

Motto :
βραχύς ὁ βίος, μακρὰ ἡ τέχνη,
σφαλερὴ δὲ ἡ κρίσις.

THE LIMITATIONS OF ECONOMIC SCIENCE

BY

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The science of Economics has never had a very good reputation and the sight of economists quarrelling over the problem of the day and holding all shades of opinion from the darkest black to the shiniest white is a common one. It suffices to refer to the disputes over the pound sterling in which British economists are engaged at present: ⁽¹⁾ equally wellknown and erudite names maintain simultaneously that (a) sterling is overvalued, (b) it is undervalued, (c) its value is "just about right". Supposing that the three opinions are represented by about equal number of economists, it is obvious that two thirds of them must be wrong.

Ever since the inception of the science, this has been the lot of economists, so that Jean Baptiste Say bitterly remarked already at the beginning of last Century: "Il semble quelquefois que les économistes politiques écrivent uniquement pour se convertir les uns les autres ou pour se prouver réciproquement qu'ils ont tort" ⁽²⁾.

A few examples from recent history, not so much of quarrels as of statements by the most informed economists that proved to be utterly wrong, will perhaps serve to illustrate the limitations of our know ledge in this field.

In accordance with the prevalent theories of the day, the Federal Reserve Banks applied from 1923 onwards the so-called open market policy in an effort to stabilise business conditions in the U.S.A. The policy was found to be effective and became a matter of routine. A commentator described it as follows:

(1) Written before the recent devaluation.

(2) *Cours Complet d'Economie Politique*, 7e éd., Bruxelles, 1844, p. 22.

“From early 1923 onward, every appearance of a tendency toward excessive expansion in production of materials or excessive elevation in commodity prices or speculative activity has been countered by a tightening of the credit market; and, on the other hand, every appearance of a tendency toward extension of a business recession into veritable depression has been countered by an easing in the credit market”.

After testing the policy for a few more years, the Federal Reserve Board summed up its effects in February 1929 by saying:

“The United States have during the last six years experienced a most remarkable run of economic activity and productivity... Among the factors which have contributed to this result, an important place must be assigned to the operation of our credit system and notably to the steady influence and moderating policies of the Federal Reserve System”.

And (the then) Secretary Hoover seconded this opinion:

“In large measure this (the prosperity without violent fluctuations) has been due to greater knowledge of the current facts of business and a growing experience in utilizing this knowledge”.

The Report on the subject by Prof. Warren M. Persons at the Congress of the International Statistical Institute, which met in Warsaw at the end of August 1929, conveyed to all participants the impression that economic crises have been done with in the U.S.A. for ever. The crash occurred just one month later.

Thus the “greater knowledge” led U.S. business straight into the crisis of 1929 and the depression of the 30'ies, unheard of in violence and duration, which swept away Mr. Hoover himself and replaced the established rules by a “new deal” based on entirely different principles and theories, some of which to-day in different circumstances are being again reconsidered and will be eventually thrown on the growing rubbish heap of discarded ideas.

After the 1929 crash on the New York Stock Exchange Lord (then Mr.) Keynes gave it as his opinion that the New York slump would benefit the world. Credit would be freed for industry, and commodity prices would recover, the farmers would find themselves in better shape. “We don't expect any serious direct consequences from the Wall Street slump... On the other hand we find the longer

look ahead decidedly encouraging... What is happening is a bull point for world prosperity" (quoted from: F.W. Hirst: *Wall Street and Lombard Street*, Macmillan, 1931). And another world-famous economist, Prof. Irving Fisher, declared on the 15th October 1929, when the precipitous fall of security markets had already lasted for three weeks and all the signs of a general economic crisis were fully in evidence, that "the Stock prices were on what looks like a permanently high plateau" and that he expected "to see the stock market a good deal higher than it is to-day within a few months" (id.).

Years later Keynes still insisted that the boom of 1929 could have continued unabated, if a policy recommended by him had been adhered to⁽¹⁾.

A delegation of world-famous experts was studying the problem of gold for the Financial Committee of the League of Nations and obtained two slightly differing forecasts of world production of gold in the future. According to both gold production should have fallen between 1930-1940 by approximately 15%. In actual fact it was more than doubled: — as a result, of course, of the devaluation of currencies, which had not entered into the experts' calculations.

Simultaneously with this forecast the following diagnosis was given by Mr. Hawtrey on the gold position of the Bank of England: "The fact is that this country (the U.K.) has a redundancy of gold, and we ought to take steps to get rid of more of it. We ought to be extremely grateful to those two countries, to the United States and France, which have been good enough to absorb hundreds and hundreds of millions of gold, at enormous expense to themselves"⁽²⁾. Seven months later the Bank of England and the British Government had to borrow from France, in an effort, which proved vain, to maintain Britain on the gold bullion standard.

It is perhaps indicative of this Brain Trust on gold comprising the names of 45 most prominent bankers and economists in the U.K., that while they were discussing in the shadow of the approaching storm, one cannot discover in the discussions even a remote allusion to the possibility of the world, or the U.K. in particular, going off

(1) *General Theory*, p. 322.

(2) *The International Gold Problem*. A record of the discussions of a Study group of Members of the Royal Institute of International Affairs 1929-1931. Oxford University Press, 1931, p. 207.

gold. Obviously nobody ever thought this to be possible. A year later, however, the authoritative economic opinion in the U.K. was: "Never again the slavery of the gold standard!"

The eminent French economist Prof. Rist, basing himself on some temporary cross-currents, declared in 1931:

"The mal-distribution of gold between continents which was such a conspicuous fact of the first five years of the last decade is now a thing of the past". To-day we know that the "thing" really was at its *beginning*. In 1930 two British economists — Gregory and Robertson — declared the desirable behaviour of prices most favourable to society to be their gradual fall. The conclusion was evidently forced on them by the singular behaviour of prices in the U.S.A. during the 1924-1929 boom. They knew, of course, that the actual movement of prices, whether desirable or not, has a marked secular tendency upwards, especially conspicuous during the periods of accelerated economic progress. But the suggestive force of recent events was obviously irresistible.

In a posthumous article the late Lord Keynes summarised his opinion about the possible scarcity of dollars in the world:

"The chances of the dollar becoming dangerously scarce in the course of the next five to ten years are not very high. I found some American authorities thinking it at least as likely that America will lose gold in the early future as that she will gain a significant quantity". This was printed in June 1946, and a year later the U.K. had exhausted her dollar loan which was supposed to last until she had reconverted and reorganised her economy. Still a year later the U.K. and the Western countries of Europe were again dependent on U.S.A. aid, tentatively for four years.

To divert to another subject. It is perhaps not so well known in the West that a dispute was raging in the 1890ies and in the first years of the 20th Century between the Russian marxists and socialist-revolutionaries about the destinies of the peasant. The socialist-revolutionaries thought, and were even quoting a text from Marx in support, that it was not necessary for Russia to repeat the capitalist stage of the evolution as had been observed in the West, and that in the coming revolution it would be possible by proper efforts to jump directly from semi-feudalism into socialism. Their hope was mainly based on the idea that Russia had 100 million or so of peasants still living in condi-

tions of primitive communism, and that with a proper guidance from enlightened socialists it would be possible to transform the peasant communes into modern communist communities "without boiling the peasant first in the factory boiler". This attitude of the socialist-revolutionaries was brandished by the Marxists as reactionary and idealistic (idealism, it will be remembered, has still remained the greatest sin of which a socialist can be accused in Moscow) and a flood of the usual abuse directed at those "utopists". Between bitter polemics scientific books were written by the leaders of both sides to prove the case. Lenin himself produced a rather dull one on the "Development of capitalism in Russia" in which he accumulated with uncanny diligence every bit of evidence ever printed by any author or public authority which would prove that in Russia, as of course everywhere else in the world, the process of concentration and centralisation of capital both in industry and agriculture was moving in its unavoidable orbit prescribed by Marx, and that, specifically, the poor peasant was growing poorer, losing his cattle and land and moving to the industrial centres, while the "kulaks" were amassing the land in their hands. This was the "historical progressive mission of capitalism" ⁽¹⁾. This attitude to capitalism was upheld by the Marxists of both wings (Bolsheviks and Mensheviks) up to the revolution of 1917 which was always considered and declared to be a bourgeois revolution. When in 1905/6 Trotski (who professed to be neither bolshevik nor menshevik) began his incessant repetition in every speech that this revolution, although not itself a social revolution, will continue as such, being by its nature a "permanent revolution", he was ridiculed by his friends from the left as well as from the right, and the "straight party line" of Lenin continued to be directed towards a bourgeois revolution. The attitude of the bolshevik party suddenly changed in the summer of 1917, when it was realised by Lenin that in the state of decomposition of power that was proceeding under the slogans of democracy, he would inherit the power who succeeded in organizing an armed force. With Trotsky's cooperation this force was organised under the pretext that it was proletarian, while in actual fact it was recruited from all possible elements of the Tsar's decomposing army with the help of professional organizers of the Bolshevik party who had dismissed as "reactionary" the democratic methods of other parties. This military

(1) Vladimir Ilyn (Lenin): *The development of capitalism in Russia*, St. Petersburg, 1899 p. 475; in Russian.

junta of which the chief leader was Trotski, seized power and declared the aim of the revolution to be socialism, contrary to all theories professed thus far by the leaders, and especially by Stalin.

When Stalin gained power in this junta, he gradually liquidated the "idealists" from the right and the left, including the socialist-revolutionaries of whom some had been trying to cooperate with the Bosheviks to the last : a socialist-revolutionary N.P. Oganovsky was occupying the post of assistant commissar of agriculture right down to the beginning of the first 5-years plan. In the course of this liquidation suddenly the idea of a communist from Odessa, according to which the peasantry should be organised in collective farms, appealed to Stalin and was declared the Straight Party Line. As a result of this ideological switch, the peasantry lost their own lands as well as those of the big estates of which they had gained possession during the period of militant communism. The good days of the NEP during which the peasants had been more or less left to their own initiative, terminated suddenly and millions of peasants resisting the forcible collectivisation were declared kulaks and liquidated either on spot or in the Siberian working camps.

Whatever else can be said of a collective farm, it is clearly an exact copy of the socialist-revolutionary idealistic dreams enforced on the peasantry by the brute force of communists. Thus all those innumerable bolsheviks whose confession of faith was the "differentiation of the village" — its decomposition into capitalist farmers and their proletarian workmen — proved to be wrong in their predictions, including Lenin himself. And it was the Bolsheviks themselves who by the irony of history, turned out to be the tools for carrying out the "ideaistic reactionary dream" of the socialists-revolutionaries.

* * *

An attentive student of economic opinions will find them very much influenced by current experience, with an admixture of wishful thinking especially with regard to the future. Opinions of the last generation are obsolete to-day, but may again come into vogue as conditions change, and more fundamental changes may bring to the surface ideas and opinions which were considered dead and buried for centuries. Some modern writings on questions of the balance of payments would do honour to any mercantilist of the 17th Century, and the modern practice would have been handled as well, if not better,

by a Colbert. The optimism and hopefulness of nascent capitalism reflected by Adam Smith turned at the beginning of 19th Century into the cruel and cold logic of Ricardo and the pessimism of Malthus corresponding to the miseries of the period. In turn they were gradually replaced by the panegyrics of the so-called vulga economists. The Marxian system with its law of wages and the theory of the Zusammenbruch was born from the ravages of the crisis of 1850'ies. And the so called Keynes "revolution" in economics, which took place in 1930'ies as a result of the depression, is a recent example. Needless to say that we are at present already living under the sign of a reaction against this revolution...

It is not intended here to discredit the profession of economist; our only aim is to stress the limitations of the science. Economics deals with the material relations existing between different individuals. The subject, therefore, is both vast and intricate, and an approach to any economic problem will result in incomplete observations and necessarily vague conclusions. From the first classic days a way out has been found in substituting an abstract "homo oeconomicus" for the actual individual, and instead of studying actual relationships, constructing "models". The "model economy" has again come much into vogue recently and the whole "Keynesian revolution" has been fought mainly on models or abstractions going to such lengths that the whole economic progress in the U.S.A. has been ascribed to continuous errors of judgment on the part of the entrepreneurs! (Keynes in the "General Theory").

The conflict with the theoretical actions of the "homo oeconomicus" and the irrational and unaccountable behaviour of real human beings is the source of most miscalculations of the economists. The wartime planning experience in the U.S.A. justified a forecast of 8 mill. unemployed, within 6 months of the cessation of hostilities. The actual entrepreneurs behaved otherwise and less than 3 million unemployed resulted.

In a certain country the granting of the match monopoly to a foreign concern halved the consumption of matches, although the prices, and the boxes remained the same. How many finance ministers have had the bitter experience of an increased tax yielding less than the lower one previously in force! Such and similar experiences are the demonstrations of the "irrational" behaviour of the masses, i.e., of real humans acting otherwise than the theoretical homo oeconomicus.

When turning to the study of economic realities, the economist meets another set of difficulties: he is himself a member of the society, his relations with other members an object of his own study. It is difficult for him, if not impossible, to detach himself of the environmental influences and interests, and this is another source of his errors. Many cotton exporters in Alexandria, for instance, believe that the local cotton industry is detrimental to Egypt. Banking and stock exchange experts usually exaggerate the importance of monetary factor in the economy, and the opinion of the great economist belonging to the class of Prussian estate-owners (junkers) — Rodbertus-Jagetzow — that the greatest social problem of his day was the indebtedness of landed property, is well known to all students.

An objective approach should be possible, however, and if errors were due only to the above reason, economics would be as exact a science as physics, where prejudice, private interest and futile abstractions (there!) have played perhaps as big a role as in economics.

What the economist lacks, when trying to study realities, are efficient tools. His averages are mere conventions. A price index, even if based on hundreds of commodities, is only a remote reflection of existing actual price relationships which are observable one by one, but not measurable in their aggregate and rarely comparable in time for longer periods. The present-day free, grey or black markets escape reliable observation by their very definition. And what is an economist to do with his neat theories of monopolistic prices when he finds that the semi-monopolistic car producers, or for that matter the producers of steel, are fighting the grey markets in their products where much higher prices are charged and paid? What about the ingenious marginal curves adorning the textbooks on the subject of prices, if everyday observations rarely, if ever, disclose their applicability?

A most recent and widely used British textbook of economics derives its curves from the transactions with tots of rum and cigarettes among the soldiers of a regiment. It is easy to see what an enormous oversimplification this represents over even a humble country-town market where farmers exchange the multitude of their produce against the necessities of the farm and its people. What has the imaginary rum-cigarette in common with the intricate price formation processes of, say, cotton in Alexandria, dependent on multiple worldwide influences having in most cases no similarity whatever with the valuation pro-

cesses in the brain of the imaginary soldier contemplating a deal in a tot of rum against 5 cigarettes.

Only a little reflection is needed to realise, for instance, that the *cost of living* — another quantity which the economist is dealing with — is different for each individual. It depends as much on changes in his income as on changes in prices, and on his consumptive habit. Thus to obtain a notion of the average cost of living, one should start compiling it for each individual, considering in each case at least the three factors mentioned and then averaging these individual indices. The Egyptian cost of living index purports to be an index of the cost of living of workmen's families for different salary classes in Cairo, and it throws only a very dim light on the general subject of the cost of living in Egypt. The relation between the cost of living index of a workman and that of a bank employee, for example, is as that between the Nilometer readings at Rodah and the level of the Nile at Assuan. Keynes himself went still further and declared that price and other such indices are similar to the statement that Queen Victoria was a better queen but not a happier woman than Queen Elisabeth — "a proposition not without meaning... but unsuitable as material for differential calculus". (General Theory, p. 40) This did not prevent him from basing his theories on differential equations between these very quantities.

There is a close similarity between economics and physics in the matter of observations and it is perhaps not without interest to enquire what is the physicist doing in similar circumstances. Modern physics is based on the law of great numbers. But the physicist is much luckier about the greatness of the numbers, and so it comes about that his statements based on this law are exact beyond the degree the phenomena can be measured. "Mean values, most probable values, all values that occur with non-vanishing probability — all become the same thing" (Schrödinger) — in statistical thermodynamics, but not in economics. As soon as the physicist comes down to such numbers where his measurements are not sharp enough, or where he is unable to follow up the events, he has found a simple solution : he declares that in these circumstances the law of causality does not apply. He does not attempt, for instance, to follow and ascertain the individual causes of the brownian movement performed by an observable particle under his microscope, and his observations of the path of such a particle are limited to fixing its positions at certain observable mo-

ments, no matter what it did in the meantime. The laws of such movement are established for millions of particles and not for one.

If the physicist observes a certain line in the spectre, he knows that it is caused by the oscillation of electrons in an atom millions of times per second, but these movements, being incapable of further analysis, are considered to be outside the scope of causality. On the other hand, he is so sure that a brick dropped will fall on the ground as one can be sure that a monkey put behind a typewriter and typing in a hazardous way will not produce the text of the Official Gazette for the next year, as Borel has put it.

Now, it appears that not only is the economist very often facing observational data similar to those that in physics are considered to be outside the law of causality, but economists bravely attempt to establish their "laws" on the basis of such observations. There is, for instance, the "quantity theory of money" which is rather nicely proved in cases of exceptional inflation. How, and to what degree is it applicable to current observations in normal times? For a reply the reader may scrutinize the graph Nr. 1 representing the monthly movement of wholesale prices in Egypt from August 1934 to August 1939 as a function of monetary circulation.

Nobody can extract any law from these erratic movements and the end points of the zig-zag course of the price curve actually show that within the three years under review the increase in circulation (the abscissa) brought about a *reduction* in prices (the ordinate). The curve is surprisingly similar to the curve of the brownian movement of a particle shown in graph nr. 2.

One can, therefore, confidently assert that the causality in both cases was more or less of a similar nature and, that any attempt to predict the prices on the basis of the possible movements of the circulation would have been as hopeless as a prediction of the movement of the particle concerned. If there is a constant force acting on the particles, they will move on the average in a certain direction in a zig-zag way. It is the same with prices: if there is a strong force (inflation) dragging them in one direction, they *may* move in this direction on the average but the movement at any given moment is unpredictable. The comparison is defective in the sense that the price index is already a calculated average, and the haphazard movements of individual prices have already been eliminated. Individual prices would have moved in a still more hazardous way.

In physics there exists a "law" for the brownian movement, which is, that the particles on the average will drift away from their point of departure at a rate shown by a formula devised by Einstein. The physicists are satisfied with this. What, if an economist came with the discovery that the price level as a function of monetary circulation tends to drift away from its original position and that the distance tends to increase with time?

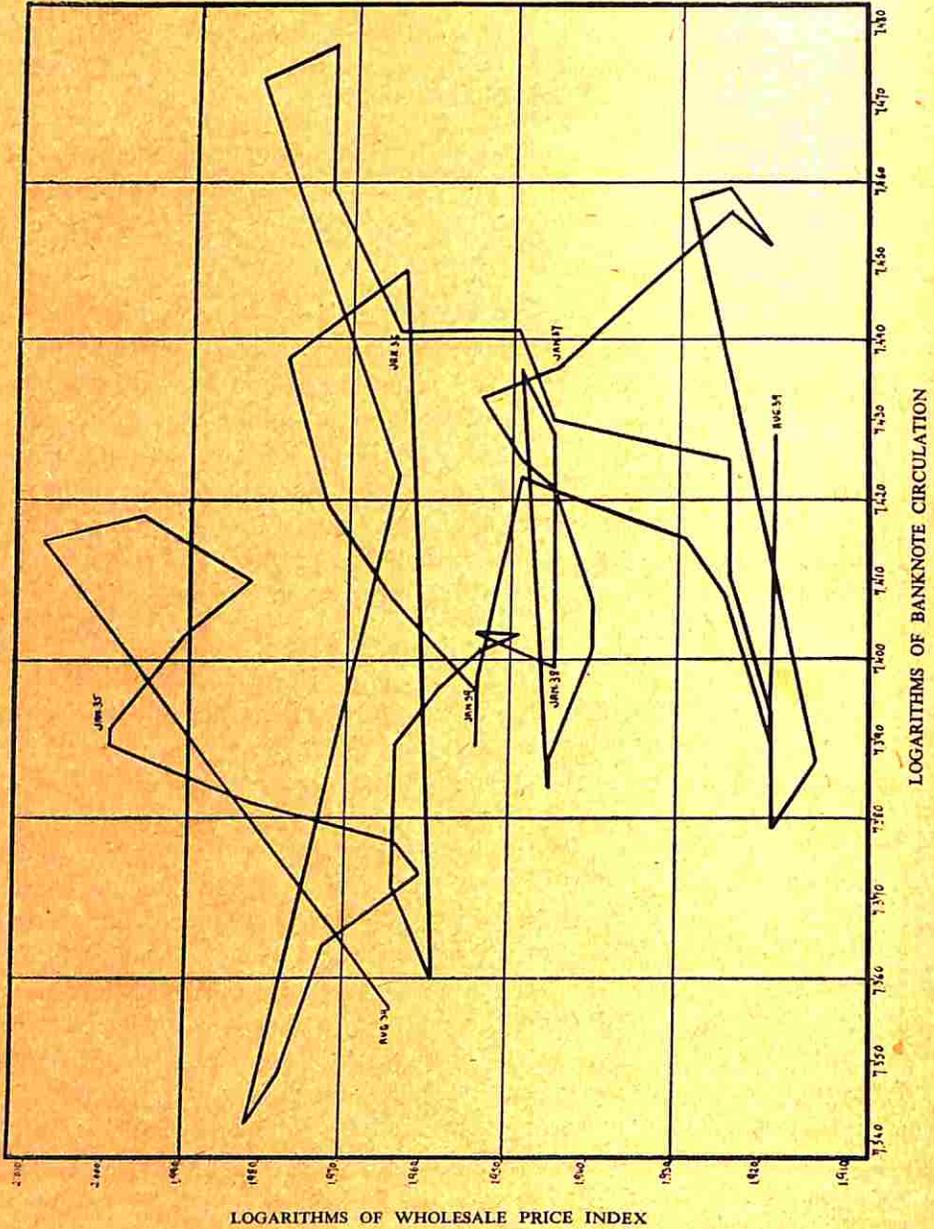
Thus we see that much more is expected from an economist than from a physicist in similar circumstances, and economists have, perhaps, been optimistic enough in attempting to comply with the expectation.

It cannot be overstressed that economic facts are nothing more than the reflection of the relationships between human beings and thus the only factors in the picture to be studied are human volitions and actions. This discloses all the difficulties and all the hazards of economic forecasting. If an individual is supposed to act rationally from his own point of view, the masses never act so, and thus all theories based on the concept of the homo oeconomicus — or any other such abstraction — are not applicable in practice, and all "model" constructions have sense mainly as exercises in logic and dialectics.

When devising his observational apparatus the economist is in a much worse position than is, e.g., the physicist. His observations are limited and never complete. What the physicist calls "uncertainty" in his microcosmic measurements acquires for the economist an enormous importance and overshadows often the very measurements themselves. If he observes the working of the Stock Exchange, he shall see a comparatively small number of speculators who are continuously changing their attitude from day to day or even from hour to hour. They cannot be all "bulls" at the same time, there must be some who think it time to sell a particular security and at the same time there are others who believe the contrary, for a transaction must have two parties. Thus the attitude of those actively dealing on a stock exchange is changing, at a varying speed, between the two poles, while the great mass of people behave as neutrals. There is no law of great numbers in this case and the whole process is hardly observable. This is why those who study the movements on the stock exchange by means of graphs and index numbers are usually the ones most surprised when a break occurs.

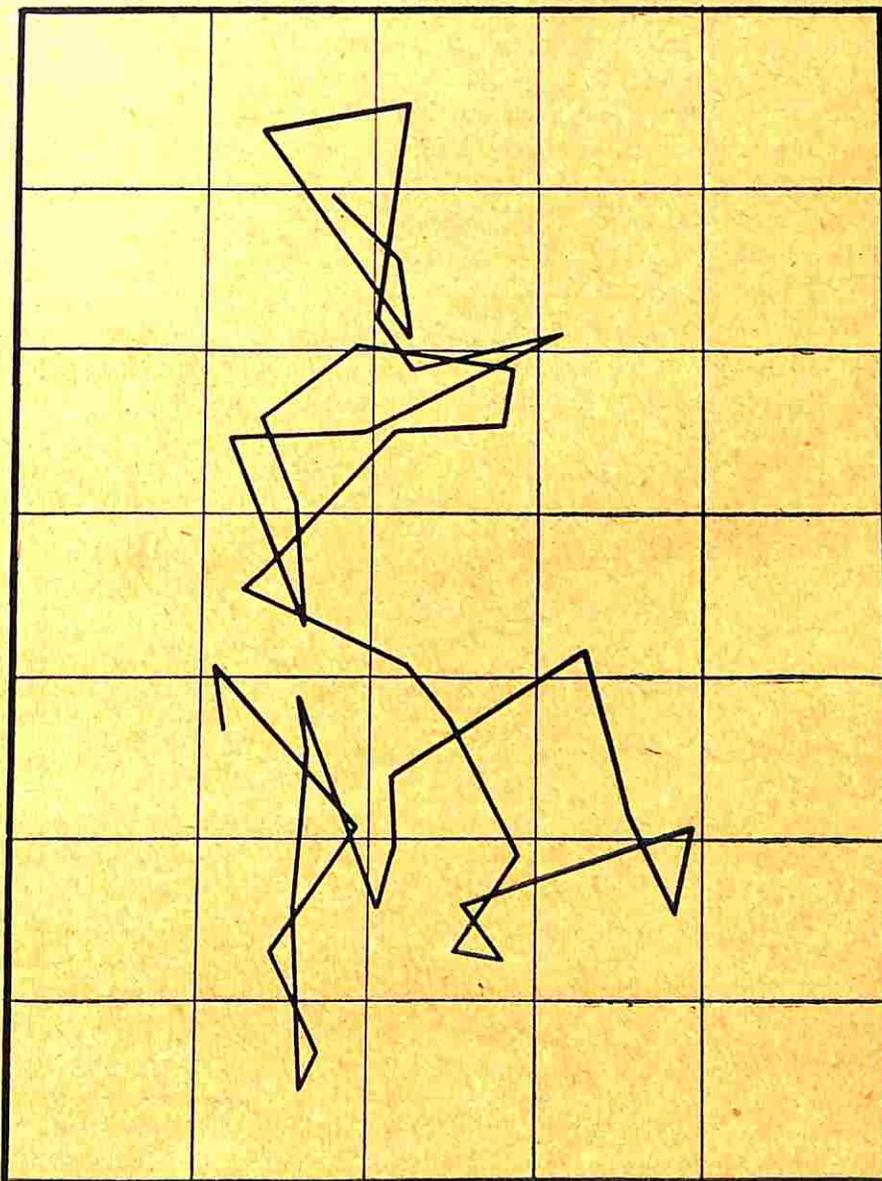
GRAPH. NO. 1

Movement of prices in Egypt as a function of banknote circulation.
Positions at the end of each month have been connected by as continuous line.
Logarithmic scale both ways,



GRAPH. NO. 2

Brownian movement of a small particle. Positions at the end of each second.
(the side of each square = 3.125μ ($\mu = \frac{\text{mm}}{0.001}$)^(*))



(*) Reproduced from Jean Perrin: *Les atomes*, p.112, with kind permission of the "Presses Universitaires de France", Paris.

One can not expect from the economist more than is expected say, from a doctor. The diagnosis of the latter based on symptomatic evidence may miss the point widely, and the patient may react to the treatment differently from what the doctor expected. But the more knowledge and experience he has, the higher will be the chances of a correct diagnosis and treatment; and so is the case with the economist — except that the body economic is infinitely more complex than the body physical, and consequently the diagnosis is more difficult. But the duty of the economist is there: he must study “what is”, and be always conscious of the capacity of his tools when entering the field of “what should or will be”.

And he must be ready to admit unequivocally his errors whenever proved. The knowledge that all his judgements are afflicted with a high probable error should save him the feeling of humiliation. He will be forgiven his misjudgments, if not due to faulty logic.

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