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KNUT WICKSELL—A CENTENNIAL EVALUATION

By Carl G. Uhr*

Johan Gustav Knut Wicksell was born on December 20, 1851 in Stockholm to a Swedish middle-class family. He died in his 75th year of life on May 3, 1926. During his years of graduate study, 1880-90, and his career as a creative economic theorist, 1890-1915 being his most active period, he was a contemporary of Menger, Böhm-Bawerk, Walras, Marshall, Wagner, and Spiethoff, whose works, apart from those of his colleagues in Sweden, D. Davidson and G. Cassel, influenced his own development and thought in many ways.[1]

Wicksell's "student years" were unusually long.[2] Before he was appointed to the chair of political economy and fiscal law at Lund University in 1900, he was a mature man with a growing family, 49 years of age, and already a writer of renown who, apart from some important articles and tracts, had published three of the five volumes that con-

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[1] The writer is especially indebted to Professor Emeritus Emil Sommarin, Wicksell's successor in the chair at Lund University, for biographical information. Our account of Wicksell's career is based in part on private correspondence with Professor Sommarin, in part on his article, "Das Lebenswerk von Knut Wicksell," *Zeitschrift für National-ökonomie,* Vol. 9 (1930-31), pp. 221-67, and mostly on two chapters in his recent, charming book, *Studenter och Arbetare* (Students and Workers), (Lund, 1947), where he relates Wicksell's rôle in the social reform movements both at Uppsala and at Lund Universities.

[2] Wicksell enrolled at Uppsala University in 1869 to study mathematics and physics; earned a B.A. degree in 1872 and later, 1885, a graduate degree, *philosophiae licentiatus,* in mathematics. Such degrees are given to advanced graduate students after comprehensive examinations in which, *inter alia,* preliminary drafts of their doctoral theses are evaluated. Usually such drafts are elaborated into finished form and another set of examinations ensue, resulting in the Ph.D. Wicksell went on instead with economics, in which, after study abroad, 1885-90, and further research in Sweden, he earned another *phil. lic.* at Uppsala, 1894, and his doctorate, 1895, on a thesis in the theory of tax incidence. The latter was incorporated as Part I of his work, *Finanztheoretische Unter-suchungen* (Jena, 1896). Finally, 1899, he earned one more degree, *utriusque juris candidatus,* in "fiscal law." This was necessary for him in order to apply for a professorship in

stitute his major works.[3] Two circumstances contributed to the tardy materialization of his academic career, his relatively late introduction to economics in about 1880 from graduate study of mathematics (which latter he pursued until 1885 when he went abroad for five years to study economics at the universities of England, France, Germany, and Austria), and his early reputation for social and religious unorthodoxy. The latter made his appointment a hotly contested issue and a decided victory for academic freedom.

At Lund his career was very productive. He contributed a stream of significant articles mainly to the newly launched Swedish economic journal, *Ekonomisk Tidskrift*, and to certain German learned periodicals, and wrote the two volumes of his *Lectures on Political Economy*.[4] In 1916, on reaching mandatory retirement age (65) and pensioned status as a professor emeritus, Wicksell left Lund to return to Stockholm. From that time until his death, he devoted himself to a very busy life of writing in the learned and the daily press on the Swedish inflation problem occasioned by World War I, and to service on a series of government commissions of inquiry into Sweden's monetary and taxation problems.

I.—Orientation and Method in Economics

Although this sketch of Wicksell's life reveals very little about him that seems unusual other than a tenacious studiousness, the quality of his work as an economist was determined both by his early training in mathematics and by his youthful and life-long attachment to the social reform movement of the 1880's.

His mathematical background accounts for the form and organization of his writing, and often endows the latter with a very formal,

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economics, for at that time economics was offered as an elective subject by the Faculty of Law. Hence professors of that subject were expected to be well informed and to offer courses on the relation of economics to jurisprudence, especially relating to the fiscal institutions and activities of government. During most of these years Wicksell and his family existed on research grants by Swedish foundations and on what little his writing brought in.

[3] *Über Wert, Kapital und Rente* (Jena, 1893), an elegant mathematical treatment of static equilibrium theory, synthesizing the work of the Lausanne and the Austrian schools; *Finanztheoretische Untersuchungen* (Jena, 1896), an elaboration of his doctoral thesis into a lofty and speculative treatment of public finance; *Geldzins und Güterpreise* (Jena, 1898), translated, 1936, as *Interest and Prices*, his epoch-making treatise on monetary theory.

[4] *Lectures on Political Economy*, Vol. I, *General Theory* (first Swedish edition, 1901), a revision and elaboration of his earlier analysis in *Über Wert;* and Vol. II, *Money* (1906), an elaboration of *Interest and Prices*. Both volumes were translated 1934-35; we refer to them as *Lectures-I* and *Lectures-II*. They went through several editions, the latter with some revision, 1915, on points relating to the nature of monetary equilibrium.

abstract character. From mathematics he brought to economics a methodology he was convinced would supersede the sterile empiricism of the German historical school and expose beyond plausibility the doctrinaire extravagances alike of the harmony-economists and their Manchester followers and of their bitter opponents, the Marxist socialists.

This was the deductive method of successive approximation applied with telling effects by Cournot and Walras, whose works he held in high admiration. It permits the economist to abstract from confusing detail and interrelations and isolate the forces at work in simplified, hypothetical cases containing definite elements of the complex reality economic theory seeks to understand. Wicksell was convinced that pursuit of this method was indispensable for theoretical as well as practical progress in economics. It seemed to him that it, and it alone, gave promise of yielding the economist cogent hypotheses which he needs before he can fruitfully approach empiric data for verification or refutation of his theorems, and before he may offer guidance to or interpret the results of public and private economic policy.[5] This was also the reason he avoided statistical work, with the two exceptions of a brief sketch of a theory of index numbers, *Interest and Prices*, Chapter 2 and Appendix (which latter was omitted in the English translation), and a pamphlet, *Läran om befolkningen* (Theory of Population), 1910, in which he developed a method for forecasting the trend and composition of Sweden's population. In both cases he made a contribution, but, on the whole, he was inclined to concentrate on problems of pure theory and to leave to others the task of adapting and testing by practical application.

Few would deny that in his generation Wicksell was uncommonly successful in applying his mathematical method in almost all branches of economic theory. As was to be expected, it served him particularly well in static analysis, as in *Über Wert* and *Lectures-I*. There he was a master craftsman in deepening and extending received theory, in laying bare its limitations, in generalizing it by transforming and reconciling apparently contradictory analyses, such as those of Böhm-Bawerk and of Walras, into unified syntheses. Essential as this was for further progress, it was not here, not in the static equilibrium analysis, that his genius played its important creative rôle.

To the contrary, his greatness rests on the advance he made toward fruitful theoretical solutions of the problems of (1) capital accumulation, (2) the relations between distributive shares in conditions of net investment and technological change, and (3) monetary relations in a

[5] Wicksell's statements on "method" in economics were always brief; cf. the prefaces and introductions to his works, *Über Wert*, pp. i-xxi, and *Lectures-I*, pp. 1-11.

"pure credit" system. For all the progress he made in this sphere, which inevitably involved dynamic analyses, his method of successive approximation sometimes got in his way and kept him from making even greater contributions. The too static approximations he employed to deal with dynamic sequences prevented him, at times, from reaching certain insights which were attainable within the same problem-focus, and were discovered by his followers, Lindahl, Myrdal, and Ohlin.

If, however, his mathematical mode of thought determined the form and probably appreciably restricted the scope of his work, it did not detract from the far-reaching implications he was wont to draw from some of his formal demonstrations. Neither did it fetter that agile spirit of freedom and well-nigh prophetic sense of the possibilities of social reform that characterize his outlook and constitute the real meaning of his economic philosophy. Clues to the latter must be sought in the character of the man and in the circumstances and motives that attracted him to economics from other pursuits.

It is said that as a youth Wicksell, who, like most of his contemporaries, was brought up on the moral precepts of the state supported Swedish Lutheran Church, underwent a religious crisis from which he emerged an a-religious philosophical rationalist of the radical type. This tendency was reinforced by his studies and contacts in university life, especially in student activities relating to the social reform movement. In due course he became known not only for his intellectual acumen but also as a gifted speaker. As such he was elected chairman of the Student Corps at Uppsala, 1878-79. This in turn brought him invitations to lecture on diverse subjects to welfare and civic organizations. One of these occasions became a turning point in his life and led to his study of political economy in earnest.

In the spring of 1880 he was addressing a temperance organization on the causes and remedies for alcoholism. Among causes he pointed to the abject poverty and dreariness of home life for the majority of urban workers, a poverty reinforced by the arrival of more and more children. As a remedy he suggested it was up to the medical profession to perfect simple, safe methods of contraception to arrest excessive procreation, and to disseminate the knowledge and application of such methods. Had it not been for the fact that the substance of his lecture was reported in the daily press, Wicksell might calmly have returned to his mathematical studies. But as it was, what he had to say reached a wider, more articulate public. Since it offended against the mores of the times just as the Darwinian theory of evolution in an earlier day offended against theological dogma, the response was immediate and strong. He was criticized and reviled in the press by professors of medicine, clergymen, essayists, and editors. Overnight he

achieved the unenviable reputation of a "moral nihilist" and came to be regarded as the leader of a suspect small intellectual sect known as neo-Malthusians. He defended himself ably and with courage in articles and tracts, all of which added to his notoriety.

In this process he felt the need to make a more methodical study of population questions. So he made the acquaintance of D. Davidson, then a docent in economics at Uppsala. Davidson, who became his life-long friend, introduced him to Malthus by lending him his copy of the *Principle of Population*. From there it was but a short step for him to the study of classical economics in its entirety. This he pursued in conjunction with mathematics until 1885 when, as we have seen, he went abroad to study modern economics. Upon his return to Sweden, Wicksell not only resumed his advocacy of the neo-Malthusian princi-ples he had defended a decade earlier, but also broadened his activity in behalf of the social reform movement.

II.—*Social Reform Program or Theory of Economic Development*

At the close of the 19th century, Wicksell was convinced that the world possessed few additional, unexplored, and unexploited natural resources that would permit continued, rapid growth in numbers with-out impoverishment. He also thought the industrial revolution and epoch-making inventions of that century represented a unique period in man's economic history, one not likely to be outdistanced by the technological progress to be expected during the 20th and later centuries. For these reasons he thought attainment of stationary popu-lation of optimum size[6] throughout the world to be the *sine qua non* for a prospective rise in the mass standard of welfare. Accordingly, he made this condition the basis for most of his speculations concerning the long run or the economic future.

However, granted a discernible tendency for population to become stationary at a size that is optimal in relation to the economy's re-sources and technology, Wicksell was optimistic about its future economic improvement, a process he was convinced would be hastened and made more harmonious by adoption of certain reforms his eco-nomic studies led him to advocate. This was implied in his statement that

> . . . the definition of political economy as a practical science is the theory of the manner of satisfying human needs which gives the greatest possi-

[6] He defined "optimum population" as a population of such size that its further increase involves a decrease in "social welfare," *Läran om befolkningen* (Theory of Population), (Stockholm, 1910), p. 42. His neo-Malthusianism recurs also in one of his most important tracts, *Socialiststaten och nutidssamhället* (The Socialist State and Contemporary Society), (Stockholm, 1905), pp. 34 ff., where he pointed out that the very substantial gains a socialist society may achieve by more effective resource utilization and income redistri-bution are threatened unless protected by a rational population policy.

ble satisfaction to society as a whole, having regard for future genera-
tions as well as the present. . . . As soon as we begin seriously to seek
for the conditions of the welfare of the whole, consideration for the
interest of the proletariat must emerge; and from thence to the procla-
mation of equal rights for all is only a short step. . . . *The very concept
of political economy, or the existence of a science with such a name,
implies, strictly speaking, a thoroughly revolutionary programme.*[7]

His "revolutionary programme" contained at least four interrelated
parts for a multiple attack on the major problems his analysis had
uncovered: problems of (1) monopoly and imperfect competition, (2)
inequality of income and wealth, (3) inequality of economic opportu-
nity, and (4) economic instability associated with the trade cycle and
with certain abberations of monetary policy and institutions.

A. *The Public versus the Private Sector of the Economy*

His program involved first a substantial expansion of the public
sector of the economy, partly at the expense of the private enterprise
sector, and chiefly in behalf of perpetuating for the future the freely
competitive portion of the latter under more tenable and stable
auspices.[8] Expansion of the public sector was in part to take the form
of public ownership and operation of "natural" monopolies (public
utilities) and also of "artificial" ones, or of "enterprises and industries
showing unmistakable tendencies toward formation of cartels."[9]

Monopolistic enterprises should be acquired by local or national
governments by properly compensating their private owners. But once
acquired, Wicksell insisted they should be publicly operated to give
consumers the full benefit of their realizable "economies of scale."
This was to be achieved by a combination of taxes and a technique
of pricing their output according to marginal unit cost. Their prices
were to be reduced by trial and error, and their output and sales ex-
panded according to elasticity of demand, up to an equilibrium point
where the sale value of output increment sold after the last price re-
duction (*i.e.*, output increment times new lower price) exactly equals
the increment in total cost of producing the extra output. Since
marginal unit cost and price would in most such cases be less than
average total unit cost on the corresponding total product, the resulting
deficit should be met from taxation.

It is not certain that he would have applied this method universally,

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[7] *Lectures-I*, pp. 3-4, italics supplied.

[8] *Finanztheoretische Untersuchungen*, p. viii.

[9] Wicksell's review of Pareto's *Cours* in *Zeitschrift für Volkswirtschaft, Sozialpolitik und
Verwaltung*, Vol. 6 (1897), pp. 161-62 and also his article, "Riksbanken och privat-
bankerna" (The National Bank of Sweden and Private Banks), *Ekon. Tidskrift* (1919),
Part II, pp. 177 ff., and *Finanztheoretische Untersuchungen*, pp. 125-38.

for he was aware that complications would arise in all but the simplest cases, but he did not stop to work them out. At any rate, by way of contrast, he thought it irrational for governments deliberately to operate public enterprises for profit as in the case of Prussia's state-owned railways. To his mind the *raison d'être* for public enterprises was to obtain a better allocation and utilization of the nation's resources than private monopoly offers, and not one of using them as engines of indirect taxation.[10]

Secondly, extension of the public sector of the economy was to take the form of a substantial increase in the variety and extent of social services. He considered social services as necessary and justified as a form of secondary or "social" distribution to compensate for income inequalities that arise in the course of primary or "functional" distribution to factor owners according to the marginal revenue productivity of productive factors. For, as he repeatedly said:

> On the whole it is a mistake to regard as obvious—as is so often done—that healthy persons capable of work must be able to live from their labor *alone*.[11]

His first concern among social services was for education. He not only wanted the government to make schooling "free" to the public at all levels of academic and vocational instruction, but also to provide subsistence grants for impecunious and worthy students. Further, he stressed the need for a broad program of social security legislation and for national health insurance. He would have devoted the proceeds of most of the progressive income and unearned increments taxes he advocated as support for these activities.[12]

B. *Reconstruction of the Fiscal System*

The second part of Wicksell's program called for revision of extant tax systems, mostly composed of indirect taxes, and for changes in the political conditions for determining national budgets and the revenue measures needed for their execution. Because of the outrageously regressive incidence of taxes in the 1890's, he urged decreased reliance on excise and tariff duties in the revenue system as a whole and adoption and development of progressive taxes on personal incomes, estates, and corporate profits, as well as a modification of the general property tax to capture an increasing share of "unearned" land value increments.

[10] *Finanztheoretische Untersuchungen,* pp. 104, 128 ff., 133-35.

[11] *Lectures-I,* p. 143; *Finanztheoretische Untersuchungen,* p. 146.

[12] On social security laws, see his articles, "Ålderdomskommittens betänkande" (Report of the Old Age Pension Committee), and "Resultatet" (The Result), *Ekon. Tidskrift* (1912), pp. 443-68; (1913), pp. 211-17; further, *Socialistaten och nutidssamhället,* pp. 28 ff., and *Progressiv beskattning* (Progressive Taxation), another tract (Stockholm, 1903), pp. 26 ff.

As for high sumptuary excises on liquor and tobacco, he argued for scaling them down to moderate rates and imposing consumer rationing instead, *i.e.*, a "liquor and tobacco control" system, to achieve more equitably the sumptuary ends, and improvement in public health and morals, that they were originally intended to serve.[13]

But tax reform, he realized, must be preceded by political reform to remove all property qualifications for the franchise. Hence he supported the movement for universal suffrage, aware that its achievement would shift political power from the minority of enfranchised property owners to the working class. To make possible an orderly evolution of political relations in this process, he insisted on special safeguards to protect the identity and integrity of political minorities from tyrannization by the majority. For minorities must be preserved to perform their vital task of criticism. The guarantees of a bill of rights were, in his opinion, not sufficient for this. It required more than that, namely, their effective inclusion in the system of representation. Hence he advocated an election system based on proportional representation.[14]

Thus it was both for political and for economic reasons that Wicksell supported the trade union movement and was anxious to extend "free" education to all. Trade unions seemed indispensable for the civic and democratic education of a politically inexperienced working class which suddenly might find itself in possession of national political power and might be maneuvered into perverting a representative, constitutional democracy into mobocracy that has it terminus in dictatorship.

Fully aware that even in a democracy with universal suffrage and proportional representation the potentially all-embracing fiscal power can be captured by narrow, sectional interests at the expense of the general welfare, Wicksell wanted to make doubly sure this would not happen. To that end he urged the following reform in matters involving budgets-and-revenues: (1) Budget proposals must always be accompanied by matching revenue or finance proposals so that expenditures are not approved without regard to the finance requirements they imply. (2) Budget and tax proposals, usually made by the administration and adopted as legislative agenda by simple majority vote in Parliament, must be alterable by amendment by any member or group in Parliament. And only those proposals that are approved by a "qualified majority," *i.e.*, two-thirds of the membership, are to be adopted and embodied in the final budget-and-revenue acts. According

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[13] *Våra skatter—Hvilka betala dem och hvilka borde betala?* (Our Taxes Who Pays and Who Ought to Pay Them?), an important tract, issued by Wicksell under the pseudonym of Sven Trygg (Stockholm, 1894).

[14] *Den politiska rösträtten och skatterna* (The Political Franchise and Taxation), a tract, 1898; *Finanztheoretische Untersuchungen*, pp. 123 ff.

to Wicksell, this was necessary both for reasons of equity and on the grounds of the marginal utility calculus.[15]

Following Adam Smith, he believed governments should only undertake functions (a) that are not served by private enterprise, and (b) that are not served as well by private enterprise. The citizens via their representatives in Parliament must decide what those functions are. Such decisions must rest on a marginal utility calculus comparing the utility of proposed services with the tax burden they imply. In Wicksell's opinion, functions proposed for government action which fail of two-thirds majority apporval were not likely to be clearly and unequivocally in the general interest even if supported by ephemeral, bare majorities. Furthermore, functions that are approved must be served to a determinate extent. This involves division of the total budget into separate activities in proportions that, again, must correspond to the current status and expression of the general interest. Finally, in spending for budgeted purposes, government confers general benefits on the public at large and also special benefits on certain segments of that public. Spending for law enforcement may yield only general benefits, but spending for a river improvement yields greater benefits to adjacent property owners than to others. In general, the qualified majority in Parliament must feel that the marginal utility of a proposed government service at least equals the tax burden it imposes to give it approval. If the proposed service yields only general benefits, it should preferably—because of diminishing marginal utility of income—be supported by taxes levied according to the ability principle. If it yields only benefits for some and not for other citizens, it should be supported by taxes levied according to the benefit principle. If it yields both general and special benefits, it should be financed by benefit- and by ability-taxes in the proportions its separate and general benefits bear to the total benefits it confers.[16]

As it happened, Wicksell lived to see some of the foregoing reforms introduced in Sweden. Universal suffrage was achieved during World War I. The growth of the trade union movement and the Social Democratic Party ushered in several of the tax reforms for which he had pleaded and extended social services considerably in the fields of education, social security, public health and health insurance. While his proposal of two-thirds majority approval of budget and revenue acts was not adopted at the national level, where, instead, other innovations of fiscal policy were evolved, it was adopted in principle by a number of provincial and municipal governments. By pointing out this we do not imply that Wicksell and his followers were solely or largely responsible for these reforms. Nonetheless, a certain credit is due him

[15] *Finanztheoretische Untersuchungen*, pp. 115, 117, 124, 137, 156-ff.
[16] *Finanztheoretische Untersuchungen*, pp. 83-84.

for having foreseen and pleaded for most of them a generation or more before they took place.

C. Monetary Reform

In the third place, Wicksell's reform program called for changes in monetary institutions and policy which, in principle, anticipated by almost fifty years the compromise between monetary nationalism and international exchange stability which has found expression in the International Monetary Fund.

At the institutional level he wanted to strengthen the credit control exercised by discount policy and open-market operations of central banks over private banks. Ultimately he visualized nationalization of the central bank in each country and its replacing private commercial banks by opening affiliates in every town and hamlet. Then he pleaded for abandonment of the gold standard and for effective demonetization of gold. This was to be done by freeing central banks from the obligation to settle payments balances in gold by their entering into international clearings arrangements with each other to redeem each other's notes and drafts at par and sell the same to the public at par. Further to immunize them from the vagaries of gold production and of gold influx and efflux in the course of foreign trade, he thought it necessary that they cease the free minting of gold and abandon the practice of buying and selling gold at fixed mint prices. The world price of gold would henceforth depend chiefly on industrial demand in relation to its supply.[17]

At the policy level, most of his life he thought the aim of central banks in regulating the supply of money, now bank credit money, should be price stabilization, i.e., stabilizing the value of money in terms of the price level of consumption goods. The means to that end were to vary central bank discount rates in the same direction as the consumer price index, thus offsetting a sustained rise in the latter by high discount rates and credit contraction and counteracting its sustained decline by reversing the process. He was convinced that this policy should be pursued both internally and internationally. To the latter end he asked that an international commission of experts work out an international price index to be the guide line for the concerted discount policy of central banks associated in the international clearings union. But, to obviate breakdown of this scheme from the balance of payments disequilibria that various nations develop from time to time as indicated by persistent debit clearings for the nations in question, he urged that, subject to the consent of the central bank majority in the clearings union, they be permitted to adopt discount policies run-

[17] *Interest and Prices*, Chap. 12, and *Lectures-II*, Chap. III, Sections 6-G and 6-H, and Chap. IV, Sections 9 and 10.

ning counter to that of the majority, and, with the cooperation of the latter, to engage in international capital transactions, etc., until the causes of their payments disequilibria had been overcome.

Toward the end of his life, 1925-26, it is true that Wicksell, impressed with his colleague Davidson's penetrating theoretical attack on his price stabilization aim, and further impressed by the monetary upheavals of World War I, modified his emphasis on price stabilization. In the end he had to admit its inconsistency with the conditions of monetary equilibrium which his own analysis had done so much to bring to light. To supplement it, he groped for other, more complex criteria for monetary policy (reminiscent of D. H. Robertson as of 1926), a matter he was unable to resolve to his own satisfaction.[18]

Yet this did not lessen the penetration of his insight into the essential requirements for stable international monetary relations, namely, an institutional arrangement which yields substantially the same exchange stability that was the glory of the gold standard but at the same time provides flexibility where the latter was rigid, i.e., provides an orderly procedure for revaluation of exchange rates when persistent payments disequilibria occur. How much clearer and how much more correct his insight into these relations was than that of most of his contemporaries can best be seen if we recall that Marshall argued for a combination of the symmetallic standard, application of bank rate to restrain activities of speculators, and a tabular standard of value for long-term credit.

D. *Countercyclical Credit Policy*

The fourth part in Wicksell's program was addressed to the problem of economic instability. It called for government-supported extension of credit in times of depression to maintain a tolerable level of employment by inducing manufacturers to produce to stock when costs are low and to hold resulting inventories off the market until improvement of trade in recovery would make it possible to dispose of them at a gain.

He considered the trade cycle, as distinct from monetary crises (which he attributed chiefly to irrational criteria for monetary management under the gold standard), to be caused by the uneven and unpredictable movement of "real forces," particularly technological innovations and the associated jerky pace of investment in fixed real capital. This process, he thought, could be smoothed substantially by countercyclical production for inventory purposes. But the credit extension needed to finance the latter admittedly represented unusual risks. The

[18] *Cf.* his article, "The Monetary Problem of the Scandinavian Countries" originally written for *Ekon. Tidskrift* (1925), now translated and appended to *Interest and Prices*, pp. 199 ff.

banks, committed to his price stabilization policy, could not be ex-
pected to carry it out unaided, especially not at the exceptionally low
interest rates that must be offered to induce much additional borrowing
for inventory production in depression. Hence the government must
either supplement bank credit with public credit, or else underwrite
the risks and losses the banks may incur in this process.[19]

III.—*Evaluation of Wicksell's Reform Program*

The foregoing account of Wicksell's social reform program should
dispel any feeling of contradiction between the abstract treatment that
dominates his major works and the concrete aims his analysis indicated
to be attainable. Moreover, in broad features it reveals his theory of
economic progress. For years he had planned to write a third volume
of Lectures (*cf.*, *Lectures-I*, pp. 7-8) to deal with social economy
or with the conditions of economic progress, as we might express it
today. There he intended to investigate the application of economic
theory and precept to the penultimate problem of the science—the
maximization of social welfare—under assumptions involving radical
change or reform of existing institutions. He never found the energy
to complete this task as a systematic exposition. Yet, as we have seen,
he left behind enough fragments in his books, his tracts and articles, to
give us his vision of the future more rational, more stable political
economy.

Thus, in a greater measure than his celebrated contemporaries,
Wicksell emerges as a theoretical apostle of the "mixed economy." He
labored, more fundamentally than others, in the tradition of J. S. Mill,
whose famous dictum seems to have dominated his outlook:

> . . . the Laws of Production of wealth partake of the character of
> physical truths. There is nothing optional or arbitrary in them. It is
> not so with the Distribution of wealth. That is a matter of human
> institution solely.[20]

Without sacrificing, indeed while emphasizing, the all-essential rights
and freedoms of the individual, Wicksell pointed out clearly some of
the paths whereby society may advance in an orderly fashion toward a
more nearly optimal allocation of resources, greater income equality,
effective equality of opportunity, increasing security and enhanced ma-
terial welfare. For the system he delineated, for a society with a popula-
tion of optimum size, a system of public and freely competitive private
enterprise, guided by his conception of rational economic policy, gave
promise of greater economic stability than prevailed in his own day.
It was not a case of his system being designed to eliminate all economic

[19] *Lectures-I*, "Note on Trade Cycles and Crises," pp. 209-14.
[20] J. S. Mill, *Principles of Political Economy*, Ashley edition, pp. 199-200.

fluctuation, but the behavior of the economy could be expected to be such that average rate of output would be considerably closer to full capacity rate of production than in the past. And its productive capacity could also be expected to continue increasing with the progress of private and social investment and improvements in technology, for the reforms he advocated would not have impaired the inducements for these activities.

It is, of course, easy to criticize his vision of economic progress, especially with the benefit of hindsight. It is clear now that he placed too great reliance on the adjustment powers of the interest rate mechanism, that he made inadequate allowance for risk and un-certainty as impediments to investment, that he was not fully aware of the impact of large-scale deficit finance and huge public debts on central bank powers of monetary management. This and more can be said against his vision. But then we must remember that his writing largely pre-dates the fateful year 1914. He could not foresee the prob-lems that have come to afflict a society which has exposed itself twice to the holocaust of total war. Who will gainsay that his reliance on interest rate variation and on counter-cyclical production for inventory purposes may not have been more effective than they now seem to most of us in preserving a tolerable degree of economic stability if the pre-1914 society had continued to evolve in peace? And if it had applied but a fraction of the resources and ingenuity it wasted on warfare to the social reforms he advocated?

For all that, Wicksell's greatness as an economist rests much more on his creativeness as a theoretician than on his views concerning eco-nomic development. His stature as a theoretician is in turn attributable to the vivid imagination with which he tackled intractable problems, and to the rigorous scientific method he applied in his work. As a re-sult, several of his contributions are of value still, not so much because of the particular conclusions he formulated, for they have mostly been superseded by subsequent work. It is rather because of the highly fruitful points of departure he found from which to approach problems, and because of the flexible framework of analysis he developed, which afforded a wide perspective that enabled others to make further progress.

IV.—Contributions to Economic Theory—Static Analysis

A. *The Marginal Productivity Theory of Distribution*

Considering the state of economic theory as of 1890 it is not sur-prising that Wicksell sensed the need for a synthesis. With the Aus-trians, the British neo-classicists, and the Lausanne schools sharing related orientations in value theory but having divergent views on production, capital, and distribution, the time seemed ripe to him to

attempt a consistent synthesis between these approaches. In substance this is what Wicksell achieved in *Über Wert* by using the marginal-utility-marginal-productivity theories of Jevons and Menger, adding to these the derived Böhm-Bawerkian analysis of capital, and fusing the product within a Walrasian framework of general equilibrium to reveal the multiple causal interrelations of the theoretical edifice. In this process he became a founder of the marginal productivity theory of functional distribution.

Chronologically Wicksell was the first, in 1893, to demonstrate the "product exhaustion theorem," or the determinacy of functional distribution on the basis of product-exhaustion by imputation of distributive shares to cooperating factors of production in terms of their respective marginal productivity. However, he was content to let the credit for the "theorem" go to Wicksteed who, independently, adduced a more systematic demonstration of it in *Coordination of the Laws of Distribution* the following year.[21]

Wicksell's use of the marginal-utility-productivity theory calls for comment. While he stressed the limitations of marginal utility theory (the impossibility of interpersonal utility comparisons, the difficulties the marginal calculus encounters in commodities in joint demand, in goods produced in joint supply, and with goods that are large and indivisible relative to the individual's budget), he defended it decisively against its critics in an article, "Zur Verteidigung der Grenznutzen-theorie," *Zeitschrift der gesammten Staatswissenschaften* (1900), pp. 577 ff. As we have seen, he was also at pains to extend its scope more directly to public finance as the underpinning for his system of "equit-able taxation." At the same time he wanted to purify this theory from certain apologetic overtones that had become attached to it.

It is clear that the general equilibrium that arises in perfect competition represents an economic optimum of some sort, especially from the standpoint of production. Given the distribution of income, consumers maximize utility positions relative to ruling prices by spending so as to obtain equi-marginal utility per dollar. Producers maximize profit positions (at zero net profits in the long run) by arranging plant to optimal scale, producing the output quantities for which least average costs and marginal costs equal demand price. To do this, they use factors in proportions and quantities such that, given their prices, they obtain equi-marginal value (or revenue) product per dollar of factor outlay.

Walras and later Pareto, not to mention others (J. B. Clark, for

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[21] For a verbal statement of the theorem, see *Über Wert,* pp. xii-xiii; Wicksell's mathematical treatment, *ibid.,* pp. 121-28, and *Lectures-I,* pp. 126 ff. This and Wicksell's rôle in the polemic about the theorem is expertly treated in G. J. Stigler's *Production and Distribution Theories* (1941), Chap. X, and Chap. XII.

instance), concluded that the foregoing equilibrium represented maxi-
mization of social welfare.[22] Wicksell objected that since interpersonal
utility comparisons can not be made, it is impossible to ascertain
which of many possible production-consumption equilibria indicate
maximum social welfare. Secondly, the consumer maximization that
arises in free competition is relative to (1) the competitively estab-
lished structure of prices and to (2) the pre-existing distribution of
income and wealth. It constitutes no guarantee that a different distri-
bution, for instance, one favoring low income groups and achieved by
authoritarian imposition of a set of uniform prices, will not yield a
greater quantum of utility. For, as he pointed out:

> . . . in normal cases there can always be found a system of uniform
> prices at which exchange will produce a larger sum of utility than at
> competitive prices.[23]

Yet, these reservations notwithstanding, Wicksell remained at least
a quasi-economic liberal in questions of intervention in "the system of
competition" on behalf of increasing social welfare, for

> . . . an encroachment on free competition, if it is . . . (to increase social
> welfare) . . . must be effected *in the right direction*. Unrestricted liberty
> is infinitely to be preferred to a misguided system of restriction on
> competition.[24]

However, if this could be said by way of qualification of the marginal-
utility-productivity theory on its home grounds, the stationary society
of universal free competition, then far greater qualifications were in
store for it in the real world where "our assumption of free competition
is and can only be incompletely realized."[25]

B. *Theory of Price in Imperfect Competition*

Wicksell made only slight headway with the theory of imperfect
competition because of his inadequate concept of the firm.[26] Nonethe-
less, using retailing as a form of imperfect competition short of

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[22] L. Walras, *Abrégé d' Éléments d'Économie Politique Pure* (Paris, 1938), p. 105, from
which a passage is quoted in *Lectures-I*, p. 74, note; V. Pareto, *Manuel d'Économie Politique,*
pp. 354 ff., 617-31; K. Wicksell, *Über Wert*, pp. 48-50, *Lectures-I,* pp. 72-83, and his reviews
of Pareto's works in *Zeitschrift für Sozialpolitik und Verwaltung,* Vol. VI (1897), pp. 159
ff., and Vol. XXII (1913), pp. 132 ff.

[23] *Lectures-I*, p. 80.

[24] *Ibid.,* p. 81.

[25] *Ibid.,* p. 72.

[26] In free competition all his firms were of optimal scale, and in simple monopoly he
viewed them as entities for maximizing net revenue by making the proper output adjust-
ment to demand functions of known elasticity. Yet he was aware of the connection
between "economies of scale" and decline of competition, an insight he made little use of
in particular equilibrium analysis.

monopoly, he anticipated some of the modern theory of monopolistic competition by showing that free entry in such conditions results in overcrowding—too many, less than optimal-scale retail firms for the good of retailers and their customers alike. He also attributed the existence of fairly fixed, differentiated retail markups to differentiation of firms, since consumers, unable accurately to judge quality of complex merchandise, become dependent on particular retailers as "buyer experts." Hence inelasticity of demand for retail services increases in proportion to the degree of consumer ignorance.[27]

Consideration of imperfect competition led him to delve into isolated exchange where his efforts led to an advance toward the theory of bilateral monopoly. At first (*Über Wert*, pp. 36 ff.), his position was similar to Edgeworth's—exchange ratios and quantities of goods traded at isolated barter are indeterminate within limits of the "contract curve." Decades later, 1925, in his review of Bowley's *Mathematical Groundwork for Economists*, he sensed an error in this theory. He went on to show that if a factor monopolist dominates in bargaining with an end-product monopolist who can not apply monopsony power, then even in bilateral monopoly, factor- and output quantities and prices are determinate. The factor monopolist attains a "real" maximum, and the end-product monopolist only a "relative maximum of normal returns." Thus the charmed circle of indeterminacy of bilateral monopoly was broken, albeit Wicksell was wrong, as Bowley pointed out in his reply, in holding that the converse case of end-product monopoly dominance was indeterminate.[28]

C. *Theory of Capital and Interest*

Wicksell's most important contribution to static analysis was his revision and reconstruction of Böhm-Bawerk's capital theory. He restated the latter solidly and lucidly on the basis of a stationary state and generalized it by (1) including land in its treatment, (2) introducing into it the assumption of variable production coefficients or factor proportions, and (3) by extending it beyond the confines of a one-commodity economy into a multiple-commodity general equilibrium treatment. As a result, Böhm-Bawerk's cumbersome trinitarian (the "three grounds") interest explanation was transformed into an explicit theory of interest as the marginal productivity of waiting, coordinate with the marginal productivity theories of wages and rent. In this

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[27] *Lectures-I*, pp. 86-88.

[28] Wicksell's review, *Ekon. Tidskrift*, 1925, was translated as "Mathematische National-ökonomie" for *Archiv für Sozialwissenschaft*, Vol. 58 (1927), pp. 252-81. Bowley's reply and re-analysis is found in "Note on Bilateral Monopoly," *Econ. Journal*, Vol. XXXVII (1928), pp. 651-65. For a systematic treatment of this entire topic, see W. Fellner, *Competition Among The Few* (New York, 1949), Chaps. IX and X.

connection, Wicksell also arrived on highly agnostic premises at the conclusion that saving is likely to be interest-inelastic.[29]

Yet, his chief innovation in capital theory was his elaboration of a new, consistent concept of capital structure, actually a method of quantifying real capital both (1) as a determinate time-structure of production capable of variation in two dimensions, "width" and "height," and (2) as a quantification in value terms, a conception he referred to as "the stratification of capital through time" (*Lectures-I*, p. 151). He developed it after first using Böhm-Bawerk's "production period," and later an improved, alternate construct of his own, the "weighted average investment period" (*Lectures-I*, pp. 172 ff.), which, however, was less clear than his structure concept.[30]

The value of Wicksell's formulation was that it made the impact of capital accumulation on the national dividend and on the relations of distributive shares more accessible than they were in earlier versions of "Austrian" capital theory and in "non-Austrian" conceptions of real capital as an aggregate of producers' goods. The essentials of this conception and of the insights it afforded may be sketched as follows.

In a perfectly competitive, stationary society, in equilibrium the quantity of real capital can be viewed genetically as consisting of labor-and-land inputs invested ("saved up") during past periods. The specific capital goods of which it is made up yield, "mature out," the services of their invested inputs in production over more or less long-time intervals or "maturation terms." Thus the capital structure can be expressed as (1) the number of invested inputs contained in it (or the number of such inputs required for its total replacement) times (2) the time-intervals such inputs must remain invested until they are used up, "mature their services," in production. Given the rates of wages, rent and interest, the value of the quantity of real capital can be obtained by multiplying these inputs by applicable wage and rent rates and by applying to each the rate of interest properly compounded for the maturation term each remains invested. Alternately, one can say that the value of a capital structure equals the sum of the properly discounted values of services its specific capital goods yield over future periods equal to their respective maturation terms.

Stationary conditions imply maintenance of the existing capital structure by replacement investment, which requires that a correspond-ing portion of society's total labor and land be thus "saved up" or in-vested in producing replacement goods, all its remaining labor-land being "current" factor services engaged in "direct" production of con-

[29] *Über Wert*, pp. 82-90; *Lectures-I* pp. 158 ff., 169, 171, 207, 209, 211 ff., and 241.

[30] The evolution of Wicksell's capital concept is readily traced in *Über Wert*, pp. 72-80, 93-94; *Finanztheoretische Untersuchungen*, pp. 29 ff.; *Interest and Prices*, pp. 122 ff., and *Lectures-I*, pp. 144-66, 172-84, 204.

sumption goods. If interest is 5% and real capital has a correspond-
ing net marginal productivity, then since real capital is "saved up"
labor-land, it follows that the marginal productivity of invested factor
units must stand in the ratio of 1.05/1.00 to that of "current" factor
units. And it is the lower marginal productivity of "current" labor-
land that determines the rates of wages and rent.

In equilibrium, at 5% interest rate, the current gross marginal
product of real capital, (i.e., its "maturing" services), must for oppor-
tunity cost reasons be of a magnitude relative to that of labor-land
input required for its replacement, of 1.05 raised by the power of an
exponent expressing the maturation term (e.g., in years) during which
this current replacement input must remain invested before it, in turn,
begins yielding services to production.[31] This was sometimes expressed
by saying that capital goods of different maturation terms yield the
services of their "oldest saved up" labor-land inputs, and that, in
equilibrium, their respective net current yields must stand in a com-
pound rate relation to each other, e.g., net yields of .05, .1025, .1576
per unit for goods of one-, two-, and three-year maturity terms, re-
spectively.

One additional property of real capital requires notice, namely, that
current replacement input for long-maturity capital is a progressively
smaller fraction of the current replacement requirement for the larger
number of short-maturity capital goods that, taken in combination,
have approximately the same yield. This means that if and when there
is an advantage in shifting or converting some short-term into long-
term investments, that advantage is reinforced by the fact that after
the shift is completed, the total requirement of labor-land for replace-
ment work is diminished.[32] Input units thus released from replacement
production are then added to the "pool" of "current" factor units
producing consumption goods, where they exert downward pressure on
wages and rents since they increase the supply of such units, reducing
their marginal productivity.

[31] Goods of one-year maturity term must have a current gross marginal product of 1.05
times, or per unit of, the corresponding replacement inputs; goods of two-year term, a
current gross marginal product of $(1.05)^2 = 1.1025$ per unit of current replacement input;
goods of three-year term, a gross marginal product of 1.1576 per unit of current replace-
ment input and so forth. Deducting replacement, their respective net current yields or net
marginal products are .05, .1025, and .1576 units.

[32] Three goods of one-year term each require 1.00 unit labor-land input per annum for
current replacement. Their combined current replacement is 3.00 input units and their
combined net current yield .15 units. One capital good of three-year term also requires
1.00 input units per annum for current replacement, and its net yield is .1576 units. After
investment conversion to three-year goods is completed, the labor-land required for
replacement is reduced by 2.00 input units per annum per new three-year goods created
by the investment shift.

Now society becomes non-stationary in only one respect; its capital structure expands by net investment. This means that more units of labor and land, over and above those usually engaged in replacement work, are withdrawn from consumption goods production to make net new capital goods. This raises wages and rents as supply of "current" services is reduced and their marginal productivity rises, while supply of capital increases and its marginal productivity declines, perhaps by an absolute amount equal to 1% from 5% to 4%.

At first the capital structure tends to increase by *expansion in "width,"* which means that *net investment increases all its capital goods* of different maturation terms *proportionately.* The structure usually contains more units of short- than of long-maturity real capital, and a proportionate increase in all varieties then means a larger absolute increase in the former than in the latter. This *disrupts* the *compound rate relations* that existed between their current yields in the initial equilibrium *in favor of long-maturity capital.* Net yields were .05, .1025, and .1576 per unit before "width" expansion reduced them by an equal absolute amount to .04, .0925, and .1476 per unit for one-, two-, and three-year goods respectively. At these yields three-year and two-year goods are *relatively more profitable* than one-year goods, and this induces expansion progressively in the "height" dimension of the structure.

"Height" expansion means that (1) *further net investment is concentrated* more and more *on long-maturity goods, and* (2) *some pre-existing short-term investments are shifted* (by non-replacement and transfer of the corresponding current replacement inputs) *to long-maturity goods.* Accordingly, some labor and land previously engaged in replacement production is released to augment the supply of "current" factor services and exert counterpressure to the wage and rent rise that occurred during "width" expansion. Thus wages and rents recede somewhat and marginal productivity of short-term capital, hence interest, rises somewhat, perhaps from 4.0 to 4.5%. When all penultimate adjustments of numbers of capital goods of different maturity terms in the structure are made and net investment ceases, fully restoring equilibrium, then current net yields of capital goods of different terms will again exhibit the proper compound rate relation to each other, now of .045, .092, and .141 per unit for goods of one-, two-, and three-year terms, respectively.

This was the essence of Wicksell's insight into capital accumulation. Taken in conjunction with his analysis of "cumulative processes" in monetary theory, it gave rise to "capital shortage and vertical maladjustment" theses of business cycles, first propounded by one of his followers, G. Åkerman, in 1924, and later, more elaborately, by Pro-

fessor F. A. von Hayek.[33] While these theses were stimulated by, and were in a sense a logical outgrowth of Wicksell's work, we must emphasize that he did not share this perspective on business cycles, nor is it likely he would have concurred in the policy recommendations to which they gave rise.

V.—Contributions to Economic Theory—Dynamic Analysis

A. *Distributive Shares and the National Dividend in Conditions of Capital Accumulation and Technological Change*

Wicksell was the first among modern theorists to subject the question of relative and absolute distributive shares to rigorous analysis. His work was stimulated by reflections on Ricardo's famous chapter "On Machinery" and by Böhm-Bawerk's emphasis on lengthening the production period as a defense mechanism brought into action by rising wages.[34] Wicksell's treatment assumed a perfectly competitive society with a constant labor force and quantity of natural resources. His demonstrations showed the impact on the national dividend and on distributive shares of (1) net investment without technological change, (2) technological change without net capital formation, and (3) technological change and net capital formation proceeding chiefly in the "height" dimension of the structure. His conclusions may be expressed as follows.

Capital expansion in "width" and later, progressively, in "height," always increases the national dividend by the social marginal product of new capital. What happens to the distributive shares of capitalists, on the one hand, and of laborers-and-landowners, on the other, depends on the degree of capital intensity society has achieved, and on the downward (negative) acceleration of the marginal productivity of real capital. If capital intensity is small, both the relative and absolute share of capitalists rises, while the absolute share of labor-land also rises, though more slowly. With slight capital-intensity marginal productivity of capital can not have proceeded far into the stage of diminishing returns, and so the interest rate declines only slightly with net accumulation. But, *ceteris paribus*, accumulation eventually makes society capital intensive. Then the relative and absolute shares of labor-land increase; the relative share of capital declines, its absolute share continuing to increase slowly.

His analysis of technological change in the absence of net accumulation was a refutation of the Ricardian dictum that adoption of labor-

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[33] G. Akerman, *Realkapital und Kapitalzins*, Vol. II (Stockholm, 1924), and F. A. von Hayek, *Prices and Production* (1934), *Profits, Interest, and Investment* (1939), and *The Pure Theory of Capital* (1940).

[34] *Über Wert*, pp. 101-5; 113-16, and *Lectures-I*, pp. 133-44; 163-66.

saving machinery proceeds regardless of whether the national dividend declines in the process, as long as its adoption is profitable to entrepreneurs. Wicksell showed that technological improvement always increases the national dividend as long as perfect competition prevails. For it increases the average productivity of the factors though not necessarily the marginal productivity of all factors equally. For instance, it may increase that of land more than that of labor and lead to much labor displacement and hardship as land is progressively substituted for labor. But labor displaced by conversion of acreage from grain to pastoral agriculture will offer itself at competitively lower wages and so make grain farming more profitable than it was. This prevents full conversion of acreage into sheep-runs and intensifies cultivation on remaining grain farms. *Ergo*, the national dividend increases and contains more mutton as well as bread with, probably, some wool for export. Yet, he conjectured, most inventions raise the productivity of both labor and land and thus prevent a serious decline in labor's absolute share.

As net accumulation proceeds, labor and land constant, it proceeds progressively in the "height" dimension because long-maturity investments become *relatively* more profitable as wages and rents rise. This retards but can not stop the rise in wages and rent and the decline in capital's relative share. However, if at the same time some technological improvements occur, then, as he said:

> ... the position is different *where,* as may easily happen, *some technical invention renders long-term capital more profitable (absolutely) than previously.* The consequence must necessarily be—so long as no further capital is saved—a diminution in the "horizontal dimension" and an increase in the "vertical dimension," so that the quantity of capital used in the course of the year will be reduced; an increased quantity of current labor and land will consequently be available for each year's direct production; and, although this need not necessarily cause their marginal productivity and share in the product to be reduced—since the total product has simultaneously been increased by the technical discovery—yet a reduction may clearly result. *The capitalist saver is thus, fundamentally, the friend of labor, though the technical inventor is not infrequently its enemy. . . . That the transformation of circulating into fixed capital, i.e. the change from short-term to long-term investments, may frequently injure labor is beyond doubt.*[35]

Thus technological change, if it enhances the marginal productivity of long-term investments *absolutely,* is likely to reverse the downward trend of the interest rate and the rise in wages and rents that otherwise follow from net accumulation with labor and land constant.

[35] *Lectures-I,* italics supplied, p. 104.

The foregoing shows clearly that Wicksell anticipated by almost three decades several of the conclusions of J. R. Hicks in *Theory of Wages* (1932). Hicks acknowledged his indebtedness to Wicksell's work. To see how close the connection is, one need only recall Hicks's suggestive theory of inventions. It strikes us that Hicks's induced (labor-saving) inventions that would have been profitable without an antecedent change in relative prices (*i.e.*, rise in wages, decline of interest) come to the same thing as Wicksell's "technical invention that renders long-term investment more profitable (absolutely) than previously."[36]

For all the progress Wicksell made with the shares-problem, one aspect of it invites criticism—namely, his constant treatment of it on the assumption of perfect competition, which is useful only for dealing with technologically stationary societies of atomistic enterprise. Once the scene shifts to technologically progressive societies, the problems of large-scale enterprise and imperfect competition inevitably intrude themselves into the analysis. Yet he was well aware of the relation between decline of competition and economies of scale in dealing with the product-exhaustion problem (*Lectures-I*, pp. 126-29, 131, 133). If Wicksell had also pursued his distributive shares discussion on the assumption of imperfect competition, then he might have discovered that oligopolistic market structures are apt to bring forces into existence which threaten the very source of technological progress in the interest of protecting existing investments against obsolescence. It was undoubtedly for lack of a developed theory of the firm that he was unable to effect this integration, in itself not far to seek, between his observations concerning imperfect competition in "value theory" and those of his "theory of distributive shares."

B. The Wicksell Effect

In his distributive-share analysis Wicksell stressed a force which is a partial offset to the decline of interest under continuous net accumulation, a phenomenon also observed by the classical economists, especially J. S. Mill, in their speculations concerning the tendency toward a zero interest rate and, presumably, a stationary society. This was the observation that a certain portion of net real saving is absorbed in rising real wages and rent during an interval of capital formation. This seemed a strong guarantee against a zero interest rate, for rising wages and rent could be expected to absorb enough net saving to prevent creation of the quantity of capital that would drive its marginal productivity to zero. Wicksell was rather preoccupied, in three separate

[36] J. R. Hicks, *Theory of Wages*, pp. 121-27.

demonstrations, with this partial-wage-absorption of saving, so much so that we label it the "Wicksell effect."[37]

He used his demonstrations as an argument against the full applicability to the factor real capital (at both the macro- and the microeconomic level) of "Thünen's law," as he used to call the marginal productivity principle. An increase in real capital, like that of any other factor, augments output by an increment, the social marginal product of capital. If we divide this output-increment by the net real saving that was destined and accounts for the increase in real capital, we obtain the "social marginal productivity rate" of real capital. Now if Thünen's law is to apply, this rate must equal the rate of interest ruling at the end of the period of net capital formation. Actually it does not, for the social marginal productivity rate of capital is somewhat smaller than the interest rate in proportion to the extent to which rising wages and rent have absorbed some of the net saving. The interest rate, on the other hand, is determined by the marginal productivity of the somewhat smaller quantity of real capital that was created. Now, *per contra*, if society's labor force (or its land) increases, other factors constant, the resulting social marginal product when divided by the labor increment gives us its social marginal productivity rate which, since no similar absorption of labor power has occurred, equals the rate of wages (or rent) at the end of the interval of labor increase. Thus Thünen's law applies fully to labor and land and their remuneration, but it applies to real capital only at the private or micro-economic level.

There were difficulties with Wicksell's argument and proofs, matters we can not enter on here, yet he was substantially right about his "effect" being a phenomenon uniquely associated with changes in the factor real capital. His stress on it was effective in the sense that his proofs were a first attempt which gave rise to a succession of more effective ones to study the process of capital formation in detail.

Essentially, the Wicksell effect points to a host of problems connected with adjustments between the capital structure and (1) changes in income distribution, (2) changes in magnitude and composition of total output (relatively more or less capital goods or consumption goods when total output varies), and (3) changes in income dispositions of individuals (saving versus consumption when income varies) that are called forth by variations in the capital structure itself. These are ad-

[37] J. S. Mill, *Principles of Political Economy*, Ashley edition, pp. 67-68, 79-90, 713-14. Wicksell's demonstrations occur in *Über Wert*, pp. 112-14; *Lectures-I*, pp. 177-80, and in his review of G. Åkerman's *Realkapital und Kapitalzins*, Vol. I (1923), in *Ekon. Tidskrift* (1923), a review now translated and appended to *Lectures-I*, where wage-absorption-of-saving is discussed verbally, pp. 269 ff., and mathematically, pp. 291 ff.

justments which seem to be required to maintain equilibrium or to prevent the "vertical maladjustments" that von Hayek stresses. As such, the Wicksell effect at the real level is a force opposed to that of "forced saving" at the monetary level of analysis in his cumulative processes. If Wicksell had juxtaposed these two forces on a common plane of discourse, he might have arrived at a capital-structure-maladjustment thesis somewhat similar to von Hayek's. For it can be shown, though we must refrain from the attempt here, that von Hayek's vertical maladjustment," or, in the later versions of his thesis, his "Ricardo effect," represents the swamping of the Wicksell effect that must occur by the increasing momentum of "forced saving" in the upward cumulative process.[38]

C. Monetary Theory

Undoubtedly, Wicksell's greatest contribution lies in the field of monetary theory. During the years 1898-1915 he became the founder of modern monetary analysis. He originated the aggregate demand-supply approach—emphasizing especially the relation of investment to savings—to changes in value of money and associated changes in tempo and scope of economic activity which find expression in fluctuations of price levels, income, and employment. This is not to say that he had an explicit theory of income and employment in the sense of the contemporary "Stockholm" and "Keynesian" schools, for, inter alia, he had no clear understanding of the consumption function and its impact on the determination of income. Yet, and herein lies perhaps his greatest merit, he developed the all-essential analytic framework within which these and other "schools" have generated their theories by using substantially the same variables he used, but assigning different values or rôles to them and dismantling some of his restrictive assumptions concerning perfect competition, perfect foresight, and so forth.

Wicksell acknowledged an intellectual debt to the participants of the bullionist controversy at the opening of the 19th century and an even greater debt to those, especially Thomas Tooke, who carried it on at mid-century as the currency-banking school polemic and in the debates surrounding the passage of the Peel Acts. They, together with Marshall and I. Fisher, may be regarded as his forerunners.[39] For it is still true that when Wicksell began his work, monetary theory was confined to

[38] Cf. the writer's doctoral thesis, Knut Wicksell—A Study in Economic Doctrine, pp. 276 ff., 290-97 (University of California, 1950).

[39] The relation of Wicksell's to earlier monetary doctrine has received attention by F. A. von Hayek in Production and Prices, pp. 1-32, and in Alvin Hansen's Monetary Theory and Fiscal Policy (1949), Appendix A and Chaps. 3 and 6, respectively. We should also mention that when D. Davidson pointed out to him, in a note in Ekonomisk Tidskrift (1916), that Henry Thornton had expressed a thesis akin to that of Interest and Prices in his treatise Inquiry into the Nature and Effects of the Paper Credit of Great Britain (1802), pp. 283 ff., Wicksell was delighted and surprised to find that ideas akin to his own

varied expressions of the simple quantity theory. Apart from his own contributions, it remained in much the same state in the rest of the world until the 1920's, as is indicated by the success of I. Fisher's work, *The Purchasing Power of Money* (1911), and a second edition as late as 1922.

Monetary discussion was mainly devoted to questions of currency reform, mono- versus bi-metallism, and these versus "tabular" standards of value. Even Marshall with his insight into "real balances" as a prime constituent of the demand for money and his stress on the need for exercise of "bank rate" to restrain speculators and forestall panics, did not transcend the traditional concern over currency standards and the mechanism of payments.[40] In all fairness it can be said that with Marshall and Fisher the problem of value constancy of money was reduced to finding ways and means to make investors reckon in real terms and to bar "speculative" as distinct from "sound" investment. But in their systems there was no direct path from the elasticity and quantity of currency to the forces that act on individual income dispositions and on entrepreneurial production decisions. Keynes, who professed to labor in the Marshallian tradition, belatedly came to recognize this as is shown by his assessment of Marshall's and Wicksell's respective efforts in monetary theory.[41] Since we have already dealt with Wicksell's proposals for reform of monetary institutions, we proceed here to his apparatus of monetary analysis.

1. *Wicksell's Concept of Money and Credit.* In his criticism of the "simple" quantity theory, Wicksell made it clear that monetary analysis must proceed in short-run defiance of Say's law by means of an aggregate demand-supply approach.

> Every rise or fall in the price of a particular commodity presupposes a disturbance of the equilibrium between the supply and demand for the commodity. What is true in respect of each commodity separately must doubtless be true of all commodities collectively. A general rise in prices is therefore only conceivable on the supposition that the general demand has for some reason become, or is expected to become, greater than the supply. . . . Any theory of money worthy of the name must be able to show how and why monetary or pecuniary demand for goods exceeds or falls short of the supply of goods in given conditions.[42]

were "ancient" enough to antedate Ricardo's writings. This may serve as a reminder to those who regard Wicksell as a "rediscoverer" of Thornton's work, for instance, Professor E. Whitaker in *A History of Economic Ideas,* p. 701. Wicksell's work was evidently done independently and in ignorance of that of Thornton. If anyone is to be credited with rediscovering Thornton, perhaps the honor should go to D. Davidson.

[40] A. Marshall, "Remedies for Fluctuations in General Prices" (1887), reprinted in *Memorials of Alfred Marshall* (1925), pp. 188-211.

[41] J. M. Keynes, *A Treatise on Money,* Vol. I (1930), pp. 186, 192-93, and 198.

[42] *Lectures-II,* pp. 159-60.

For his purposes, a question of the conditions for value constancy of money and of the causes and consequences of its fluctuation in value, he adopted the following general concept of money:

> ... money is a quantity in two dimensions, quantity of value, on the one hand, and velocity of circulation, on the other. These two dimensions multiplied together give the "efficiency" of money (a term due to Helfferich) or its power to facilitate the turnover of goods in a given period of time.[43]

This expresses the left side of the Fisher equation of exchange, MV. Although Wicksell studied the forces that account for variation in V, the reciprocal of the extent to which "value storage" occurs in the form of money, his analysis of V was neither complete nor fully integrated with the rest of his system. Briefly, it amounted to an income velocity explanation of the rate of turnover of cash balances.[44] Yet his study of velocity led him to a fruitful insight, that the influence of credit on currency "may under all circumstances be regarded as accelerating the circulation of money," i.e., increasing its "virtual velocity" (Lectures-II, p. 67).

From this he concluded that in a "pure cash" economy V is practically a constant, and the old quantity theory holds without qualification. At the other extreme, a "pure credit" economy (one where checking accounts have almost entirely replaced currency and where the total amount of deposits is fully subject to the policy discretion of the central bank), this V becomes a variable magnitude which may, potentially, approach infinity. Here the "supply of money" is perfectly elastic, and, subject to the central bank discount rate, adapts itself perfectly to the demand for money. Accordingly, he conducted most of his monetary analysis on the assumption of a "pure credit" system for a closed economy. This gave him a great advantage in generalizing his treatment by relegating particular monetary institutions into the background, and, as Ohlin put it, thus "escaping from the tyranny that the concept 'quantity of money' has exercised over monetary theory."[45]

2. *Wicksell's Theory of Monetary Equilibrium and his Norm for Monetary Policy.* Wicksell's apparatus of monetary analysis can be indicated as follows. Aggregate demand consists of money income spent for consumption and money income saved. Aggregate supply has two corresponding categories of goods, output of consumption goods and of capital goods. Changes in the value of money or in the price level must

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[43] *Ibid.,* p. 19.

[44] The quantity of money is the sum of cash balances; the demand for money is a demand for cash balances. The latter has several constituent elements, the most variable of which is a demand for balances to accommodate accumulation of savings which are not simultaneously absorbed in investment; *cf. Interest and Prices,* Chap. 6, and *Lectures-II,* pp. 59 ff.

[45] B. Ohlin, in his "Introduction" to *Interest and Prices,* p. xiv.

be determined by the interaction of these variables. Savings enter the money market as a supply of investable funds, where, if banks do not indulge in net creation nor in net destruction of deposits, they become available at a loan rate which equates entrepreneurs' investment demand for them to their supply. Investment demand is determined by the "real rate of interest," *i.e.*, by the "expected yield on recently created real capital," the analogue of marginal efficiency of capital. The monetary equilibrium that arises when the loan rate equals the real rate was expressed in this manner:

> The rate of interest at which the *demand for loan capital and the supply of savings exactly agree,* and which more or less corresponds to the expected yield of the newly created real capital, will then be the normal or natural real rate. It is essentially variable. If the prospects of employment of capital become more promising, demand will increase and will at first exceed supply; interest rate will then rise and stimulate further saving at the same time as the demand from entrepreneurs contracts until a new equilibrium is reached at a slightly higher rate of interest. At the same time equilibrium must *ipso facto* obtain—broadly speaking, and if not disturbed by other causes—in the market for goods and services, so that wages and prices will remain unchanged. The *sum* of money incomes will then usually exceed the value of consumption goods annually produced, but the excess of income—*i.e.*, what is annually invested in production—will not produce any demand for present goods but only for land and labor for future production.[46]

This equilibrium may be disrupted in several ways by his famous "cumulative processes." The real rate and investment demand are highly variable because expected yield of capital is affected by innovation, population growth, opening of new markets, etc. For one of these reasons the real rate rises while the loan rate remains constant. Investment demand rises above the concurrent supply of voluntary savings, but the deficiency is made up by net deposit creation within the pure credit system. Rising investment demand has begun raising prices on capital goods and shifts the distribution of augmented money income in favor of entrepreneurs. The latter, anxious to expand investment on roseate profit prospects, compete for labor and land fully employed elsewhere, and succeed in attracting some of these resources away from consumption goods production at a rise in wages and rents. Thus output of consumption goods declines somewhat while money income and consumption spending of workers and landowners increases. Hence consumption goods' prices rise, and their rise makes profit prospects in capital goods industries even brighter. This induces further expansion there at another rise in wages and rents with further curtailment of consumption output and a subsequent new rise in their prices, etc. This process might go on indefinitely until hyperinflation ends in a

[46] *Lectures-II,* p. 193.

crisis in the course of which the loan rate is raised. It may be raised above the level of the real rate with consequences of cumulative deflation, or it may be raised to equal the latter in which case a new equilibrium arises, most likely at prices that are somewhat higher than in the initial situation.

Wicksell did not insist that cumulative processes necessarily must terminate in crises of hyper-inflation or deflation; nor did he exclude the possibility they may set in motion forces that eventually generate a new equilibrium without crisis. He was content to have demonstrated that the discrepancy between the rates ". . . is enough to explain actual price fluctuations which manifestly cannot be due to variations in the quantity of gold . . . ," (*Lectures-II*, p. 200).

But even in a pure credit system, the banks are not in a position to know the vagaries of the real rate. Yet he insisted their primary duty is to give money value-constancy, *i.e.*, to stabilize the price level. The means to that end is for them to vary the loan-rate in the same direction as the drift of the price level away from its normal index level of 100. The result would not be perfect price stabilization but price fluctuation narrowed to a much smaller range than in the past. Moreover, in conditions short of a pure credit system, he was fully aware the banks can not effectively stabilize the price level by interest rate policy if large, autonomous changes in money quantity occur (for instance, gold in- or efflux for a particular country; for the world as a whole, a sudden rise in gold production or its cessation altogether; or if governments engage in heavy deficit finance and/or fiat issues, or their opposites). But the gold complications were presumably remediable by his international clearings system and the effective demonetization of gold, and, except in times of war, there should be no occasion for serious interference with price stabilization from the side of government finance.

3. *Modification of the Monetary Policy Norm—The Wicksell-Davidson Polemic.* His prescription of price stabilization as the norm for monetary policy rested on a tacit assumption which Davidson was quick to discover. This led to a polemic between the latter and Wicksell in *Ekonomisk Tidskrift*, 1906-1909. While Davidson had the better part of the argument, the issues between them were never properly joined because of the crabbed manner in which both of them argued.[47]

Davidson's point was that price stabilization is only consistent with maintenance of equilibrium if productivity is constant, but if the latter changes, the proper norm is to let prices vary roughly in inverse proportion to the change in productivity. We have initial equilibrium and productivity rises, which means the real rate rises, hence the banks should raise the loan rate accordingly. If this is done, money income

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[47] This polemic has been sketched by B. Thomas in "The Monetary Doctrines of Professor D. Davidson," *Econ. Journal*, Vol. XLV (March, 1935).

remains constant, but increased productivity means larger output which must then be sold at declining prices. Now, if the banks insist on stabilizing prices, then they must reduce the loan rate to prevent the price decline. If so, the loan rate becomes "too low" and lays the basis for an upward cumulative process. For reduction of the loan rate means net deposit creation and an increase in factor payments proportionate to the rise in productivity. This increase in factor incomes is not likely to be divided between saving and consumption in the same proportion as the increase in output is composed of consumption and of capital goods. Most of the extra money income may be spent for consumption at a rise in consumption goods' prices which becomes the basis for an upward process.

It was years later, 1925, after Sweden had tasted severe inflation during World War I, and after Davidson had published the substance of his own monetary analysis in articles in *Ekonomisk Tidskrift*, 1918-23, that Wicksell conceded the strength of his argument. His concession came as an admission that banks can not effectively prevent the inflation that results from "commodity scarcity," *i.e.*, from the equivalent of a decrease in productivity, caused by blockade and other dislocations of warfare.[48] Yet Wicksell did not abandon price stabilization as an imperfect, but to his mind the only practicable criterion for monetary policy. In a peaceful world, he argued, there would be no war-caused "commodity scarcity" nor any other occasion for inflation due to precipitate "decrease in productivity." As for "increase in productivity," he averred such increases are of small scale and are a secular force that does not seriously distort equilibrium relations in the short run. As for Davidson's norm, to let prices vary inversely with changes in productivity, he thought it a counsel of perfection and pointed to the pervasiveness of imperfect competition to block its adoption. Thus he was convinced the practical choice lay between his own norm and no definite norm at all.

4. *Major Characteristics of Wicksell's Monetary Analysis.* Looking back on the foregoing, the salient features of Wicksell's innovation in monetary theory may be summarized as follows:

a. His explanation of cumulative price level fluctuations reversed the alleged relation between changes in money-quantity and the price level as expounded in the quantity theory. It was generally the other way around; the price level rises or falls without corresponding change in money-quantity or in output, but its fluctuation causes a corresponding change in velocity of circulation of money. In the absence of (1) large, autonomous changes in money-quantity (due (i) to the *modus operandi* of the gold standard, or (ii) to major changes in government finance),

[48] For evidence of this concession see *Interest and Prices*, pp. 201, 204-05, 213-15, where one of Wicksell's last articles, "The Monetary Problem of the Scandinavian Countries," originally published in *Ekon. Tidskrift* (1925), has been translated and included as an appendix.

and in the absence of (2) large, autonomous changes in productivity, price level fluctuations were caused by a divergence between real and loan rates of interest.

b. The driving force behind the movement of prices was a variable investment demand functionally related to the real rate, which latter varies in response to the impact of "real forces," such as innovation, population growth, and so forth.

c. The variability of investment demand implied short-run divergence between aggregate demand and supply. For consumption demand (aggregate income minus saving), does not readily shift out of equilibrium with the supply of consumption goods *except as* total income changes. Hence changes in income were primarily due to a divergence between investment and savings.

d. A moving price level with its attendant changes in circuit velocity of money implies a change in the magnitude and distribution of total money income, and a "forced" change in the allocation of real income between consumption and formation of real capital, a phenomenon which in his day was expressed by the conception of "forced saving" and its opposite.

e. Maintenance of monetary equilibrium and its restoration after disruption was entirely placed on the adjustment powers of central bank discount or interest policy. Optimistically, he considered such policy equally capable or arresting and reversing a deflationary price movement as he, more realistically, thought it capable (in the absence of gold standard, or fiscal interference, or drastic productivity change) of arresting and reversing an inflationary price movement.

f. His analysis proceeded on assumptions of (i) a closed economy with a pure credit system, with (ii) perfect competition on all markets, (iii) high mobility and full utilization of resources, and (iv) near-perfect foresight for all except central bank directors who, because of their deficiency in this regard, must be guided by rational norms of monetary policy.

5. *Transformation of Wicksell's Heritage of Monetary Theory: The Rise of the "Stockholm School."* Shortly after his death, Wicksell's heritage of monetary theory and also that of Davidson, underwent a searching exegesis and expansion by the efforts of younger economists in Sweden, notably Professors Lindahl, Myrdal, and Ohlin, whose labors gave rise to the vigorous, contemporary "Stockholm School." We can not enter into this interesting development here, but it may be useful to point out the primary transformations Wicksell's heritage has undergone in this process.[49]

[49] The rise of the "Stockholm School," 1927-35, is related in Ohlin's article, "Some Notes on the Stockholm Theory of Saving and Investment," *Econ. Journal* (1937), reprinted in *Readings in Business Cycle Theory* (1944), pp. 87-130; *cf.* further the well-known works of E. Lindahl, *Studies in the Theory of Money and Capital*, and G. Myrdal, *Monetary Equilibrium* (1939).

Lindahl and Myrdal approached the Wicksellian heritage in the conviction that entrepreneurial anticipations are the strategic factor to which most other economic variables respond. Each selected a more refined technique of analysis than Wicksell had used. Lindahl entered on a sequence or intertemporal equilibrium analysis, and Myrdal used a complementary technique of disequilibrium analysis, the *ex ante, ex post* method. The former attempts to find the conditions that influence and determine the direction of entrepreneurial anticipations and then seeks for criteria for policy that will elicit the kind of entreprenurial behavior that tends to maintain or restore economic stability. The latter asks how, with the *ex post* data on which analysis must proceed, shall we be able to tell whether anticipations have been consistent *ex ante*, and if not, in which direction from *ex ante* equilibrium are we drifting? In both cases a systematic study was made of the Wicksellian apparatus under more realistic assumptions than he had used, assumptions of imperfect competition, imperfect foresight, underutilization of resources, and so forth. Some characteristic conclusions are as follows.

The significant variable, investment *ex ante*, is determined by entrepreneurial anticipations, and it in turn accounts for changes in income, and, via the latter, for the adaptation of savings (by *ex post* gains or losses) to the rate of investment. Since factor prices are not very flexible, income fluctuations account for variations in employment. Thus fluctuating income levels take the place of Wicksell's fluctuating price levels as the important variable. For the price level adapts itself to changes in income, and in adapting itself it effects changes in distribution of income, just as in Wicksell's case it was the quantity of money that adapted itself to the movement in the price level and affected income distribution in that process.

Monetary equilibrium or equality between *ex ante* investment and saving is compatible with price movements provided they are not cumulative and unilateral. It is also compatible with and conditioned upon human and other resource underutilization to a degree corresponding to the extent of market imperfection. Here a price-structure underemployment equilibrium emerges as an alternate to Keynesian underemployment equilibrium based on interest-inelastic investment demand and on a minimum level of interest rate determined by infinite elasticity of liquidity demand for cash balances.

In maintaining and restoring equilibrium, interest rate policy can be of service, for instance, in adapting flexible prices (capital values) to changes in inflexible prices (wage rates), but it can not guarantee full employment. Its rôle is rather one of removing monetary causes of instability and of adapting the money and credit structure to nonmonetary causes of economic change. The latter must generally be dealt with by nonmonetary measures.

Because of imperfect competition and the coexistence of flexible

and inflexible prices, interest changes by themselves are likely to be ineffective in achieving a sufficient approach to economic stability. Therefore, monetary policy requires coordination with other policy, especially with fiscal policy. Moreover, interest rate reduction in depression is unlikely to suffice for initiating recovery. The latter depends more on maintenance of consumption at some level not far below its average level, for instance, by means of public expenditures for social security, unemployment benefits and by private disinvestment. Cushioning of consumption and deferral of replacement investment during the downturn are together likely, after some time, to raise *ex ante* investment demand above the reduced rate of *ex ante* saving and thus provide a basis for recovery.

These and other insights, made available by the intensive and comprehensive work of the Stockholm School, indicate, however sketchily, some broad features of the transformation of the Wicksellian heritage.

VI.—Conclusion: A Comment on Wicksellian Economic Philosophy

Perhaps it is fitting to close this paper with a general remark about the economic philosophy of Wicksell and his followers. That philosophy may be characterized as experimentalist on the positive side and as devoid of orthodoxy on the negative side. Neither he nor his followers have been imbued by strong preconceptions in favor of *laissez faire* systems. They were willing to bid the "unseen hand" farewell and place increasing reliance on deliberate, rationally conceived economic policy as constituting the best prospect for achieving greater stability and internal harmony in the economy. Because their outlook was focussed on, and to some extent enabled them to anticipate, the course of economic change, it avoided doctrinaire allegiance to particular positions and opposition to all others that has vitiated much of the reasoning among various "schools" outside as well as inside the Marxist camp.

It is readily granted that such a frame of mind *per se* is no guarantee against errors and bias in analysis, nor against selection of less-than-best policy alternatives. Yet it preserves and widens the scope for such objectivity as is possible in social science. It conduces to an open-mindedness, a willingness to generate and test new approaches, including a certain readiness to take calculated risks where the *a priori* yields no unique answer. Needless to say, such a philosophy, which is the *essence* of the Wicksellian heritage, for all its adaptibility does not lack for method and rigorous discipline. Yet, its success seems to rest on its having avoided making a straight-jacket out of discipline and on its having been able to distinguish between its assumptions and reality.