Foreword
MONIAC: A Clever Invention Celebrated by Remarkable Scientists

by Alberto Quadrio Curzio

This Special Issue of *Economia Politica. Journal of Analytical and Institutional Economics* celebrates the 60th Anniversary of MONIAC (Monetary National Income Analogue Computer), the hydraulic computer built by a remarkably original and creative economist, A.W.H. Phillips. The reader will appreciate, through the contributions by distinguished scholars, how Phillips's work deeply influenced the macroeconomic debate over many decades.

My foreword to this Special Issue is devoted to thanking those who conceived the idea and put it in place.

First of all I wish to address my warm thanks to Professor Kumaraswamy Vela Velupillai who had the initial idea and organized an international Conference at the University of Trento. The engagement of Prof. Velupillai in planning the conference and editing, then publishing, this special issue deserves my uppermost appreciation. Without his devotion to this initiative it would have been impossible to reach the result of this special issue. All this took up quite a lot of time and scientific attention as Prof. Velupillai had continuous mail correspondence with the speakers and the authors of the essays on this special issue (which had the usual referee process made by a remarkable group of the Associate Editors of *Economia Politica*). Everything was planned carefully and therefore I am totally satisfied with the work done and I am pretty sure that the authors and the readers will share my opinion too. While preparing this special issue I had also the privilege of getting a deeper knowledge of Professor Velupillai's excellent works in a number of fields of economic analysis combined with his noble attitude to remember scientists who gave fundamental contributions in the past even though nowadays they are not celebrated within the mainstream economics.

A brief example of what is said is given by his «Background Note» of the Introductory Essay «Celebrating the MONIAC. The ways of serendipity»[1] by

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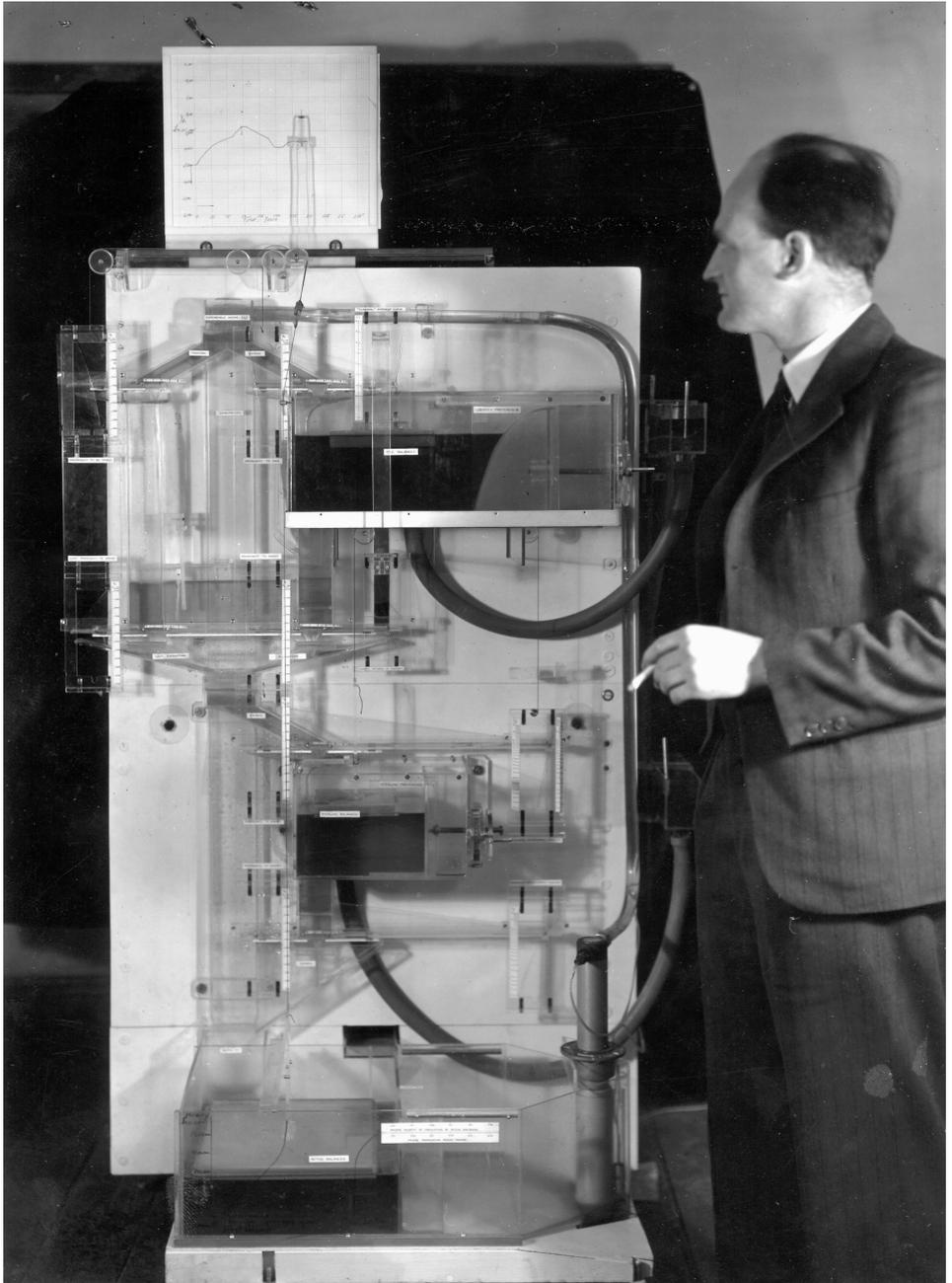[1] To this essay we address the reader for the bibliographical references to the authors mentioned onwards.

Fɪɢ. 1. Phillips with his machine in 1950.

Giovanni Pegoretti, K. Vela Velupillai and Stefano Zambelli, published in this issue. From this Background Note let us pick up this statement.

My return [i.e that of K. Vela Velupillai] to Trento, permanently, in September 2008, coincided, happily, with the arrival, also permanently (as these things are measured in the academic world), of my friend Stefano Zambelli as a permanent Professor in the department of economics at this University. One of the first intellectual pursuits that we revived, after a lapse of almost a decade and a half, was our investigation into the theoretical and computable conundrums of the dynamics of coupled oscillators. We knew, by instruction and from the early work of our common maestro, Richard Goodwin (for example, Goodwin, 1947), that such systems, even if linear, pose intractable theoretical and computational problems, none of which had been resolved by analytical means over the more than a century since Poincaré's pioneering works that introduced new methods and visions for dynamical systems. We had studied, not very systematically till that time, the conundrums and paradoxes posed by, and emerging from, the famous simulational experiments carried out by Enrico Fermi, Stanislaw Ulam and John Pasta (Fermi - Pasta - Ulam, 1955).

In preparing to begin re-thinking and revising our interest in studying, theoretically, computationally and simulationally, the mysterious dynamics of coupled oscillators, we had to put some order into our own mislaid manuscripts of past joint work and, more importantly, to «unearth» our collections of the classic works on the subject, essentially those by the pioneers.

This archival and «archaeological excavation» process, pleasurable though it was, brought back painful, melancholy, memories of times shared with Richard Goodwin, in discussing his lost and thoroughly neglected works on coupled market dynamics, analogue computing in general interdependent economic systems, nonlinear dynamics and, most importantly, his simulation experiments of coupled dynamics using two coupled Phillips Machines (Goodwin, 2000) [...]

Unknown, naturally, to them, again on this side of the Atlantic, Richard Goodwin and A.W.H Phillips were experimenting with coupled economic systems, using the machine the latter had constructed for studying aggregative Keynesian monetary dynamics, informed – largely – by the kind of macrodynamical models built by the former (Goodwin, 1991). Their simulations of coupled, dynamic, linear economic systems, were based on the model developed by Goodwin for coupled market dynamics, in 1947, where, without realising it, he had discovered what eventually came to be called the «quasi-periodic paradox» in nonlinear dynamics (cf. Abraham, 1985).

This statement of the Introductory Note brings us to Professors Giovanni Pegoretti and Stefano Zambelli who collaborated with Prof. Velupillai especially in the organization of the international conference. Their role was also of fundamental importance because it would have been impossible to convey to Trento so many distinguished scholars without the full support of the local University. On this occasion Pegoretti and I remembered that Prof. Nino Andreatta, one of the founder of the University of Trento, had a certain interest in his early work in MONIAC, probably because he practiced with it when he was a research student at the Cambridge University. I had also the pleasure to remember that Professor Andreatta appointed me in the year

1974 as member of the founding committee of the Faculty of Economics at the University of Trento.

Finally, but crucially, I thank all the speakers at the Conference and the authors of the essays of this special issue:

Alan Bollard (Governor, Reserve Bank of New Zealand), Willy Brown (Darwin College Cambridge), David Colander (Middlebury College, Vermont), Brian Hayes (senior writer, American Scientist), Michael Kuczynski (Pembroke College, Cambridge, UK), Robert Leeson (Stanford University, CA), Allan McRobie (Cambridge University, UK), Michael Stevenson (Artist/ Sculptor, New Zealand/Berlin). A special thanks is due to Doreen Newlyn, the widow of Walter Newlyn, co-inventor with A.W.H. Phillips of the hydraulic machine.

Their contributions are extremely interesting as the reader will see, and therefore it is an honour and a pleasure for me, as editor in chief of this Journal, to host their essays.

I have to thank those who were in Trento at the International Conference for their thoroughly kind and friendly participation at an elegant dinner promoted by the very dear friend Vera Velupillai (with other friends as Giovanni Pegoretti and Stefano Zambelli) in my honour for the conclusion of my academic career as full professor of economics.

My last, but not least, thanks goes to Umberto Quadrino, chairman of the Edison Foundation which is not only the sponsor of *Economia Politica*, but also of this special issue. I want to stress that Dr. Quadrino, whose interest and competence in economic issues is indeed broad, immediately realized the importance of this initiative. The same interest was shown by Prof. Marco Fortis, vice president of Edison Foundation, who has been following our journal with great attention contributing to it with many ideas and editorial notes. Finally I want to thank Dr. Beatrice Biagetti, General Secretary of the Edison Foundation, for her important contribution in editing this special issue.