'histoire quantitative*, Genève 1965.

²¹ Cf. J.-F. Bergier, "Situazione e problemi attuali della storia economica," *Quaderni storici delle Marche*, 4 (gennaio 1967), pp. 5-22; and the criticism of two particularly qualified historians: Pierre Chaunu, "Histoire quantitative ou histoire sérielle," *Cahiers Vilfredo Pareto*, 3 (1964), pp. 165-176; and Pierre Vilar, "Pour une meilleure compréhension entre économistes et historiens. 'Histoire quantitative' ou économie rétrospective?," *Revue historique*, 233 (1965), pp. 293-312.

²² It was presented in 1964 during the annual conference of the *American Economic Association*. The reports presented on this occasion have been published in the *American Economic Review*, LV (1965). Many of them were reprinted in Italian in the number of *Quaderni storici delle Marche* which I have cited above.

It is more with retrospective econometry than with economic history that we have to deal or, to adapt the pleasant expression by which the researchers themselves have come to call their "new economic history", with "cliometrics". Although we still lack the proper perspective in order to judge it advisedly, the first results are very encouraging.²³ But the risks this research runs are as high as its high degree of technicality: that of neglecting the qualitative variables of the constructed models, the socio-historic context whose evidence we still recognize. Proofs and results will be falsed without possibility of going back. One of the most serious practical difficulties of the mathematical method lies justly in its irreversible mechanism. Basically it is the same problem which we have to contend with when preparing programs for mecanographic classification or for electronic calculation: if we make an error or forget one thing in working out the program or the code, we compromise the whole operation.

THE CONDITIONS NECESSARY FOR A RICH FUTURE

One can see that the difficulties and the dangers are real. But they can be surmounted and in any case must not discourage the historian from approaching these methods and from making good use of the best they have to offer. In order to master the very complicated techniques which he does not know or which he knows badly, he will associate himself with the economist, the econometer, the statistician, the mathematician: many rich perspectives open before an interdisciplinary collaboration, before the work of a team to which each brings his own gifts and the knowledge which he has but which are necessary to the whole. But the results which one rightfully can contemplate, are they not worth the sacrifice of the traditional individualism of the historian?

In this perspective, it is no longer a question of the new methods substituting the old. Instead is it a question of methods or, more exactly, of an ensemble of intellectual techniques which allow a new approach to problems? The methodological renewal lies in the implementation of equal techniques in their adaptation

²³ Cf. R. Fogel, *art. cit.*

Notes and Discussion

to the specific needs of history. But this will nonetheless need to call upon all the classical experience of the historian whose role is to create harmony in this meeting of all these methods and all these techniques. Not one historian will be too many for this effort.

The contact of techniques, also the contact of imaginative beings who handle them. In history, as in all other sciences, the imagination is an indispensable quality of the researcher. The leading man of the American "new economic history," Douglass North, himself, has denounced certain failings of his colleagues who thought that econometric techniques, computers and all of the unbending apparatus that goes with them replaced imagination...

And this appeal to the imagination, does it not lead us back to the plane of the qualitative, which is to say, man? For it is man, or better, men in their relations with society, who remain and always will remain the unique subject of history. These men, actors of events, objects of phenomena, whose fine mechanisms we shall dismantle in vain unless we then reassemble them in order to reanimate the past. We shall exhumate uselessly cadavers if we know not how to make them relive.

What do mathematical models and formulae, columns of figures and graphs mean if we are no longer sensitive to all the life which they so poorly represent, but which they represent nonetheless in the total of suffering and joy, hopes, and delusions which they bear? All this is beyond all technique, all calculation. It is within the competence of imagination and sensitivity. The historian, even if he flirts with mathematics for the better future of his science, is not very different from a poet.