Tradition & Discovery

The Polanyi Society Periodical

Volume XXV **Number 3 (completes Volume XXV)** **1998-99**

ISSN 1057-1027

Preface

This issue of *TAD* is the issue immediately following the death of William. T. Scott, a physicist, philosopher, Polanyi scholar and the man, who just after the death of Michael Polanyi, was asked by Magda Polanyi to write a biography. That was a project which Bill Scott worked on for many years but did not complete, since his own health declined. Marty Moleski, the scholar now completing the project Bill began, and I have put together an obituary for Bill; we discuss not only his Polanyi biography but the many other worthy endeavors Bill undertook. Following this obituary, you will find "At the Wheel of the World:The Life and Times of Michael Polanyi," one of Scott's finest essays on Polanyi, which originally was the address he delivered at the 1991 Kent State Polanyi Centennial Conference. Also you will find Paul Craig Roberts and Norman Van Cott's essay "Polanyi's Economics." Roberts was invited to the 1998 Polanyi Society meeting in Orlando and gave this paper. Few scholars familiar with Polanyi's philosophical thought also know much about his ideas about economics.

There are two reviews in this issue. John Flett discusses a new book that has information on The Moot, an intellectual discussion group in which Polanyi participated. In an early interview with Richard Gelwick, Polanyi reported that his interactions in The Moot were very influential in shaping his ideas. Also you will find my review of Richard Allen's 1997 collection of Polanyi essays published under the title *Society, Economics, and Philosophy--Selected Papers.* Allen has put into circulation 25 interesting Polanyi essays which undoubtedly will now get some attention.

Note also, on page 4, that the tentative program for the upcoming 1999 Polanyi Society annual meeting in Boston has been set. By early October, the papers should be available to anyone attending (or anyone interested) on the Polanyi Society WWW site (http://www.mwsc.edu/~polanyi).

Phil Mullins

Tradition and Discovery is indexed selectively in *The Philosopher's Index* and *Religion One: Periodicals.* Book reviews are indexed in *Index to Book Reviews in Religion.*

NEWS AND NOTES

Mars Hill Audio has just published, in July, 1999, a two and one-half hour program on two audio cassettes titled *Tacit Knowing Truthful Knowing: The Life and Thought of Michael Polanyi*. Included are comments by Marjorie Grene, Richard Gelwick, Thomas Torrance, Ruel Tyson, and Marty Moleski. This program is part of Mars Hill Audio *Reports*, a series of audio documentaries on significant figures and ideas. For information immediately, contact Mars Hill Audio, P. O. Box 118, Quinque, Virginia 22965 or e-mail: tapes@MarsHillAudio.org. A future issue of *TAD* will provide more details.

Struan Jacobs(swjacobs@deakin.edu.au) recently published a paper, "Michael Polanyi's Theory of Spontnaneous Orders", in *The Review of Austrian Economics*, Vol. 11, No. 1/2, 1999: 111-27.

Carlo Vinti has recently published a book, *Michael Polanyi—Conoscenza scientifica e immaginazione creativa*. Roma: Edizioni Studium, 1999. ISBN 88-382-3817-0.

Three issues of *Appraisal* (Vol. 2, No. 1 [March 1998], No. 2 [October 1998] and No. 3 [March 1999]) have come out since the last *TAD* listing of articles. About half of Vol. 2. No. 1 introduces the thought of another Hungarian born philosopher, Aurel Kolnai, who is in the same generation as Polanyi. Editor Richard Allen provides biographical data on Kolnai as well as the following short papers papers by Kolnai; " Three Riders of Apocalypse," "Elements of a personalist Conception of State and Society," "Jottings on Personalism" and "Advising." Francis Dunlop's essay, "Aurel Kolnai's 'Inchoate Sketch of A Theory of Morality'" and John Pollard Hittinger's "Aurel Kolnai and the Metaphysics of Political Conservatism" round out the Kolnai material. The following two additional articles are included: Georg H. Neuweg, "Self-Reference and the Loss of Meaning," Paul Dean, "F. R. Leavis and Michael Polanyi on Meaning." Vol. 2, No. 2 [October 1998] contains material from the April, 1998 *Appraisal*-sponsored Polanyi Conference as well as other material. Revised conference papers include the following: Norman Wetherick, "Polanyi and Psychology," Robin Hodgkin, "The Genesis of Technology," Percy Hammond, "Technical Knowledge," James Lund, "Philosophy and Paideia; Their History in Relation to Pragmatism," Martin X. Moleski, SJ, "Fuzzy Logic: The Beauty of Unclear and Indistinct Ideas." The issue also includes Angela Botez' essay "Michael Polanyi and Lucian Blaga As Philosophers of Knowledge" and Joseph Labia's working paper "Subject and Object." The most recent issue of *Appraisal* (Vol. 2, No. 3 [March 1999]) contains additional material for the April, 1998 Appraisal Conference: Norman Sheppard, "Michael Polanyi and the Philosophy of Science: The View of a Practising Scientist," Julian W. Ward, " "Idealism or Realism? Polanyi's Epistemology Compared with that of Kant, " Paul Dean, "Polanyi and the Teaching of Literature" Additionally, there is Chris Goodman's essay, "Beyond Nihilism" presented at the April, 1999 Appraisal Conference as well as a provocative short piece by Harold Turner titled " Oldham, Temple and Polanyi: Some Contrasts for Discussion."

Upcoming 1999 Polanyi Society Meeting in Boston

The tentative program for the Polanyi Society annual meeting to be held in Boston on November 19 and 20, 1999, is printed below. Paper titles are not yet available but session topics have been formulated. More complete information will follow in the next issue of *TAD*. As in past years, papers will be available before the session; they will probably be posted on the Polanyi Society web site (http://www.mwsc.edu/~polanyi) by early October if not before.

The location for the meetings is listed below. As in past years, Polanyi Society sessions are held in conjunction with the annual meeting of the American Academy of Religion and Society for Biblical Literature. The Polanyi Society meetings have in recent years occurred just prior to the official opening of the AAR/SBL meetings. Because of the pressure for space, these large umbrella professional organizations are now carefully monitoring hotel reservations. It is necessary to register for the AAR/SBL annual meeting to be eligible for hotel accommodations in one of the primary hotels near where meetings are held. However, anyone who is interested is welcome to attend the Polanyi Society meetings, whether or not they are attending the AAR/SBL meetings. The Hynes Convention Center where the Polanyi Society meetings will occur is a stop on the subway. If you want information about registration for the AAR/SBL meetings (and information about hotels), please phone AAR/SBL Joint Ventures at 404-727-2343.

The papers in both sessions this year are concerned with questions about Polanyi's realism. Since papers will be posted for downloading, they will not be read in the sessions. The format for each session will open with a panel discussion that is focused on particular papers.

Friday, November 19, 1999—Hynes Convention Center, Room 312—9:00-11:00 p.m.

"Science, Meaning and Reality"

Chair: Andy Sanders

Panelists: Walter Gulick, Dale Cannon, and Phil Mullins

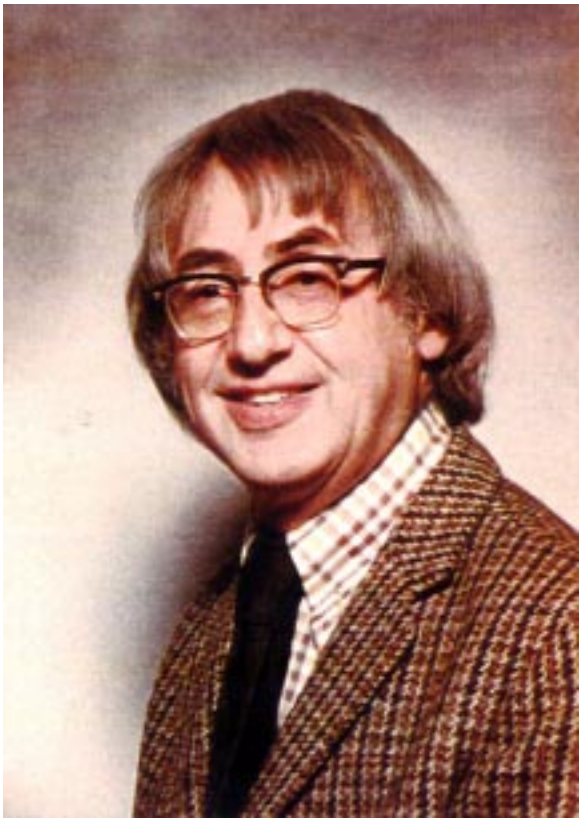
Saturday, November 20, 1999—Hynes Convention Center, Room 312—9:00-11:30 a.m.

"Realism, Ethics and Religion"

Chair: Walter Gulick

Panelists: Stefania Jha, Andy Sanders

For addition information: Martin X. Moleski, SJ
Department of Religious Studies
Canisius College
Buffalo, NY 14208
Tel: (716) 888-2383
FAX: (716) 886-6506
moleski@canisius.edu



William T. Scott, 1916-1999

ABSTRACT Key Words: William T. Scott, Michael Polanyi, Polanyi biography
These remarks are an obituary for William T. Scott who worked for many years on a biography of Michael Polanyi. In addition to providing an overview of Scott's own life and work, his connection with Polanyi is reviewed.

William Taussig Scott, a physicist and a friend and an important interpreter of the life and thought of Michael Polanyi, died February 22, 1999, after a long and fruitful life. Bill died peacefully at Friends House, Santa Rosa, California, twenty-three years to the day after the death of Michael Polanyi whose biography he worked on diligently for most of his last twenty years. In 1977, when Bill visited Magda Polanyi, Michael's widow, he was surprised when Mrs. Polanyi asked him to write a biography of her husband.[1] When asked why he was the person for this undertaking, Mrs. Polanyi stressed the importance of finding a biographer with background in both science and philosophy. As remarks below suggest, certainly Bill Scott was well suited in terms of his background.

William Taussig Scott was the first child of Carl Forse Scott and Dorothea Taussig Scott, born in 1916 in Yonkers, New York. His father was an engineer with a classicist's heart. His paternal grandfather was a distinguished and impractical etymologist for the *Century Dictionary*, and was likely Bill's inspiration for an academic career. His maternal great grandfather, from whom the name "Taussig" came, was a Czech pharmacist, doctor and judge. Family lore suggests that Bill was a curious child who enjoyed working on mathematical puzzles; he remembered working on such puzzles at night in bed!

Scott received a superb education at Scarborough School, Swarthmore College (B. A. 1937) and the University of Michigan (Ph. D. 1941). Bill became a Quaker at Swarthmore and was passionately committed to peace all of his life. He was a conscientious objector in World War II. Later he served as a counselor in the Vietnam War and helped found the Northern Nevada Peace Center and Sierra Interfaith Action for Peace. While living in Nevada, the governor twice awarded Bill the Thornton Peace Prize. As a bright young physicist, his professional life was influenced by his decision not to work on weapons research. His life as a scientist was frequently that of a social activist: Bill was a co-founder in 1949 and president of the Society for Social Responsibility in Science, an early international organization whose members included Einstein.

Scott worked as a teacher of physics at Amherst College and Deep Springs Junior College for a few years before becoming a professor at Smith College from 1945-61. He then moved to the University of Nevada, Reno and the Desert Research Institute where he taught and did research as an atmospheric physicist on how cloud droplets coalesce. One of Bill's more fascinating articles, "The Gentle Rain—A Search for Understanding" is included in *Intellect and Hope: Essays in the Thought of Michael Polanyi*.[2] This essay was Scott's attempt to illumine aspects of the cloud physics program he worked in, using Polanyi's theory of knowledge.[3] During his career, Bill published many articles in theoretical physics, atmospheric physics and on the teaching of physics; he wrote a textbook *The Physics of Electricity and Magnetism* in the late fifties that took a somewhat unusual historical approach.[4] In 1967, he published *Erwin Schrödinger: An Introduction to His Writings*, which is a brief study of Schrödinger's life and work in philosophy and theoretical physics.[5]

Bill Scott always had broadly interdisciplinary interests and projects. While pursuing his Ph. D. at Michigan, he considered changing his field to philosophy of religion. Although he did not make the change, Bill's interest in philosophy and religion bore interesting fruit. For a decade, Scott was Director of the Committee on Philosophy of Inquiry at the University of Nevada, Reno, a program that sponsored twenty interdisciplinary courses with support from the National Endowment for the Humanities. In 1959-60, Scott took a sabbatical at Yale University. He had a National Science Faculty Fellowship to work with Henry Margenau on quantum measurement theory, but he also undertook studies in theology with Robert Calhoun and other Yale Divinity School faculty. It was at Yale on the 24th and 25th of November, 1959 that Scott first encountered Michael Polanyi.

Polanyi was invited to give the Eddington Lecture at Cambridge University on the 16th of February of 1960 and the contract required that a printed copy of the lecture be on sale in Cambridge the day after delivery. This requirement meant that Polanyi needed to finish preparing his lecture "Beyond Nihilism" for the printer before departing for the United States in mid November. While in the United States, Polanyi took the opportunity to try out his already completed lecture at Princeton (November 18), Harvard (November 23) and Yale (November 24). Here is what Bill said in an early draft from his biography about his first meeting with Polanyi:

> Although I had purchased his *Personal Knowledge* and his shorter book *The Study of Man* on the recommendation of a friend, the books were still unopened on my shelf when I was invited to a forthcoming faculty dinner for Polanyi and asked to serve as his host at breakfast the following morning. Over the weekend I was driven to a hasty reading of *The Study of Man*. Although I was intrigued by Polanyi's topic, "Beyond Nihilism," and attended his evening lecture with interest, I failed to comprehend his account of life transcending physics and chemistry; it did not fit my lifelong grounding in physics.
>
> At breakfast the next morning I protested to Polanyi of what I thought was an error. Although Polanyi very politely set me right, he was a man of exquisite courtesy; I nevertheless realized that I still misunderstood him.

After his initial encounter with Polanyi, Scott took seriously the project of trying to understand Polanyi's perspective. He appreciated Polanyi's grounding in science and came to find convincing both Polanyi's philosophical and cultural analysis.

> Later, when I delved into Polanyi's major work *Personal Knowledge*, I was excited to discover a scholar who profoundly addressed contemporary issues of belief and value, speaking from a formidable background in physical science and providing a new understanding of the knowing process throughout the wide range of human experience. Polanyi presented an analysis of our situation as persons who have lost the ability to justify our beliefs, beliefs which we do indeed hold but hesitate to admit into our rational discourse. Dealing with an extraordinary variety of subject matter, he gave an insightful view of the causes of our loss and showed the way to the rational holding of our fundamental beliefs. I realized that I had found the bridge between authentic science and authentic faith that I had long been seeking.

Scott often emphasized two components of Polanyi's analysis.[6] As a physicist, Scott particularly appreciated Polanyi's discussions of the hierarchical structure of reality:

> For this physicist for whom the world was once really and merely a collection of atoms, Polanyi revealed a world filled with a rich variety and complexity of realities, of which the physical is merely the substratum. The Polanyian concept of the hierarchical structure of the universe shows the dependence of each organized entity on successive sets of boundary conditions. By demonstrating how each set of boundary conditions is necessary but not determining for the understanding of the level above (e.g., the gears of a watch are necessary but not sufficient for the explanation of the watch), he frees us from the concepts of reductionism and determinism that have straightjacketed scientific and philosophical thinking. By coupling the ideas of boundary conditions and hierarchical levels of reality, Polanyi creates a new and fruitful way to relate the intricacies of science to the life of the human spirit.

Scott also held that Polanyi's concept of tacit knowing recovered for the scientific and philosophical tradition the fundamentally human nature of inquiry:

> Thus tacit knowledge gives a respectable status to intuitive processes, which are commonly treated as being secondary or inferior, and provides a basis for trust in our own perceptions and in the perceptions of others. By demonstrating the ubiquitous personal element in the entire knowing process, Polanyi puts the person back into the scientific world view from which he has been removed from the time of Descartes.

After he had thoroughly read and digested *Personal Knowledge*, Scott wrote a review.[7] He sent a draft of the manuscript to Polanyi and the ensuing correspondence opened the door to a friendship that lasted the rest of Polanyi's life. In addition to letters and occasional visits, Scott spent a sabbatical in 1969-70 in Oxford on a National Science Foundation grant studying and writing in the history and philosophy of science, working with Polanyi and Rom Harre.

After Scott decided to take on the challenging assignment as a biographer, as requested by Magda Polanyi, he initiated a program of study and writing marked by extraordinary care and thoroughness. It was a program generously supported by the University of Nevada Physics Department, by grants from the American Philosophical Society, the Max Planck Gesellschaft and the National Endowment for the Humanities. Bill traveled and interviewed Polanyi family members and a great many friends and associates of Polanyi. He made thousands of note cards and many recordings. He read and re-read all of Polanyi's published work—including all the approximately 200 scientific papers—and many relevant unpublished documents. Early in his work, Bill had the good fortune to interest Monika Tobin, a woman of Austrian descent with good training as a historian, in his biography project. Tobin proved invaluable in organizing the mass of data that Bill collected; later, she helped with writing and checking details. Tobin stuck with Bill's project throughout his life and continues to provide advice to the Polanyi Society members who have been working to bring the work Bill started to publication. At the November, 1991, Kansas City Polanyi Society meeting, Bill's wife Ann asked Phil Mullins, Walt Gulick, Richard Gelwick, and Charles McCoy to form an advisory committee. The group provided guidance, support and helpful criticism of Bill's work.

What we now know that we did not know in the eighties—when people began to ask Bill if he was about to finish his biography—is that Bill suffered from and eventually succumbed to Parkinson's Disease. Although it was not diagnosed until the mid nineties, it seems likely that Bill's work for some years was hampered by Parkinson's manifestations. Bill was able to pull together a very succinct view of Polanyi's life, presented in April, 1991, at the Kent State Conference (see the following article), but he was unable to finish the biography as he had intended. Ann Scott set aside her own work as a writer and devoted herself to helping Bill finish the Polanyi manuscript. Anne Scott and Monika Tobin completed the last draft of the manuscript in 1994 and sent it out to readers and publishers for comment. In 1997, Ann Scott and the advisory committee agreed that Marty Moleski, acting as a co-author, would produce an abridged and revised version of the biography.

The first draft was 293,000 words and consisted of twenty-five chapters. Bill chose to take a thematic approach to Polanyi's career, treating adsorption, x-ray crystallography, reaction kinetics, transition state theory, and economics in separate chapters; the manuscript also contains extensive summaries of the stages by which Polanyi developed *Personal Knowledge*. The 1994 edition was quite uneven in its format. Part of the work Moleski has done is to impose a uniform style on Scott's manuscript so that it may be preserved for future reference in Scott's archives at the University of Nevada in Reno, and in the Polanyi archives at the

University of Chicago. Moleski then cut the length to 168,000 words and rearranged the material in chronological rather than thematic order. This version of the biography has been in the hands of the readers since early in 1999. Monika Tobin is finishing the work on footnotes and bibliography. A final draft of the manuscript should be ready for circulation to publishers at the end of 1999.

Those who met and knew Bill Scott in Polanyi Society gatherings will miss his calm, gentle and often persuasive comments, injected in the rowdy fray of discussions of papers delivered at Society meetings over the last twenty-five years. Bill is survived by his spouse Ann Herbert Scott and five of his six children, Jennifer, Stephanie, Melanie, Peter and Kate and six grandchildren.

Phil Mullins and Marty Moleski, S. J.

Notes

[1] Scott briefly described his discussion with Mrs. Polanyi in a draft of the Preface for his unfinished Polanyi biography. Many who knew Bill and his spouse Ann Scott, of course, also heard verbal accounts from them of how Bill came to be the Polanyi biographer. Some additional details that follow are drawn from draft materials in the unfinished Scott manuscript. The authors wish also to thank Ann Scott for a 1997 interview and for providing other materials on Bill's life and work.

[2] William T. Scott, "The Gentle Rain: A Search for Understanding." *Intellect and Hope, Essays in the Thought of Michael Polanyi*. Eds. W. H. Poteat and Thomas Langford. Durham, N. C.: Duke University Press, 1968: 242-274.

[3] See also William T. Scott, "The Personal Character of the Discovery Mechanisms in Cloud Physics." *Scientific Discovery: Case Studies*. Ed. Thomas Nickles. Dordrecht, Holland: D. Reider, 1980: 273-291.

[4] William T. Scott, *The Physics of Electricity and Magnetism*. New York: John Wiles, 1959 : 635 pp.; revised editions , 1966 and 1977.

[5] William T. Schott, *Erwin Schrödinger: An Introduction to His Writings*. Amherst: University of Mass. Press, 1967: 175 pp.

[6] The following quotation discussing these two components comes from a 1994 draft Preface for the biography manuscript. But see also Scott, "The Gentle Rain," 243 for a similar emphasis.

[7] This was subsequently published as William T. Scott, "Polanyi's Theory of Personal Knowledge: A Gestalt Philosophy," *Massachusetts Review*, 3, No. 2 (1962): 349-68.

At the Wheel of the World: The Life and Times of Michael Polanyi

William Taussig Scott

[Editor's Note: The following essay is a revised version (dated May 2, 1991) of the lecture Professor Scott delivered on April 12, 1991 at the Kent State Centennial Conference. This essay was published by the Polanyi Society in the proceedings volume for the conference, *From Polanyi to the 21st Century* (1997) which was edited by Richard Gelwick.]

ABSTRACT: Key words: Pollacsek/Polanyi family, Michael Polanyi biography
This essay provides some interesting elements of early Polanyi family history as well as comments on Budapest and Hungarian history and culture at the turn of the century. It presents the Polanyis as intellectuals immersed in a worldly environment, led by "Cecil-Mama," the radical mother of Michael Polanyi.

When Michael Polanyi was a boy of sixteen, he accompanied his mother Cecile on a vacation to the Tyrolean Alps. Soon Cecile and a group of her lively friends left him behind to attend a socialist gathering in Stuttgart. Michael sent her a teasing appeal: "I beg little mother to let somebody take your place at the wheel of the world for a few moments and write a letter to your Misi because he loves you a lot."

It was natural for young Michael to think of a member of his family "at the wheel of the world." Mama Cecile Pollacsek and Papa Mihaly Pollacsek were part of the small coterie of Budapest intellectual elite who put forward new ideas as if they had an army behind them. Cecile and Mihaly were ambitious for themselves and for their six children who adopted the new family name of Polanyi to better fit them for leadership in Hungarian affairs. The children expected to be at the wheel of the world as well.

Cecile herself was the daughter of Andreas Wohl, a scholar of distinction in the city of Vilna, the center of Russian Jewry, now Vilnius in Lithuania. A teacher of Jewish history, Wohl refused the honor of becoming chief rabbi of the city because he disliked Jewish ritual. Liberal in religious attitude, he wrote an article relating the Talmud and the New Testament and regularly sent Christmas greetings to the Pollacsek-Polanyi family who did not take part in traditional Jewish religious practices.

Michael's father Mihaly was the descendent of a line of prosperous Jewish mill-owners who were also liberated in their religious practice. He studied civil engineering in Switzerland and Germany. While working for the Swiss National Railways Mihaly became so adept at designing railroad systems that he was sent to study the layout of the London and Edinburgh rail stations. The visit imbued him with a lifelong admiration for the Protestant work ethic and English ways of doing things.

Mihaly and Cecile met in Vienna, then the seat of the Austro-Hungarian Empire, a city alive with European culture. There Mihaly became a successful railroad financier, and there the first four children were born: Laura, called Mausi by everyone, in 1882; then Adolf, a year later; then Karl, in 1886; and Sophie, in

1888. When Mausi was eight years old, the Pollacseks moved to Budapest, drawn by new opportunities in the Hungarian railroad system and the expanding economy.

The move was an auspicious one for the young family. Budapest was a vigorous metropolitan city. The imperial Habsburgs appreciated the role of Jewish financiers and industrialists in building the Hungarian economy and had given new freedoms to Jews. Among Hungarian intellectuals, the search for social betterment was a subject of intense concern. The spirit of the 1848 revolutions was alive in those liberals who looked to the English system with its steady procession of reforms; others turned to the Marxists with their conception of class struggle and the supposed necessity of violent revolution to overcome oppression. Soon these political and social issues would be part of the nightly conversation around the Pollacsek dinner table.

Mihaly set up his family in an elegant apartment, an entire spacious floor at 12 on the great new boulevard Andrassy ut. There the younger children were born, Michael in 1891 and a few years later Paul, who was institutionalized as retarded. In these pleasant quarters the children were provided with English and French tutors, a German governess, Hungarian servants, a fencing instructor and a groom to take care of their horses. Karl's wife Ilona later described the rigorous education that Mihaly set up for his children: "In the morning a cold shower, an hour of gymnastics, hot cocoa with a roll, Schiller and Goethe, Corneille and Racine, all this with private teachers." The family spoke German at home and considered the grasp of English and French fundamental to a European education. Surely one needed more than German and Hungarian to take one's place at the wheel of the world!

Meanwhile Cecil-Mama, as she became affectionately known to generations of Hungarian intellectuals, established her famous salon where she attracted the new poets, artists, dramatists and writers influenced by the West. Talk was intense and wide-ranging. Cecile had the knack of finding something in a new visitor's work that would evoke stimulating conversation.

On some evenings the whole family took part in home theatricals. These were times of high hilarity. Cecil-Mama assigned roles to everyone, even to father Mihaly who was himself an amateur actor and the handsome subject of a family treasure, a large portrait in dramatic theatrical costume. While their mother dreamed up the script as the play went on, the cast of delighted children became wilder and wilder in the family act of creation. Michael remembered these happy evenings through the more sober years ahead.

As the children grew older, the talk around the dinner table reflected the range of the family interests: avant garde theater, an exhibit of Impressionists, Russian politics, a new rural branch of the railroad, Tolstoi and Dostoievsky, Ibsen and Nietzsche. Mausi, the eldest, became an early feminist and historian, one of the first women to get a Budapest Ph.D. Adolf was the distant, brilliant one, later to be expelled from his law studies at the University because of his part in the creation of a socialist student movement. Karl, the outgoing debater and always the closest brother to Michael, was already showing interest in questions of economic history and social policy. Sofie, the gentle young homemaker, did not take up with the excited political and philosophical discourse. But young Michael was all ears.

The joyful life on boulevard Andrassy ut came to an abrupt end in 1900. When the railroad line Mihaly had been building from Budapest north into Poland was washed out by three months of steady rain, he conscientiously paid his laborers and all his other creditors and entered into bankruptcy. Subsequently, he was reduced to consulting jobs and traveling on hard third-class railroad seats in his new job for the Frankfurt Fair.

The family was forced to give up their servants and move to a modest fourth-floor apartment.

Five years later the Polanyis were crushed by another unexpected tragedy. Mihaly caught pneumonia going into the snow after a hot sauna and died soon after. The family responded to this new grief in a variety of ways. Cecile was struck with indolence, depending on Mausi and Sofie to care for the household. Adolf hurriedly returned from Japan to a job in Budapest and Karl found ways to continue his University studies while earning his living on the side. When Mausi married Sandor Stricker, a well-to-do textile manufacturer, he helped support the rest of the family.

Michael was fourteen, fortunately by then well established in the *Minta Gymnasium*, a model humanistic school. While other schools stressed piety and patriotism, the *Minta* fostered creativity and thought. The school attracted some of Hungary's best teachers and bright students like Michael who enjoyed the chance to think for themselves. Michael thrived in the heady academic climate of the *Minta*, earning part of his school costs tutoring rich boys in whatever subject they needed.

In his eight years at the *Minta*, Michael studied Hungarian and German literature, Latin and Greek, religion, history, art, geography, natural history, descriptive geometry, mathematics and physics. Physics and art were his favorite subjects with poetry and drama close behind. He wrote a scientific paper on the specific heat of gases (later he said it was "nonsensical"), and like many of his classmates also wrote poetry, mainly in German. With his earlier grounding in English, he was able to read the science fiction novels of H. G. Wells as they came from the press, revelling in the idea of using science to make a better world. As president of the school's student association he lectured on Endre Ady, the controversial Hungarian poet and political revolutionary, at the holiday celebrating the 1848 uprising.

A special source of excitement during Michael's school days was a series of vacation visits to old family friends, Russian emigres Samuel and Anna Klatschko at their home in Vienna. Klatschko devoted a large part of his income as a patent official to helping Russian refugees with subsistence and false passports, sometimes sending them to Budapest where the Pollacseks helped in finding places to stay for a while. The Klatschko family told many tales of heroism and escape and also introduced Michael and his brothers to the works of many notable Russians: anarchist Bakunin, playwright Chekov, early leaders of Marxism Plekhanov and Axelrod, composer Tschaikowsky and others.

Michael's letters home from vacation were full of ideas and philosophizing. He talked about the Heraclitean changes below his window and lifted his eyes to the Eleatic realm of ideal permanence. Discussing the scientists who judge the world by appearances and cannot get at the *Ding an sich*, he conjectured that this reality behind appearances might be movement, energy, aether or molecules and observed that this ultimate cause affects him although he has nothing to do with it. In more intimate moments, he wrote to Mausi about his impressions of healing among the diverse and very strong personalities of their family.

After his graduation from the *Minta*, Polanyi matriculated in the medical program at the University of Budapest along with a fourth of his school classmates. While the idea of physical chemistry appealed to him—it was like physics but more intuitive—he may have been daunted by fear of the mathematics that would be involved. Certainly his interest in science was more visual and experimental than abstract and mathematical. Perhaps he simply recognized that there would be greater financial opportunities as a medical doctor than as a professor of physical chemistry—in those days most scientists were people of independent wealth. Or

perhaps it may have been only in medicine that he could find a University professor to sponsor him.

We have little record of Michael's university days. But we do know from his classmate and close friend the mathematician George Polya of their respect for the lectures given by the famous physicist Lorand Eötvos. Polya and Polanyi enjoyed great discussions after each of these physics lectures. We also know that Polanyi found an opportunity to work in the Pathology Laboratory of Ferenc Tangl. Tangl was convinced that pathology must be founded on physics and chemistry, and Polanyi's six papers on pathology show that his main interest was in the precise physical and chemical methods rather than in the pathological findings.

There were no formal courses in sociology at the University and Karl Polanyi helped found a student group called the Galileo Circle, to explain the scientific point of view on various areas including the social sciences. Professor Gyula Pikler was adviser, an economist, physiologist and philosopher of law who stated "Scientific research and speculation must never give way to religious, social, or political considerations." The 256 members elected Karl Polanyi as president. Michael joined the Circle's "Committee on Natural Science" and gave occasional talks on physics and chemistry.

In the spring of 1912, Michael decided to take time out from medicine to explore his growing interest in physical chemistry. This discipline was new in academia and well-developed at only Leiden and Karlsruhe. Since Karlsruhe was nearer Budapest and had already attracted a congenial group of Hungarian students, Polanyi decided to go there. Professor Ignaz Pfeifer of Budapest, experienced in helping impoverished but talented students, located a wealthy young man whom Michael could tutor for his room and board and encouraged him to enroll in the summer term.

Polanyi's course work at Karlsruhe included advanced thermodynamics—he very much liked its neat logic. He was especially interested in the Nernst Heat Theorem, which says that the measure of disorder called entropy should go to zero in a substance as its temperature T goes to zero on the absolute scale because all molecular motion ceases at absolute zero and the molecules become perfectly ordered. Polanyi reflected on this claim and it occurred to him that the disorder should also disappear if the pressure p on a piece of matter got stronger and stronger.

Although the faculty at Karlsruhe was competent, only Polanyi's mentor Professor Georg Bredig knew the new developments in the theory of thermodynamics. Bredig told Polanyi that his conception seemed valid but he would like to find an expert to judge it after Polanyi had written it up carefully. At the end of the term, Polanyi went back to Budapest and devoted six months to study all the relevant material he could find in the literature on the Nernst theorem.

Polanyi finally produced a short letter to the editor and a fully explicated larger paper and sent them to Bredig who promptly sent them to Einstein as the best expert in such matters. Einstein replied immediately: "The papers of your Mr. Polanyi please me a lot. I have checked over the essentials in them and found them fundamentally correct. The thought that the entropy would behave at $p = 4$ as at $T = 0$ is a happy one."

However, as scientists know today, there is a practical difference between $p = 4$ and $T = 0$: it is possible to get the temperature low enough to show the zero-value effect, but one cannot get p anywhere big enough to show the approaching-infinity effect. Perhaps the center of a black hole has the right conditions, but I do not know.

So no useful results actually came of it, but Einstein recognized Polanyi's competence. "Bang!" as Polanyi said later, "I was created a scientist". The two papers were soon published as a piece of creditable work that took Polanyi from apprenticeship status to membership in the scientific community.

Polanyi then tried to develop a new derivation of the Nernst theorem, one that would be more physically satisfying. When Polanyi wrote to Nernst with his ideas, Nernst replied unpleasantly. He saw no need for a different derivation and that there were errors in Polanyi's letter. However, Einstein kindly corresponded with Polanyi and helped his younger colleague get his mathematics of limiting processes cleared up. To jump ahead a bit, Polanyi and Einstein exchanged six letters between November 1914 and July 1915 followed by seven later letters in the next two decades without any substantial exchange of views. I am sorry to disappoint whoever it was who thought there was evidence of a real collegial sharing between Polanyi and Einstein on philosophical questions. I could not find any.

Obviously at that time Polanyi's interests were not with his medical studies. Although he planned to return to Karlsruhe to continue his work in physical chemistry, he completed his medical courses and received his M.D. degree in Budapest in April of 1913.

The spring of 1913 brought a dramatic change in Michael's life. At the age of 22, he fell in love—his first real love affair. She was a graceful young dancer from Geneva named Jeanette Odier who had come to Budapest to teach eurythmics in Mausi's progressive kindergarten. Jeanette was included in many family dinners though she herself seldom participated in the fierce debates in German and Hungarian on Kant or Ady or whatever subject was riveting the family's attention. Jeanette told me many years later that she first really noticed Michael when he shared his excitement over hearing from Einstein.

Jeanette knew nothing about thermodynamics. But in the sweet spring of Budapest there were other things to think about. She remembered leaving the intense talk of the dinner table "exhausted by what seemed to be a true circus spectacle" to walk along the Danube with Michael, speaking quietly together in French and sharing their common interest in poetry and painting. Michael, always a romantic, loved reciting from his favorite poets: Goethe and Shakespeare, Musset and H`lderlin. It is easy to imagine the petite dancer from Geneva being swept up by the charm of the strikingly handsome young Hungarian and by the dazzling diversity of his mind—qualities that continued to impress Polanyi's friends, both men and women, throughout his long life.

In the summer, the Striker family moved to Austria so Mausi closed her little kindergarten, and Jeanette's job of teaching harmonious bodily motion to pre-schoolers came to an end. Jeanette stayed in Budapest to teach in Cecil-Mama's feminist-oriented Lyceum for Women and Michael left for a year of study in physical chemistry at Karlsruhe.

The young lovers were too poor to consider marriage until Polanyi had the security of a Ph.D. and a well-established position in his field, a reality Cecil-Mama unhesitatingly pointed out. They were engaged for a time but Michael broke the engagement in March of 1917 and not long afterwards Jeanette met and married a Swiss physician.

At Karlsruhe for the year 1913-14, Michael immersed himself in a full set of courses: theoretical,

experimental, technical and mathematical. Although he did little experimental work later in his career in chemistry, the cleverness of some of his experimental designs and his intuitive ability to guide his experimental students showed the influence of his technical work in Karlsruhe. In June at the end of a productive year, he returned to Budapest for vacation, little expecting what lay ahead for himself and for European civilization.

War was declared at the end of July and the guns of August soon took their bloody toll. Although Michael's M.D. training did not include the necessary internship for practicing medicine, the Austro-Hungarian generals needed doctors for the men at the front, experienced or not. Michael enlisted and in September was assigned to a regimental hospital in Zombor. Many enemy soldiers carried cholera, typhoid, and other communicable diseases and infected the Austro-Hungarians. Polanyi reported seeing more men killed by disease than by gunshot. Either way, the carnage was terrible.

Michael found military life a continued flurry of orders and counter-orders with little chance for doctors to practice their profession in the face of the military command's ineptitude. Michael wrote to Karl "Nothing could have destroyed more brutally the illusion that we are self-responsible persons." For this highly organized young doctor/scientist, these autumn days were both frustrating and heart-breaking.

By mid-October, Michael was himself coming down with something. A week later, he was isolated in a Budapest hospital with a mild case of diphtheria. In a fortnight he recovered enough to work in bed, writing professional letters and working on five scientific papers. Meanwhile, he devoured H. G. Wells' newest novel, *The World Set Free*, a fantasy about the invention of an atomic bomb—yes, an atomic bomb—and the response of heads of state who discovered independent sovereignty was no longer possible and joined in creating a world government. "Beeinflussung!" Michael wrote to a scientist friend in Munich. "Influence!"

After his discharge from the hospital in early December 1914, Polanyi returned to Zombor for two months' ward duty and a month's assignment at a field post with the troops. He became sick again, this time with a chronic bladder infection that meant a combination of periods of furlough and light military duties in Budapest until his complete discharge in August 1917. He turned to earning his living by industrial consultation on chemical matters.

Watching the devastation of war strengthened Michael's concern for peace. As part of an Austrian popular movement, Mausi and her children made up ribbons with the motto (in German) "For a Negotiated Peace." In 1917, Mausi traveled to the international Peace Conference in Stockholm as one of the two women delegates from Austria. Later that year, Michael wrote an impassioned plea to the Peacemakers to go to the roots of the war. He declared the fundamental cause was competing sovereignties—not business—and urged Peacemakers to overcome their extreme nationalism and form a supranational community with a European police force to encourage international cooperation towards a new age of wealth and well-being. The influence of Wells' novel is clear.

Of the five scientific papers Polanyi wrote or revised in the wartime hospital, the most important for his career was one that developed a multi-layer theory of the adsorption of gases on the surfaces of solids. The most desirable result of such a theory would be to obtain the curve of the volume of gas clinging to the surface, the so-called adsorption isotherm. However, the law of force between gas and solid was not known and Polanyi cleverly proposed to avoid the trouble by only calculating the change in the curve as the

temperature changes, which could be found by basic thermodynamics. After much revision, his article on adsorption appeared in the *Proceedings of the German Physical Society* for February 1916. After publication, Polanyi translated the article into Hungarian and submitted it as a Ph.D. thesis to Dr. Gustav Buchb'ck of the University of Budapest who accepted him as a doctoral candidate. A neat reversal to publish first and then find a Ph.D. advisor! Polanyi's oral examination was not held until September 1918 and the degree itself not granted until July 1919.

Just a note about the thesis: Although the theory was impressive it later ran into trouble after a 1921 presentation to the Physics Colloquium in Berlin where Albert Einstein and Fritz Haber severely attacked it. They saw that according to the prevailing ideas about electrons and Bohr's atomic theory, electrons would move freely into the bottom layer of the gas and shield the upper layers from any attraction. The whole idea wouldn't work. It was only because by then Polanyi had achieved success in another field that his reputation was saved from catastrophe. Six years later after quantum mechanics was discovered, Fritz London showed that the required type of forces could perfectly well exist and Polanyi's theory was justified. It is now part of the complex of theories that account for adsorption.

Back to wartime Budapest Michael found inspiration for the life of the mind in weekly meetings of the "Sunday Afternooners," a group of artistically and philosophically minded individuals who met in the home of poet Bela Balasz. Discussions were led by philosopher Georgy Lukacs. They began at 3 PM and continued through the night till 3 AM. The subjects of discussion were ethical problems in questions suggested by writings of Dostoevski and Kierkegaard. Michael had already come under the influence of Dostoievski's Grand Inquisitor and Tolstoi's confessions of faith. At that time he considered himself a thoroughly convinced Christian.

The war ended for Hungary with a declaration by the Prime Minister on October 17, 1918. Then followed a series of three revolutions and three regimes. The first was a flowers-in-the-gun bloodless liberal revolution leading to a widely middle-class regime under Count Mihaly Karolyi. Michael accepted a position in the Ministry of Health. His most important duty in this new assignment was drafting a parliamentary bill governing the demobilization process, a job he did so carefully that the bill was accepted without change.

Alas, the intellectuals were so much against politics that they could not do what was needed to get two main reforms accepted. Before they even had a parliament elected, Bela Kun and the Communists made a coup and took over the government. This repressive new regime was also inept, never being able to set up the Soviet style of governance they intended. Struggling with ethnic groups wanting independence, Kun hastily formed a Hungarian Red Army and beat off the Czechs. Michael left his government post and found a quiet job at the University teaching physics, the only non-Red young man on the staff. He had a chance in his free time to try out a new research field, that of the rate of chemical reactions.

When the monarchy broke up at the end of the war, the entire economy of the Austro-Hungarian Empire was in disarray. Mausi and Sandor Stricker with their three children Misi, Eva and Otto, decided to move back to Budapest after selling the textile factory in Moravia. They bought a large English-style house in a big park and moved in, Michael with them, just in time to survive the communist regime. They raised food in half of the garden, both animal and vegetable, and were so successful they only needed to buy a few staples at the market. At the beginning, however, everything was "absolutely crazy." Eva remembers a scene of the piglets racing through the vineyards eating the grapes, followed by the French governess who in turn was

followed by the children. The ducks ate the goldfish, the sheep ate the pomegranates, the dogs hunted the poultry, and the neighbors stole some of the chickens and ducks.

When the Romanians came into Budapest chasing the Reds, there were reports of widespread looting. The Stricker family had tied up some money in bolts of textiles from Sandor's old factory and sent Michael to a field across the way with a pile of cloth and the family silver. He remained sitting on top of the heap until the soldiers had passed by.

When Kun undertook to chase out the Romanians, they responded with great force and occupied Budapest in August 1919, bringing in the third, so-called White Regime, under the Austrian Admiral Horthy. This White Regime brought in antisemitic laws and the Polanyi family was uneasy. It seemed a good time to emigrate. Adolf and family went to Italy, Karl and Sofie and family to Austria, and Michael to Germany--his post at the University of Budapest was taken from him. To continue his research he went to Karlsruhe with its peaceful atmosphere, good library, and friendly community of scientists.

In preparation for this major move, Polanyi prudently put his life in order--along with his genius and charm, he was generally prudent. First, he made sure that his Ph.D. would be formally awarded. Then he re-registered his change of name from Pollacsek to Polanyi and opted for Austrian citizenship. With concern for some minimal income until he found a permanent post, he arranged for the maintenance of his Budapest-based consulting business and for financial help from his lawyer uncle Karl Pollacsek and his wealthy brother-in-law Sandor Striker. Already a convinced Christian at heart, he requested the sacrament of baptism in the Catholic Church. Then he packed his belongings and, in early December 1919, boarded the train to a new life in Germany. This time he was leaving Hungary for good, readying himself to take his place at the wheel of the world.

I have spent much time talking about Michael Polanyi's early years because his remarkable life took shape then. I will have to give more cursory glimpses of the fifty-five fruitful years ahead—I've been studying Polanyi's life and thought for more than thirteen years and could tell you a lot more if I had time.

Polanyi found life in post-war Karlsruhe both stable and spartan with little light for night study and simple meals of whatever his landlady could scrounge at the market. But these were minor matters. After all, he had a place to work, a subsistence income, and the world of physical chemistry was opening before him.

Besides, in the Hungarian student community he met a pretty young chemist with a long blonde braid down her back. Her name was Magda Kemeny. Michael remembered seeing her and her twin sister at a party in Budapest and soon learned that Magda had shifted her studies to the liberal Karlsruhe Technische Hochschule which granted women degrees in chemistry. At Christmas, Michael invited all his Hungarian student friends to a dinner party. Magda remembered there was no wine but Michael had put at her place a single wine glass with one Lily of the Valley. She was charmed.

Michael and Magda began taking regular walks in the hills. Magda confided her ambition of going to Russia to help set up chemical industries and Michael shared his hope for a job in German science. On one occasion, Magda remembered Michael rushing down a steep bank to pick her a special wild flower, thereby dislocating his ankle and needing her help in limping back to town. Magda found Michael "impetuous" as well as charming. "He was a very passionate man," she told me years later. It was little wonder they fell in love. They

were married a year later in Budapest on February 22, 1921.

Since scientific research and publication was his main interest, Polanyi immersed himself in his physical chemistry. When he tried to devise a theory of the rate of reaction of a mixture of bromine and hydrogen gases using known sources of energy, he arrived at a theoretical result that was 300,000 times too slow. Excited to have found what he believed to be a new hidden source of energy, he published papers suggesting that he was on to an as-yet-undiscovered quantum effect in line with the discoveries of Planck, Bohr, and Einstein. It was not until over a year later that he realized that he was wrong. In his excessive ambition, he had overlooked the presence of a fast chain reaction. He wryly dismissed his fascinating idea as his "Zauberei" (magic).

Fortunately, Polanyi's other research activities proved more productive and he was soon offered his first scientific post at the Kaiser Wilhelm Institutes. The move to the Berlin suburb of Dahlem marked the beginning of what Polanyi often referred to as the happiest period of his life. During the following 13 years, Magda and Michael created their first home and became parents of two beloved sons, George and John. And Michael established himself as a physical chemist of very considerable gifts.

Polanyi's new post was in the Fiber Institute, but he really would have preferred to work in physical chemistry on reaction rates. He said as much in his interview with Fritz Haber, the director of the neighboring Physical Chemistry Institute. Haber replied that the rate of reaction is a world problem and that Michael should first "cook a piece of meat", referring to the routine nature of the fiber research immediately ahead. Polanyi got the idea.

Within two weeks after Polanyi joined the Fiber Institute, he found the explanation to a peculiarly puzzling x-ray photograph of cellulose fibers, an answer that was not only far from routine but that represented the discovery of a whole new mode of xray analysis. In recognition of his accomplishment, Polanyi was provided with equipment and resources for a team of assistants to help him tackle problems of the structure and strength of crystal fibers. Over the next 13 years, he and his team produced 53 papers in the field of x-rays and crystals. Nowadays Polanyi and two scientists from other laboratories are jointly credited with beginning the important ongoing study of the mechanical consequences of defects in crystals.

In early 1923, Polanyi moved to the Physical Chemistry Institute, eager to wrestle with a "world problem" and to work on his new idea for measuring the rates of very fast reactions. He used the luminescence of a dilute flame, such as the yellow sodium light, to detect where in time and space the luminescent reaction takes place, and thus get information on what he called "atomic reactions", when just one atom moves from molecule A to molecule B. Polanyi and a second team of assistants studied over a hundred reactions by this method, providing much data for possible theories of the process and establishing the grounds for his son John's Nobel Prize work many years later.

In 1929, Polanyi, with the help of Eugene Wigner, his former doctoral student and Nobelist to be, worked out a scheme for a theory of atomic reactions that can be calculated from a kind of contour map. Just when Polanyi needed the help of a person familiar with contour lines, along came Henry Eyring, an American mining engineer who wanted to shift to physical chemistry. After Polanyi, Eyring, Wigner and coworkers established a theory based on the contour lines approach, Eyring returned to Princeton University to become famous for a great development of it.

Through the Dahlem years, the most important event of Polanyi's week was the Physics Colloquium at the University of Berlin. In the twenties these Berlin lectures were the center of the physics community of the world—it was rare not to have at least three Nobel Laureates taking part. Fifty years later Polanyi recalled: "The seminar ... where Planck, Einstein, Schr`dinger, von Laue, Hahn and Lise Meitner met every Wednesday for informal discussion is still the most glorious intellectual memory of my life." In those days, Polanyi himself gave an occasional paper. All the physics students knew him by sight--the "remarkably good-looking" young physical chemist from Hungary who had the knack of putting difficult things in a simple way.

Polanyi also had the knack of directing his students and assistants in a fashion that encouraged their abilities to think and work independently. His first team of research assistants were given the name of *Assistentenrepublik* for their democratic spirit in sharing in the direction of the lab, as well as for tackling together with their wives the problems of daily cooperative food buying in a rapidly inflating economy. Michael and his assistants frequently played tennis together on the nearby courts, where vigorous scientific discussion would be interrupted by a volley, then resumed at the net.

In contrast to Michael's experience of professional success, Magda met delay, frustration, and discouragement in pursuing her own Ph.D. Although she was able to do some work on her dissertation under the guidance of Michael and his protJgJ von Gomperz, the mounting German inflation closed the Technische Hochschule in Berlin just as she prepared to matriculate. Magda had once hoped to be somehow an equal partner in science with her husband, but now she saw herself slipping far behind. She did some translating but no real research, and no longer spoke of her chemistry. Only later, in midlife, did she use her scientific and linguistic gifts in writing a dictionary of textile terms in four languages.

Nonetheless, Berlin provided much good life for the Polanyis in their early married years. They found the community of Dahlem a satisfying place to work and live—even though the acute housing shortage forced them at first to manage in cramped quarters "like poor people" as Michael explained in a letter to his mother. They found ways to get around the problems of space, taking off the door of their little kitchen so they could set up a table and reciprocate in entertaining their colleagues at dinner.

When George was born in 1922, Michael learned to change diapers and shared with Magda the joys and worries of young parents. By 1925 when Polanyi realized he had no prospect of finding a large enough apartment, they contracted to build a house of their own, an economical wooden one that was unusual for that time and place. It had a lovely lawn and a garden for the pleasure of family and friends. They were living in this house when John was born in 1929.

In those days there were excursions to the mountains, walking and tennis nearer home, social entertaining and occasional times of escape to solitude for reflection and note taking. In times apart Michael reflected on how to create what he called a "life that turns out well;" challenging himself to develop an opus incorporating tradition and memory but also channeling "the intellectual passions with which the mind rushes on ahead of the string of events."

Polanyi's scientific opus proceeded well but gradually he lost his intense motivation and began to yearn for his own philosophical wheel of the world. He liked to think of himself as a medieval knight, disciplined in body and spirit, serving the values of civilized life and called into action by the widespread breakdown of these values. However, the philosophical puzzle of the arbitrariness of moral laws led him to

see that people have to make decisions on their own responsibility in the context of the cultural heritage they have accepted. For Polanyi, this was an early acknowledgement of the personal character of knowing and being.

Life in the sometimes idyllic suburb of Dahlem did not shield Michael and Magda from the dark clouds then gathering over Germany. As early as 1919, Michael had written Cecil-Mama of the power of German antisemitism, especially in the universities. In the political upheavals and insecurities of the twenties, an even stronger power was growing, that of pervasive individualism cut off from its heritage, which led to an increasingly crude and violent political scene. Michael believed the inescapable issues of the time were economic and attempted to keep up with them through vigorous correspondence with his brother Karl in Vienna and through Karl's economist friends Gustav and Toni Stolper who had moved to Berlin. Later, he formed an *Arbeitsgemeinschaft*, a working group of natural scientists who met at Harnack House in Dahlem every few weeks to attempt objective discussion of economic issues.

By 1933, most of Polanyi's Jewish colleagues were losing their jobs under Hitler, but he was temporarily spared because of his wartime medical service and because of his Austrian citizenship. Nevertheless, he decided he had to leave. When the University of Manchester, the most distinguished of the red brick English universities, offered him a position as head of Physical Chemistry, he gladly accepted the post. Six months later, after much to-do with finishing research, shipping laboratory apparatus, and settling personal affairs (all but the laundry which was somehow left behind) the Polanyi family arrived in Manchester at the beginning of September, 1933.

The University warmly welcomed the four Polanyis and installed them in a large house in the Didsbury section, befitting Polanyi's status as a professor. Magda set about the work of purchasing furniture, hiring servants, and arranging for the children's needs. She and Michael agreed on the Quaker Boarding School in Bootham as the right place for eleven-year old George, and they found a daily playmate for four-year old John. Little John spoke not a word to his young friend until he had learned enough English to overcome his shyness. Then he rapidly and permanently switched to the language of the land.

Despite the black fog and the loss of cherished Berlin colleagues, Polanyi found Manchester a good place to be. It was his home base for the next 25 years, a period when his many-sided gifts and interests moved in the fields of physical chemistry, then economics and social theory, and finally philosophy.

In the Manchester lab, Polanyi boldly entered a new phase of research in reaction rates, using as a tool "heavy water," which had been discovered in New York only two years before and was useful for the study of proton transfer reactions. He wanted to study proton transfers in biological compounds but they were generally too unstable for experimental purposes. However, he seized on a stable compound, phthalocyanine, just discovered in a London laboratory, and put his American post-doctoral student Melvin Calvin to work on that compound.

At the Berkeley Centennial Celebration last month (May, 1991) Calvin—now a Nobel Laureate and professor emeritus of the University of California—shared memories of his two years in Manchester with Polanyi. Calvin's own lab was in the basement but he often came upstairs to Polanyi's office, sometimes as often as once a day. What did they talk about? "Anything," Calvin remembered, and then he repeated emphatically, "just *anything*." Calvin also described Polanyi's special gift to him: learning to be "fearless" in following his

own intuition and inspiration.

Others in the Manchester team continued work on the flame experiments and on modifications of the rate theory, both along new lines—with Polanyi, there were always new lines! As his own interests continued to shift toward fundamental economic and political problems, Polanyi was pleased to see his younger colleagues publishing a series of papers on their own ongoing experiments—he called these applications "hatching ducklings."

During these early years in England, Polanyi's lifelong interest in the problems of the world drove him to study the mechanisms of the economic system. He was convinced the woes of periodic unemployment under capitalism helped to engender the passionate revolutionary ideologies of the time. He believed his job was to ask the two technical, not moral, questions. First, what is the mechanism that generates depressions and what can we do to alter it? Second, is a planned economy a workable alternative to capitalism?

Three major projects came out of his explorations in economics. The first project was the book *USSR Economics*, (1935), which was based both on Polanyi's readings and on his four trips to the Soviet Union in the period 1928-35. He made it evident that planned economy was not working. He was pleased that Walter Lippman praised this factual account of difficulties in Soviet production as the work of "an exceptionally gifted observer."

The second project, an original, animated film on the money cycle, was an effort to teach the public how the normally invisible capitalist economy actually functions. The film, titled "Unemployment and Money", came out of five years of work begun on a beach in Yugoslavia and finished in London in the spring of 1940, when wartime concerns overshadowed its importance. Alongside the film project, Polanyi came upon the essence of Keynesian insights on the relation between deficit spending and unemployment, but did not get this relation into the film script. The film was not a success for Polanyi, only being seen by relatively few audiences.

The third project, a scholarly book entitled *Full Employment and Free Trade* (1945) was suggested to Michael by his son George. Polanyi interpreted Keynesian theory by working out a plan for a workable free enterprise system modified to prevent serious depressions and unemployment. The fundamental idea was using deficit spending through newly created money in a way that does not require the burden of heavy interest payments. The book was widely and positively reviewed but later ignored in the plethora of studies by professional economists. Polanyi took the failure of both film and book with wry humor, writing to Mausi "My main point is to say *my say*, so that at least nobody will be able to reproach *me* if the world goes down in the next economic collapse."

At Eastertime, 1935, while he was in Moscow to deliver a paper, Polanyi met the chief Soviet theoretician N. I. Bukharin. Bukharin shocked Polanyi by his statement that Marxists have no need for the "bourgeois" conception of science as motivated by the pure love of truth. Rather, Bukharin explained, science should serve the practical needs of the people as determined by the Party. The Soviet denial of truth in science aroused Polanyi and the zoologist J. R. Baker to the creation of the Society for Freedom in Science and a long literary campaign against the Soviet claims and those of their British supporters.

Many of these intellectuals found resonance with Bukharin's view of science and saw collectivism as the wave of the future for the West as well as the East. As the threat of war grew, Polanyi became concerned that no matter which side won, the great ideals of the free, liberal state would be lost. He saw no movement on the horizon toward formulating an adequate defense of these ideals.

In 1937, in anticipation of his later philosophy, Polanyi wrote down some thoughts about truth, reason, belief, and values: "Truth is a miraculous part of life, for we are always drawing conclusions and entrusting ourselves to our convictions." He continued with several insights that became incorporated later in his book *Personal Knowledge*: perception is active, not passive, and belief is an organ of perception. The reference frame of belief cannot be established by reason though reason can clarify it. Our historic martyrs did not examine both sides of basic values. Instead they chose their beliefs and died for reason and liberty.

When war broke out in September, 1939, Polanyi wanted to devote his scientific talents to allied military needs but was not allowed to. He resolved to take on as his own particular war duty, the preparation of the intellectual defense of liberalism. Since supervising the work at the University of Manchester laboratories took little of his time, he was free for other concerns.

Although Michael and Magda suffered very little from physical damage in the war, it brought them increasing inconveniences in food, heating and communication along with severe emotional strain. Michael volunteered as fire watcher during the bombing raids and Magda worked with an agency assisting bombed-out people—they were both impressed with the calm sturdiness of the bombed-out British.

As the war heated up and fears of invasion grew, the Polanyis soberly shipped eleven-year old John off to Toronto where he spent the next three years with the family of Dr. Michael Cameron under a government program to move children out of danger. In the fall of 1940, George became a student of history in Oxford while undergoing military training there. He joined the Royal Artillery in the fall of 1942 and left for Normandy June 1944. He had the good fortune of being attached to headquarters. The hardest tragedy for the Polanyis to bear was the Nazis taking Sofie's husband Egon from Austria, then Sofie herself and her youngest child Karl. They all died in concentration camps.

In 1944, Michael Polanyi was inducted into the Royal Society in recognition of his creative contributions to physical chemistry, just 27 years before John also became a Fellow. Impressed by a piece of Polanyi's theological writing, Joseph Oldham invited him to join The Moot, a wide-ranging discussion group that met twice a year to hear a paper on some aspect of Christianity. Polanyi expressed his own outlook in a letter to Moot member Karl Mannheim: "In the midst of rising and falling convictions in the general populace, there remains fixed a deeper, secret pivot of faith around which we keep revolving, a code of duty of which we are so unconscious that we cannot formulate even one syllable."

The deepest expression of Polanyi's early Christian outlook was based on St. Paul. He said of his belief: "Fundamental is the fact that from the beginning of my enquiries in the early years of the war I was guided by a conviction that the Pauline scheme of redemption is the paradigm of the process of scientific discovery. It demands us to undertake a task for which our explicit faculties are clearly insufficient, trusting that our labours will be granted success by powers over which we have no command."

Throughout the war period Polanyi pursued his self-assigned duty, composing many articles, speeches and book-length drafts on various aspects of liberty. His thought followed many lines and as usual his mind was filled with more ideas of world scope than he could put together in any one of his book-length projects. It frequently took an invitation to lecture or to publish to provide him with a coherent focus, and the prospect of an attentive audience to stir him into action. Karl Mannheim invited Polanyi to publish a volume in his series on sociology and social reconstruction, on the subject of the structures of a free and creative society. It was published as a collection of essays in 1950 under the title *The Logic of Liberty*. A more immediate invitation came in May 1945, to give a series of lectures that turned into the book *Science, Faith and Society*. These two works satisfied Polanyi's self-set wartime duty and opened the way for the future. However, his writing thus far did not provide fundamental philosophical justification for his claims. He needed to go deeper. Now he turned to what he called his "true vocation: the pursuit of a new philosophy to meet the needs of our age."

The crucial invitation for Polanyi's philosophic direction came in 1947 when the University of Aberdeen asked him to give the Gifford Lectures on science and religion. He accepted with gusto, pouring himself into voluminous reading and intense writing and rewriting at home in Manchester and in country guest houses. The University kindly arranged change in his status from Professor of Physical Chemistry to Professor of Social Studies.

The work was often discouraging. It took four years and several postponements. In February 1949, Michael told Mausi that the task was unfortunately too much for him and he needed to find a compromise. A month later, he wrote to Karl telling of a postponement of the lecture dates, adding "In fact, I was on the point of going down the drain", and in April he confessed to an old friend that he felt as if he was squandering his last years on a "supreme wild-goose chase." But through it all he had support from family and friends, and especially from the vice-chancellor at Aberdeen who patiently put up with Polanyi's delays.

I have not time to discuss the content of the Gifford Lectures which were given in 1951 and 1952 except to remark in general that they formed a substantial part of *Personal Knowledge*, and in particular that the distinction between subsidiary and focal awareness—so fundamental to many of us—was first brought forward in Lecture Seven of Series Two. A small, polite audience of about 50 asked questions but expressed little excitement. After the years of monumental work, Polanyi was disappointed by the little public response.

A book was clearly called for; not just a reprinting but a thorough revision. The preparation of the typescript of *Personal Knowledge* took five years' work, including the publication of about two dozen articles. The American philosopher Marjorie Grene was of considerable assistance, both as critic and as researcher into references. With the help of her children, she constructed a fine topical index, arranging cards all over the table. This book, which is so clearly Polanyi's greatest work and which most of us here have read and benefitted by, went to press in May 1957.

After a short rest, Polanyi was ready to use his still considerable energy for expansion and promulgation of his work, a firm hand on the wheel of the world. After Michael and Magda had a year's combination of travel and living in London, he was invited to a two-year term as Senior Research Fellow at Merton College in Oxford. In due course, he and Magda moved the portrait of Mihaly and their other family treasures to a comfortable house at 22 Upland Park Road, their home base for the remainder of their lives.

Being a resident scholar in an Oxford college did not turn out to be as stimulating as Polanyi had expected. As a new Research Fellow hardly known among British philosophers, he had few dons and students beating a path to his study. It was after he retired from Merton at the age of 70 and was free to spend extended periods of time in the United States that he found his metier to be lecturing in the American academic scene; in every case an enthusiastic and attentive audience gathered to hear him. Even though he continued to feel that England was his home, he certainly had a love affair with America. By 1964, at Duke University, he was able to say to his co-visiting friend Richard Gelwick "I am no longer an invisible man."

Polanyi's work abroad and at home during the next 14 years is known principally through his books: *The Study of Man*, *The Tacit Dimension*, and *Meaning*, the last co-authored with philosopher Harry Prosch. Each of these books was originally given as lectures in one of the ten universities where he spent extended time in interactions with a campus. Less well known is the extent of his speeches and shorter publications during this period. Rather than take my disappearing time to tell you about them, I have included an abbreviated chart showing the places of extended stays, and 35 of the most important papers in five categories. Ten key themes run through all the work which show how much this work was an extension of *PK*: Emergence, Evolution, Culture, Tradition, Creativity, Achievements, Responsibility, Community, Dynamic Society and the need for a New Foundation for Knowledge. This body of work, which one could characterize as putting the person back into the scientific world view, continues Polanyi's great contribution to our time.

In addition to this scholarly work, there were three organizations in which he took an important part. From 1953 until 1967 he was a leader in The Congress for Cultural Freedom, founded by Melvin Lasky in 1950. The second organization where his thought was crucial was the Study Group for the Unity of Knowledge with headquarters at Marjorie Grene's department in the University of California at Davis. A third group was established in connection with conferences of the Consortium of Higher Education Religion Studies in Ohio. Originally called "The Society of Explorers," the group soon changed its name to the Polanyi Society, a sponsor of this meeting. Convivium, the parallel British group, was formed some years later.

By 1970, Polanyi was complaining of feeling his age. He missed his dear long-time correspondents sister Mausi and brother Karl, both no longer alive, but was grateful for the continued life and work of his sons. His charm and curiosity were still a delight to both friends and family. In the upstairs study of the quiet home at Upland Park, he continued his disciplined daily work and carried on his extensive correspondence, confessing that he was exhausted while planning his writing but unhappy when idle. He hoped that one of his younger colleagues would help him complete his latest thoughts. He still wanted to explore further the foundations of religious faith and the domain of human obligations. However, his life was slipping away. "I feel so unbelievably old," he repeated to his friends.

On a visit from Budapest by Erzebet Vezer, Michael Polanyi quoted a line of a poem by Endre Ady in perfect Hungarian: "Tomorrow I'll have run already far, and will weep somewhere." He died peacefully on the 22nd of February, 1976.

In the end, Michael Polanyi found himself unable to carry out all his dreams. But during his nearly 85 years, he fulfilled a remarkable number of them. Did he take his place at the wheel of the world? You will have to judge for yourself.

POLANYI'S WORK 1958-71

EXTENDED STAYS AT UNIVERSITIES

Keele	Edinburgh	Oxford	Virginia	Yale	Menlo Park/ Stanford	Duke	Wesleyan	Chicago/ Austin
Study of Man 1958	Gunning Lecs. 1960	Morton Lecs. 1960-61	History and Hope 1961	Terry Lecs. Tacit Dim. 1962, 1966	Ctr. Beh. Sci. 1962-63 No Publ.	Man in Thought 1964	Ctr. Adv. St. 1965-66 No Publ.	Meaning 1968-71

KEY ARTICLES IN FIVE CATEGORIES

History and Society	Science	Tacit Knowing	Stratification	Religion and Art
Tyranny and Freedom 1958	Unaccountable Element in Sci. 1960	Knowing and Being 1961	Epic Theory of Evolution 1960	Sci. and Relig. Sep. Or Common 1963
Politics of Humanity 1958	Sci. Academic and Industrial 1961	TK and its Bearing... 1962	Science and Man's Place 1964	About Relig. Faith 1964
Beyond Nihilism 1959	Study of Man (Calcutta) 1961	Creative Imagination 1965	Life Transc. Phys. and Chem. 1967	Transc. and Self-Transc. 1968
Faith and Reason, The Sci. Rev. 1961	Republic of Sci. (1962	Logic of T. Inference 1966	Life's Irred. Structure 1967	Acceptance of Religion 1968
Why Destroy Europe? 1965	Science and Reality 1967	Sense-Giving and Sense-Reading 1967	Clues to Mind and Body 1962	What is a Painting? 1970
Message of the H. Rev. 1966	Genius in Science 1969	Logic and Psychology 1967	Structure of Consciousness 1965	On Viewing A Painting 1970
Sixty Years in Universities 1967	Science and Man 1970		On the Modern Mind 1965	
Growth of Sci. in Soc. 1967				

Polanyi's Economics

Paul Craig Roberts and Norman Van Cott

[Editor's Note: Paul Craig Roberts, an economist who was one of Polanyi's last graduate students, was invited to present a paper on Polanyi's economic ideas at the annual meeting of the Polanyi Society in Orlando, Florida on Nov. 22, 1998. The following paper was Robert's presentation. This paper was based upon a longer paper done in 1971with Norman Van Cott and presented to the Western Economics Association; since Dr. Roberts wishes to acknowledge the collaborationof Norman Van Cott, he is listed here as a joint author. This essay appeared recently in *The Independent Review: A Journal of Political Economy* is printed with permission]

ABSTRACT: Key words: Michael Polanyi, Keynesian and monetarist economics.
*In 1945, Michael Polanyi achieved, in **Full Employment and Free Trade**, the integration of Keynesian and monetarist economics that the economics profession did not ahieve until the 1970s. In yet another field, Polanyi saw the heart of important matters long before anyone else.*

People familiar with Michael Polanyi are impressed with his intellectual powers, the range of his mind, and his ability to get to the heart of issues, often long before anyone else. This is no less true of his work in economics. In *Full Employment and Free Trade* published in 1945 by Cambridge University Press, Polanyi synthesized Keynesian economics with the monetary school of economics later associated with Milton Friedman. In this synthesis, Polanyi was at least two decades, and perhaps three, ahead of the best minds in the economics profession.

This is a remarkable achievement, especially for that time. It was generally believed then that John Maynard Keynes' *General Theory of Employment, Interest and Money* had established the irrelevancy of monetary economics. As Friedman later put it, monetary policy was "twice damned" and was considered a useless remedy for unemployment. Moreover, Keynesians also thought that their new theory established that full employment was not the natural state of a free economy.

Amidst this confusion stood Polanyi talking in the same breath about full employment and free trade (by which he meant a free market as opposed to a planned economy)—items considered to be mutually incompatible—and setting out in detail a monetarist explanation of Keynes' theory. Not only did money matter, Polanyi showed that money was all that mattered.

Being untrained as an economist allowed Polanyi to avoid pitfalls that confused economists. It also left him unaware of the magnitude of his achievement. He saw himself as a Keynesian, but in fact he achieved, in the early years of Keynesianism, before the monetarist critique, an integration of the two approaches that economists did not reach until the 1970s.

Needless to say, Polanyi got no credit for his achievement. He was too far ahead of his time and too far outside his bailiwick. Had he possessed an economics chair and graduate students, he might have been in contention as the most important economist of his time, eclipsing both Keynes and Friedman by his early synthesis. Economics and public policy would have been spared the long and pointless Keynesian odyssey

toward big government.

Keep in mind that in 1945 economists still did not know that the Federal Reserve had caused the great depression by shrinking the supply of money. This story was to come later from Milton Friedman and Anna Schwartz. In England the unemployment problem began earlier when the British government tried to re-establish the pre-World War I parity of the pound with gold and the dollar. This required a deflationary policy that deprived the economy of a sufficient supply of money to maintain full employment. When the government abandoned its attempt to return to pre-war parity, Britain started to recover. But at the time there was a jumble of voices. Some were Marxists. And there was the more reassuring voice of Keynes.

Unemployment, Keynes said, was due to an insufficiency of total or aggregate demand. As a result of inadequate demand, resources, which includes people, were left unemployed. The solution, said Keynes, was for government to increase demand by running a deficit in its budget. By spending more than it collected in tax revenues, government would add to aggregate demand.

Keynesians have a diagram, which still exists in economics texts, that shows the sum of consumer and investment demand crossing the aggregate supply schedule at a point below full employment. Government then calculates the gap in demand and fills it in with the appropriately sized budget deficit.

Keynes had his finger on a source of the trouble. There was insufficient demand. But what Keynes, or the Keynesians, did not understand was that insufficient demand was a result of insufficient money.

Polanyi saw this instantly. He produced movies which he showed to audiences all over the U.K. The movies showed what he called the "Money Circle" and the unemployment that resulted when the circulation of money, or the "Money Belt," was not wide enough to maintain full employment. Polanyi's diagrams had the additional advantage of showing that "squirting" money into the economy was not inflationary until the Money Belt widened beyond the width necessary for full employment.

Full Employment and Free Trade used the concepts and terminology that Polanyi had developed for his films for public audiences. Using a "squirting pump" to inject money into a "Money Belt" may have struck economists as childish terminology and kept them from seeing the challenging theoretical concepts that Polanyi had developed. If Polanyi had not felt the responsibility to inform the public and, instead, had used mathematical equations to express his relationships, he might have advanced the economics profession twenty years in one swoop.

On the other hand, Polanyi might have intentionally pitched his appeal to the public on the bet that academics and intellectuals were a lost cause. Polanyi was up against more than terminology, theory and analysis. The same predisposition toward planning, which Polanyi had fought in science, was abundantly present in economics. Polanyi's solution to unemployment—money creation—required no extension of the government sphere of influence. But an increase in the size and role of government was precisely where economists were heading. Economists maintained that full employment was unthinkable in an unplanned market economy. As William H. Beveridge expressed it in *Full Employment in a Free Society:*

> Full employment cannot be won and held without a great extension of the responsibilities and powers of the State exercised through organs of the central Government. No power less

> than that of the State can ensure adequate total outlay at all times, or can control, in the general interest, the location of industry and the use of land. To ask for full employment while objecting to these extensions of State activity is to will the end and refuse the means (p. 36).

Polanyi realized that an insufficiency of demand meant an insufficiency of money. This realization permitted full employment to be maintained without the need for national economic planning and without running up the national debt. There was no reason to incur public debt and interest payments when the purpose of the fiscal deficit was to satisfy an excess demand for money and absorb an excess supply of goods and labor. The government should finance its deficit by issuing new money.

Polanyi, in other words, used Keynes' fiscal deficit to implement an expansionary monetary policy. Even today this is advanced thinking for economists, who still think of monetary and fiscal policy as distinctly different areas of policy.

Polanyi's wedding of monetary and fiscal policy solved a difficulty that monetarists later pointed out in the Keynesian system. Monetarists showed that financing a deficit by borrowing does not increase aggregate demand unless the central bank "accommodates" the fiscal policy by expanding the money supply. Since it is the expansion of money that increases demand, Polanyi's policy of issuing new money to finance a deficit achieves the same result as monetarists achieve when the central bank buys bonds to expand bank reserves. In a depression climate of fear and uncertainty, Polanyi's solution is more direct as it is independent of the willingness of borrowers to borrow and lenders to lend.

The Keynesians of Polanyi's day intended to use public investments to fill the gap in aggregate demand. Polanyi objected, noting not only was this pointless when money creation was costless, but also that the consequences would be to distort the allocation of resources, violate the neutrality principle, and drive down the return from public investment far below the return in the private sector. Polanyi argued that a balance must be maintained between public and private expenditures so that the joint satisfaction derived from both would be a maximum. This principle requires that government expenditures be rationally determined on their merits as investments and that the nation's resources not be squandered in order to fill a gap in demand or to fight "social evils."

Polanyi understood the depression in terms of a shortage of money. He understood its prolonged continuation as a consequence of an insufficiency of money frustrating the public's determination to build up its cash balances. In Keynesian terms, this excess demand for cash balances meant that savings could exceed investment for a lengthy period, thereby continuing the "deflationary gap."

This imbalance would be corrected by issuing money to cover fiscal deficits. "There is a balance between all the needs of man," Polanyi wrote, "and when a certain measure of financial security is attained, the desire for more will be abated" (pp. 41-42). The rate of savings will fall off. Money will be redirected to consumption, and the Money Belt will widen, eliminating the need for deficits.

In 1945 many economists and policymakers believed that depression would resume with the end of World War II. Polanyi, however, predicted correctly that the cash

> balances accumulated during the course of this war are likely to reduce the rate of thrift considerably for a time after the return of peace, and that their possession may even cause the public to spend at a rate which may threaten inflation. In the light of such suppositions it may appear likely that the chronic excess of Savings over Investment and the consequent state of permanent depression, which have so sorely tried the highly industrialized countries in this century, could have been all avoided merely by allowing the public to accumulate cash balances (p. 42).

No economist has ever written truer words.

Appendix I
Polanyi's Adaptation of the "Pigou effect"

Gottfried Haberler in 1937 and A.C. Pigou in 1943 showed that a downward wage-price spiral had the effect of increasing real money balances. As price declines drove up the value of the existing money supply, the increase in real money balances would at some point satisfy savings desires and result in a resumption of consumption. Pigou later dismissed his "Pigou effect" or "real balance effect" as an academic exercise, because a government would not employ a downward wage-price spiral as a means of increasing the real money supply. In contrast, Polanyi recognized the real world policy implications of the real balance effect. He dismissed the wage-price flexibility discussion as irrelevant and stated the "Pigou effect" in terms of constant prices and increases in the nominal stock of money. In Polanyi's approach, the policy issue is not obscured by adverse effects on expectations caused by price level declines.

Appendix II
The Predilection for Planning

By 1945 when Polanyi's book was published, the issue for many economists was no longer one of full employment. Keynesian full employment policy had become a stalking horse for a vast program of social reform. The idea that economic life should ever again be left to the market was beyond the pale for progressive thinkers—regardless of whether full employment could be maintained by careful regulation of monetary circulation. Even the conservative authors of the 1944 White Paper on employment policy were committed to the planning of public investment as a full employment policy and worried that "civilian production, when it is resumed, may concentrate on the wrong things from the point of view of national needs" (p.7).

In his assessment of the White Paper, M. Kalecki noted that budget deficits are not the only path to full employment: "The same end can be achieved by redistribution of income from higher to lower income grades" (p.135).

In Britain the issue was "Plan or No Plan." The "no plan" position called for planning public investments to offset fluctuations in private investment. The "plan" position called for planning private investment as well, if not the entire economy. In 1945 T. Balogh could welcome the King's Speech for

announcing the intention of nationalizing the Bank of England and setting in place "machinery to provide for the effective planning of investment." Balogh noted that in order for the government to operate the economy in the national interest, finance would have to be controlled no less than materials and labor.

In *Full Employment and Free Trade*, Polanyi subjected the White Paper on Unemployment and the Beveridge Plan to devastating criticisms which are as analytically sound today as the day they were written. In addition, he devotes two chapters to showing that the totalitarian powers, Soviet Russia and National Socialist Germany, did not secure full employment with planning, but with increases in monetary circulation.

Polanyi, however, was confronting an intellectual force much more powerful than the Keynesian income-expenditure model and unsubstantiated notions about economic planning. He realized that economic analysis alone could not influence the intellectual and emotional attitude that attributes irrationality and social injustice to societies that evolve on their own by cultivating beliefs inherent in their tradition.Instead, this attitude seeks justice in a society revolutionized from above by "pure and sensitive souls" motivated by "the charming spectacle of the public good." Polanyi would later use these words of Robespierre to good effect when, recognizing that the real challenge was an excess of moral passions, he moved on to diagnose the pathology of our time as "moral inversion."

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Notes on Contributors

Paul Craig Roberts, an economist who was one of Polanyi's last graduate students, is Chairman and John M. Olin Fellow at the Institute for Political Economy (505 S. Fairfax Street, Alexandria, VA 22314) and Senior Research Fellow at the Hoover Institution, Stanford University. He was Assistant Secretary of the Treasury in 1981-82.

Norman Van Cott is chairman of the Department of Economics at Ball State University, Muncie, Indiana.

Phil Mullins teaches in the interdisciplinary humanities program at Missouri Western State College, St. Joseph, MO. He has been the *TAD* editor since 1991and prior to that for several years coordinated the annual meeting of the Polanyi Society. In both capacities, he worked closely with William T. Scott who he first met more than twenty years ago.

Marty Moleski, S. J. currently coordinates the annual meeting of the Polanyi Society. He teaches at Canisius College, Buffalo, NY. For approximately the last two years, he has been completing the Polanyi biography which William T. Scott worked on for many years.

Submissions for Publication

Articles, meeting notices and notes likely to be of interest to persons interested in the thought of Michael Polanyi are welcomed. Review suggestions and book reviews should be sent to Walter Gulick (see addresses listed below). Manuscripts, notices and notes should be sent to Phil Mullins. Manuscripts should be double-spaced type with notes at the end; writers are encouraged to employ simple citations within the text when possible. Use MLA or APA style. Abbreviate frequently cited book titles, particularly books by Polanyi (e.g., *Personal Knowledge* becomes *PK*). Shorter articles (10-15 pages) are preferred, although longer manuscripts (20-24 pages) will be considered.

Manuscripts normally will be sent out for blind review. Authors are expected to provide a hard copy and a disk or an electronic copy as an e-mail attachment. Be sure that electronic materials include all relevant information which may help converting files. Persons with questions or problems associated with producing an electronic copy of manuscripts should phone or write Phil Mullins (816-271-4386). Insofar as possible, *TAD* is willing to work with authors who have special problems producing electronic materials.

Phil Mullins
Missouri Western State College
St. Joseph, Missouri 64507
Fax (816) 271-5987

Walter Gulick
Montana State University, Billings
Billings, Montana 59101
Fax (406) 657-2187

REVIEWS

Reeves, Marjorie (ed.). ***Christian Thinking and Social Order: Conviction Politics from the 1930s to the Present Day*** (370 Lexington Avenue: New York: Cassell, 1999), 224 pages. USD$27.95. ISBN: 0-34-70248-X.

Polanyi, when writing to Mannheim on their experiences in the Moot, acknowledges, "These things…[i.e., Moot discussions] changed our lives" (42). In itself, this is a remarkable statement, since before Mannheim's death in January of 1947, Polanyi attended only four Moot meetings. It is hard to square this minimal contact with its evident impact on Polanyi's thought. Yet, that it had such an impact is well documented. *Christian Thinking and Social Order: Conviction Politics from the 1930s to the Present Day* (*CTSO*) provides the astute reader with an insight as to why Polanyi initially would have joined such a group, and helps outline the atmosphere which shaped much of his thinking.

At a basic level, *CTSO* provides missing historical information and clarifies some questions raised by both Gabor's (Eva Gabor, "Michael Polanyi in the Moot". *Polanyiana* 1-2(2), 1992, 120-126), and Mullins' (Phil Mullins, "Michael Polanyi and J.H. Oldham: In Praise of Friendship", *Appraisal* 1(4), October 1997, 179-190) articles that treat the importance of the Moot for Polanyi. For example, Mullins, in his article on the relationship between Oldham and Polanyi, states, "…there is no mention of an explicit objective for the Moot…." The article in *CTSO* by William Taylor shows the origins of the Moot were found in Oldham's proposal to form a Christian "Order," an elite group which would help form a new cultural Christendom. This "Order" never developed, but an understanding of Oldham's original proposal helps explain Mannheim's influence over the Moot's thinking—more so than any other individual.

CTSO, with its easy style, assumes little acquaintance with the period, and its major figures. In its larger aspect, *CTSO* is an exercise in "historical retrieval" (ix) that treats the projects of Joseph Oldham and his British circle and their efforts to get Christian churches to address "pressing issues of culture, society and politics" (ix) in the middle (and, secondarily, the later) decades of the century. Much of the book is in an introductory style with snipits and outlines of debates, rather than carrying a sustained argument. Due to this orientation, it lacks the particular definition, which might be of interest to those reading to learn many details about Polanyi's background. The precise tributaries to Polanyi's thought are impossible to trace.

CTSO clearly sketches the atmosphere of the times and the unique response of the Moot and its related organizations. It is illumines the Moot's nature as an "informal discussion," and shows the importance of such discussion in the development of thinking in a variety of figures and projects. While the Moot's discussion probably stimulated and helped jell some of Polanyi's ideas, the *CTSO* account does not catalogue or plot Moot discussions. At best, readers can understand Polanyi's context and speculate about where cross-pollination occurred. Although *CTSO* does provide a concise picture of the times unavailable in any other single published work, (with the possible exception being R. Kojecky's very good *T.S. Eliot's Social Thought*, Faber, 1971), the book ultimately leaves the reader feeling unsatisfied.

One important shortcoming of the book is its heavy emphasis on education. This no doubt reflects the life-long emphasis of Reeves herself. Nevertheless, it is frustrating and gives the

book an unbalanced feel. Even the article on the Moot is an abridged version of an essay titled "The Moot and Education," first published in 1996. The overbearing emphasis upon education, rather than illuminating the developing issues, became something, this reader at least, had to wade through.

Recently, some discussions in *Appraisal* (see Vol. 1, numbers 2, 3 and 4) have hinted at an acquaintance between Polanyi and the philosopher John Macmurry. Macmurry's concern to be "a thinker and a doer" provided strong stimulus to the Moot and such a base assumption would have resonated strongly with Polanyi. In this context, questions come up about two other writers and their important books: M. Buber's *I-Thou*, and Jaques Maritain's *Integral Humanism*. Both books were extremely influential, even to the extent that the Moot arranged a special dinner occasion with Maritain. It is impossible in such an environment to imagine Polanyi did not have at least a passing acquaintance with these works. And if it is true that epistemology models ontology, perhaps a study of the ontological models around Polanyi would prove fruitful. Such questions deserve fuller consideration and this book provides a convenient entrance point.

John Flett
jflett@deepsight.org
New Zealand

Michael Polanyi. *Society, Economics and Philosophy—Selected Papers*. Ed. R. T. Allen. New Brunswick, NJ.: Transaction Publishers. 1997. USD $49.95. ISBN 1-56000-278-6.

This new collection of Polanyi articles, put together by R. T. Allen, is a set of essays that range chronologically from Polanyi's first non-scientific publication (1917) to publications near the end of his life (1972). Allen suggests that he avoided pieces that were incorporated in major Polanyi books from the *Logic of Liberty* onward, as well as articles that seemed very closely to resemble other articles or seemed to add little to things written elsewhere (1). What his principle of selection leaves him with is twenty-five essays that suggest the range of (non-scientific) topics that Polanyi reflected on in his long life. Some of the essays (e.g., "Genius in Science" published in 1972 in *Boston Studies in Philosophy of Science*) may be familiar to those who have explored a bit beyond the major Polanyi books. But many of the essays are selections that fall outside of philosophy of science, treating topics in economics, politics, religion and aesthetics. These essays, Allen groups into three categories, "Political Questions," Economic and Social Theory" "Mind, Religion and Art," (in addition to his fourth category,"The Theory and Practice of Science"); I will focus my comments here chiefly upon material in the first two categories, since that is less familiar.

First a note about Allen's two appendices and his Introduction, since these sections could be helpful to scholars: in addition to a brief comment on Polanyi's life, work and place in the history of thought, in his Introduction Allen helpfully discusses his motives and principles used in pulling together this collection. Appendix I is a previously compiled and privately published annotated bibliography of Polanyi's writings. With many entries, Allen provides notes that identify places, other than the original place, where essays or parts of essays have been published. Appendix II provides summaries of articles that were not included in Polanyi's major books or in this collection. If the themes are common ones

treated in books and other articles, these summaries are very brief. Other summaries are more extensive. Allen suggests that he wanted to provide in one place "something of the whole body of Polanyi's non-scientific publications, except for two of which I have not been able to trace any copies" (2). This set of summaries should help guide those interested in selecting other essays for study.

The opening unit of Allen's collection, titled "Political Questions," includes eight selections drawn from essays written as early as 1917 and as late as 1970. Two very early pieces were originally in Hungarian and were translated for this first English publication by Endre J. Nagy. "To the Peacemakers: Views on the Prerequisites of War and Peace in Europe" was a pamphlet republished in the *Huszadik Szazad* (the journal *Twentieth Century*) in 1917. It is an essay strongly critical of nationalism that shows Polanyi's skepticism about the possibilities of a lasting peace in Europe. Some of Polanyi's constructive suggestions for Europe sound strangely like ideas in the contemporary American press about the EU. The second short early essay was originally published (in 1919) in the journal of the Galileo Circle (*Szabadgondolat*) edited by Karl Polanyi. This essay suggests that materialistic accounts of politics in terms of competing interests are misguided. Polanyi recommends skepticism toward politics as presently constituted in favor of a more analytical approach:

> Our job is exploring the truth; dissecting the confused images of politics and analysing the belief in political concepts; finding the originating conditions of political illusions and what animates the imagination to fix illusions to certain objects (31).

"Jewish Problems," a 1943 essay based on a 1942 speech to a British Jewish group, reflects Polanyi's skepticism about Zionism. Polanyi is clearly sympathetic with the plight of poor Jews. He sees himself as a part of Judaism. But he is also quite critical of what he regards as Judaism's backwardness. He thinks the ghettos prevented Jews from joining the projects of modernity, except for rare figures and the assimilators. He thinks assimilation is a sensible course and that this should proceed—and would have without incident—if Nazi policies had not emerged. "The Struggle Between Truth and Propaganda" is a critical review of a rosy portrayal of Stalin's Soviet Union by the Webbs. "Rights and Duties of Science" is a sharply critical review of a book by J. D. Bernal advocating social planning for science (the review is also part of Polanyi's 1940 book *The Contempt of Freedom*). "History and Hope: An Analysis of Our Age" is a 1962 article that develops Polanyi's "moral inversion" argument used in many articles and books. The final two essays complement "History and Hope": "A Postscript" (1963) extends the discussion of "moral inversion." "Why Did We Destroy Europe" (1970) treats Polanyi's panoramic reading of history and the transformation of values in the nineteenth and twentieth centuries.

The six articles in Allen's second section "Economic and Social Theory" somewhat overlap themes treated in the first eight essays insofar as some of Polanyi's ideas about political freedom and history are intimately linked to his ideas about economics. In Allen's account, Polanyi's economic thought has been somewhat neglected; he hopes that putting these six essays into circulation will rectify this. "Collectivist Planning," which was also included in *The Contempt of Freedom*, is an interesting theoretical discussion of the fit of organizational strategies and tasks; it is, of course, also a critique of central planning in science, the economic sphere, and particularly in the Soviet Union. This is an especially interesting discussion since it clarifies the middle ground which Polanyi seems to take in his economic and political thought: he is certainly critical of collectivist experiments but is sometimes equally insightful in his criticisms of absolute laissez faire approaches:

> Public protection should, as a rule, be given to such individual actions in which there is are a real public interest to preserve; and naturally

not in disregard of the action's social consequences, but precisely because of them. Disregard of social consequences is equivalent to anarchy, which may amount to barbarism. The protection given to barbarous anarchy in the illusion of vindicating freedom, as demanded by the doctrine of laissez faire, has been most effective in bringing contempt on the name of freedom; it sought to deprive it of all public conscience, and thereby supported the claim of Collectivism to be the sole guardian of social interests (139).

"Profits and Private Enterprise" (1948) is another essay which analyzes problems of centrally planned endeavors. Here Polanyi discusses "the polycentric problem" (153) which he argues centrally planned economies cannot solve. He returns to the "principles of polycentricity" in "The Determinants of Social Action," an essay included in a 1969 festschrift for F. A. von Hayek. Polanyi holds that

> . . . the allocation of a multitude of resources to a large number of productive centres for the purpose of producing and distribution a great variety of commodities can be carried out in an orderly manner only by a system of mutual adjustments. This is to say that the task *of modern technology is of a polycentric character and that polycentric tasks can be solved only by mutual adjustment* (185-185).

Polanyi enlarges upon this thesis by discussing the nature and limitations of institutions through which polycentric tasks are implemented.

"The Foolishness of History" (1953) was originally an *Encounter* article that contends that there is no economic rationality in Lenin's economic concepts, although many writers have been duped by them. Polanyi praises von Mises' insights about Soviet theory, but also points out that von Mises did not properly foresee ways "that a system of nationalised enterprises could be run on commercial lines" (162). At the beginning of the Cold War, Polanyi seemed to foresee where history was headed, although he hoped that rational argument could redirect history:

> We are faced with the force of moral passions, armed with weapons of mass destruction, but this fearful combination hinges simply on a false conception of administrative possibilities; and this very point may therefore be susceptible to persuasion by argument (163).

"Towards a Theory of Conspicuous Production" (1960) is a more detailed analysis of the Soviet attempt to replace "the market by central direction" (169). Polanyi claims that the Soviet system is not truly "directed centrally" (181). He argues central direction cannot replace a "process of mutual adjustment" (169). In "On Liberalism and Liberty" (1955), Polanyi suggests that the Soviet Union has a rigged market economy, one manipulated by government intervention. In this article, Polanyi helpfully distinguishes centralized economic systems and totalitarian systems (found in both the Soviet Union and Germany). Polanyi discusses free institutions and traditional practices of freedom that he thinks are the foundation of healthy political liberalism. He criticizes both right and the left wing politics as it was manifest in the mid fifties: "Too many people are still glaring at each other through the angry masks of obsolete ideologies" (208).

The six articles in Allen's third section, "The Theory and Practice of Science" cover ground that readers who have studied *Personal Knowledge* will find familiar. Although I shall comment on only three articles, they are, nevertheless, an interesting group, "Science: Observation and Belief"(1947) summarizes Polanyi's argument thus:

> Cogito ergo credo—I think, therefore I believe. Let us accept this fact and believe with open eyes. We have then a chance to hold our beliefs in mature consideration of alternative beliefs, and not merely to succumb to some uncontrolled residue of belief (232).

"Science and Reality" (1967) is an essay which those who desire to explore more carefully aspects of Polanyi's realism will find fascinating. "Creative Imagination" (1966) explores the way in which imagination and intuition work together in the logic of scientific discovery. Other essays in the third section are "Genius in Science" (1972), "Life Transcending Physics and Chemistry (1967), and the brief companion essay "Do Life Processes Transcend Physics an Chemistry?" (1968).

The five articles in Allen's fourth section, "Mind, Religion and Art," are pieces that represent Polanyi's effort to apply his theory of tacit knowing to questions about machine intelligence, mind-body problems, religion and art. "The Hypothesis of Cybernetics" (1951) argues a formalized deductive system is not equivalent to a human mind. "The Body-Mind Relation" (1968) is a complex article that argues against reducing mind to the body and sets forth Polanyi's hierarchical view of the human being. "The Scientific Revolution" (1964) is another complex essay that comments on a number of matters: the hierarchical universe; Greek, medieval and modern rationalism; skills, perception and knowledge; and the scientific and Christian conceptions of human beings. For those interested in making more sense of some of Polanyi's notions about religion—particularly Christianity— this is a fascinating essay. There are comments here about Buber and Tillich (thinkers Polanyi was at least somewhat acquainted with) and the "Pauline scheme" (343). "Polanyi's Logic—Answer" (1966) is a brief reply to a comment on his article titled "On the Modern Mind." Polanyi unpacks his claim that explanations of human actions that don't consider whether actions are good or bad are explanations that "deny that moral motives enter in our actions" (345). "What is a Painting?" was a 1970 essay in which Polanyi extends the theory of tacit knowing to discuss the "transnatural" (353) integrations involved in appreciation of works of representational art. This is one of the essays that underlie the final Polanyi and Prosch book, *Meaning*.

All in all, this in an interesting collection of Polanyi essays. Scholars certainly will find this a useful book. Those who teach Polanyi material will find this a convenient source which offers alternatives or supplements essays in *Knowing and Being* or major Polanyi texts.

Phil Mullins
Misouri Western State College
St. Joseph, MO 64507
mullins@mwsc.edu

Electronic Discussion Group

The Polanyi Society supports an electronic discussion group exploring implications of the thought of Michael Polanyi. For those with access to the INTERNET, send a message to "owner-polanyi@sbu.edu" to join the list or to request further information. Communications about the electronic discussion group may also be directed to John V. Apczynski, Department of Theology, St. Bonaventure University, St. Bonaventure, NY 14778-0012 E-MAIL: apczynski@sbu.edu PHONE: (716) 375-2298 FAX: (716) 375-2389.

Polanyi Society Membership

Tradition and Discovery is distributed to members of the Polanyi Society. This periodical supercedes a newsletter and earlier mini-journal published (with some gaps) by the Polanyi Society since the mid seventies. The Polanyi Society has members in thirteen different countries though most live in North America and the United Kingdom. The Society includes those formerly affiliated with the Polanyi group centered in the United Kingdom which published *Convivium: The United Kingdom Review of Post-critical Thought*. There are normally three issues of *TAD* each year.

Annual membership in the Polanyi Society is $20 ($10 for students). The membership cycle follows the academic year; subscriptions are due September 1 to Phil Mullins, Humanities, Missouri Western State College, St. Joseph, MO 64507 (fax: 816-271-5987, e-mail: mullins@griffon.mwsc.edu) Please make checks payable to the Polanyi Society. Dues can be paid by credit card by providing the card holder's name as it appears on the card, the card number and expiration date. Changes of address and inquiries should be sent to Mullins. New members should provide the following subscription information: complete mailing address, telephone (work and home), e-mail address and/or fax number. Institutional members should identify a department to contact for

WWW Polanyi Resources

The Polanyi Society has a World Wide Web site at http://www.mwsc.edu/~polanyi/. In addition to information about Polanyi Society membership and meetings, the site contains the following: (1) the history of Polanyi Society publications, including a listing of issues by date and volume with a table of contents for recent issues of *Tradition and Discovery*; (2) a comprehensive listing of *Tradition and Discovery* authors, reviews and reviewers; (3) information on locating early publications; (4) information on *Appraisal* and *Polanyiana*, two sister journals with special interest in Polanyi's thought; (5) the "Guide to the Papers of Michael Polanyi" which provides an orientation to archival material housed in the Department of Special Collections of the University of Chicago Library; (6) photographs of Michael Polanyi.