

Ida Rolf and the Two Paradigms

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The history of Ida Rolf's early work in the field of biological chemistry, long before her creation of structural integration, has always been a very short story. A PhD from Columbia, a decade of work at the Rockefeller Institute, a few papers published, and then she left the world of science, later taking a long, meandering path to creating the work we all share.



Ida Rolf, 1924

I've recently read some new information about the world she left, and about the context in which she entered her first profession, that makes the story much more full and rich. It also gives an appreciation of the magnitude of the leap she took in developing her namesake work, and offers us some insights on the potential and the pitfalls of our field.

Dr Rolf officially entered the world of scientific medicine in 1917, when she was hired to work in the Chemistry Laboratory at the Rockefeller Institute for Medical Research. However, the story starts earlier than that.

To understand the culture into which she was walking, the important date is September 12, 1876. On that day, Johns Hopkins University was launched in Baltimore, Maryland. Thanks in large part to its first director, William Welch, the single most influential figure in American medical history, Hopkins would change the face of American science and medicine and usher in a paradigm shift that dominates the health sciences in the Western world to this day. For the first decade of Ida Rolf's professional life, she was a product of that paradigm shift.

Hippocrates and Wholism, Part One

The founding of Hopkins was important in part because of the chaos that existed in American medicine for most of the 19th century. It was chaos created by a vacuum. The medical practices that had existed largely unchanged since the days of Hippocrates, had begun to fall out of favor, as the emergence of the scientific method began to shed doubt on their effectiveness. But for all that science was discovering, no treatments had emerged to replace the old therapies.

The great irony (for our field and for many other so-called "new paradigm" approaches to health), is that the paradigm that existed prior to the scientific medicine revolution looked a lot like what we describe as "new". This paradigm, which dominated Western and Middle Eastern medical thought for over two centuries, was founded largely on the writings of Hippocrates and his colleagues and was based firmly on the principle of wholism.

Hippocrates saw health as a reflection of balance in the body, and illness consequently was a result of imbalance. Internal imbalance, caused by living habits, environmental factors, hygiene, etc., led to disease. From that idea followed the belief that if a physician could intervene in such a way that balance was restored in the body, illness could be healed. Hippocrates, in the fifth century B.C., not Hahnemann or Sutherland or Still or Alexander or Rolf, can be credited with first popularizing that notion in western thought.

(The approach to health promoted by the Hippocratic writers was similar in spirit to the other great wholistic traditions that existed at the time – traditional Chinese medicine and Vedic medicine in India. Both had existed for thousands of years before Hippocrates, and both stressed balance, although their systems of healing diverged greatly.)

Hippocrates stressed the importance of trusting in a sick person's innate power to recover and heal. He was the first Western physician to articulate what would become known as "*Vis medicatrix naturae*" – the healing power of nature. He also hinted at an understanding of the power of the immune system, speculating that diet, rest, cleanliness and hygiene were factors in these individual differences in resistance to disease.

However, there were two problems. First, many of the treatments that were developed were harsh and sometimes deadly. Poisonous purgatives, bloodletting, and cauterization (burning the skin), often resulted in the death of the patient. Second, there was not any testing done to see if treatments actually worked. This problem of rigor, of submitting one's ideas and treatments to rigorous testing, would continue to haunt the wholistic world centuries later. Complicating things further was that the physicians of the era were forced to speculate about what went on inside the body. Dissection was not done on humans and thus there was very little actual anatomical knowledge of the human body. The Greeks of the Hippocratic era frowned on dissection, and then later through the Middle Ages, the Church forbade the dissection of bodies. It was not until Vesalius in the 16th century performed dissections and drew pictures of what he found, that the inner workings of the human body were studied and mapped for the first time. (He barely escaped death for his heresy.)

Descartes and the Dawn of Reductionism

And so it went, for two thousand years. The course of Western medicine continued largely unchanged until the 17th century. In 1628, years after Vesalius' dissections, William Harvey traced the circulation of blood, a feat which has often been called the greatest achievement in the history of medicine (although a Muslim physician, Ibn Nafis, has been credited with essentially the same discovery four hundred years earlier in Cairo).

But the really significant sea-change that took place at the time came from the philosopher Rene Descartes. In the middle of the 16th century, he put forth the notion of dualism: that the human mind and body are distinct entities, neither which directly affects the other. In his view of dualism, everything in the realm of the physical operates by purely mechanical properties. Descartes included the body as part of the physical realm, viewing it as a biological machine with no free will.

One of the properties of a machine or mechanism is that it can be broken down into smaller constituents, or smaller mechanisms. It can be reduced to its parts. Thus Cartesian Reductionism was born, and it would set the stage for the paradigm shift that would change the course of science, and later, medicine as well.

Dualism was useful at the time – it also separated the physical from the spiritual, which allowed scientists to study the physical universe without charges of heresy from the Church. It laid the foundation for Isaac Newton’s revolutionary work in mathematics and physics and for the development of the scientific method. But the view of the body as a machine would later lead to a purely mechanical approach to medicine. It would lead to minimizing for three centuries the understanding of the effects on healing of a patient's beliefs and attitudes, their emotions and faith, and of the power of the doctor–patient relationship.

Descartes also published in 1637 his *Discourse on Method*, which would lay the foundation for the development of the scientific method. This was a crucial addition – the scientific method would give scientists a schematic for studying nature. It gave reductionism its tool to study the parts systematically.

While developments in the physical sciences exploded after Newton, things moved more slowly in the biological sciences. In the 1740’s, James Lind conducted a controlled experiment and discovered that scurvy could be prevented by eating limes (and since then British sailors are still called “limeys”). Then in 1798 Edward Jenner published a work that would become a beacon of the new scientific method. He discovered that immunizing people with cowpox would also inoculate them from smallpox. As important as the discovery was, possibly more important was the rigor of his methodology. He made certain that his findings were repeatable and airtight before going public. For the first time, a researcher in the biological sciences had held his own feet to the fire.

The breakthroughs came faster as the 19th century dawned. In France, Xavier Bichat discovered that organs were composed of discrete material (often found in layers) that he called “tissues”. Pierre Louis began to use autopsies to compare healthy to diseased tissue. In England, John Snow ingeniously used mathematics to track a cholera outbreak and concluded that contaminated water had caused the disease. In doing so, he founded the field of epidemiology. And in Germany, Jacob Henle and others formulated the germ theory of disease, which would be a landmark development of the 19th century.

Something else was happening as well, that would fundamentally affect the doctor/patient relationship. Researchers (and later clinicians themselves) were now using instruments to study and diagnose patients in a widespread way. The stethoscope was invented. Doctors incorporated the use of thermometers, which had been invented two hundred years earlier, to measure patients’ temperatures. Pulse and blood pressure were measured. The laryngoscope and ophthalmoscope were developed. Most significantly, the microscope with an achromatic lens came into use in the 1830’s and a whole new universe of possibilities exploded for researchers, to study a world that had never before been seen.

This reliance on instruments created a new distance between doctor and patient. Doctors began to rely less on their observations and their senses (a central plank in Hippocratic thought), and more on instruments, numbers, and data. To the dismay of many critics at the time (and more than a few critics since), the human body became an object to be tested and prodded (Descartes!), the results analyzed by the fields of mathematics and chemistry.

Germany was the center of the medical universe during this period. Numerous laboratories were established, with the greatest scientists of the day actively probing the nature of the body, exploring its parts and their functions in a manner that exemplified the modern scientific method. The Hippocratic writers had believed that nature should be passively observed, then theories developed. The German laboratories demolished this idea – they set up controlled experiments

that poked and prodded and manipulated nature to see what secrets they could find. Jacob Henle, the first to formulate modern germ theory, summed up a basic credo of the new method, “Nature answers only when she is questioned.”¹

The problem with all this was that, as revolutionary as the new medicine was, very little of it yet translated into new treatments or preventions of disease. The old ways were falling out of favor, and physicians increasingly were abandoning the treatments that had been accepted for thousands of years. But nothing was there to replace them. A vacuum existed. (Wholistic medicine would partially step in to fill the vacuum during the 19th century, but more on that later).

In a bit of irony, some of the first practical discoveries that saved lives lay in the area of cleanliness and public hygiene. Scientists found that contaminated water caused cholera, typhoid was passed by food and drinking water, plague was spread by flea-infested rats...the scientists were discovering the lifesaving power of cleanliness and hygiene, a fact pointed out by Hippocrates a few centuries earlier.

While Europe was bubbling with scientific discovery in the 1800's, America was almost totally uninvolved in the revolution. The United States was experiencing the same vacuum of effective treatments that existed in Europe, but to add to that, the state of research and clinical training in America was so abysmal that the president of Harvard in 1869 said “the ignorance and general incompetency of the average graduate of the American medical schools...is something horrible to contemplate”. Many states had no licensing for doctors at all. Many medical schools had no admissions standards, save for a willingness to pay the fee. No American medical school let its students perform autopsies or see patients. No American medical school taught students to use microscopes. By the mid-1800's not a single university or institution in America supported any medical research whatsoever. Many American physicians were making their pilgrimages to study at the great research centers in Europe, but they came home to a giant void, where their education and skills had no outlet. American medicine was still in limbo and adrift. That was about to change.

The Revolution Hits America

When Johns Hopkins died in 1873, he left a large trust to found a university and hospital. His trustees, seeing the numbers of American medical students who were studying in Europe, decided (against the advice of the most well-known educators of the day) to model the university after the great German universities. It was at those universities that open inquiry and research were not just allowed, but demanded, and where students were expected to meet strict entrance requirements, something unknown in any American medical institution. The trustees intended to create an institution that would be as rigorous as its European counterparts.

After its founding in 1876, the new president of Johns Hopkins University began assembling an international faculty, and the school started modestly by offering graduate courses. In 1884 William Welch was hired to found and run the medical school. The medical school itself would not open for nine more years, but the Pathological Laboratory opened right away. And almost immediately, American medicine was transformed, and Welch would eventually become one of the most (if not the most) influential scientists in the world.

Welch had trained as a doctor and studied extensively in Germany. He had worked with and studied under the greatest scientists in Europe, and at a young age (he was only 34 when offered his position at Hopkins) he was already highly regarded in the profession. And more importantly, he had also developed contacts and friendships across the scientific world. He was not a great

researcher - over his career he made only minor contributions to the field - but he had a rare gift to inspire trust and loyalty from almost everyone he came into contact with, and he had impeccable judgement, about people and about science.



William Welch

He assembled a faculty and opened his laboratory, and the Hopkins campus very quickly became something unique, a cauldron of inquiry unlike anything anyone had seen before. The faculty, researchers and students would meet on a daily basis, socializing, debating, collaborating, generating new ideas, prodding each other, in an environment that colleagues would liken to the passionate single-mindedness of a monastery. Everyone shared the vision that they were creating something new and important..

The students did something no U.S medical students had ever done before: they visited hospitals and saw patients and made diagnoses, learned to use laboratories to test their ideas, performed autopsies. They didn't just attend lectures like students at other schools; the immersed themselves in the science and the practice of medicine.

Knowing that this was available, students flocked to Hopkins. Their entrance requirements were strict, unheard of in America, but students arrived in droves anyway. It was the place everyone wanted to be. It also became the place that every trustee at every competing university wanted to (or was forced to) emulate. Their graduates and researchers were in demand – some hospitals would only hire Hopkins-trained doctors. Of the first four Nobel laureates in medicine or physiology, three were trained at Hopkins (the fourth was trained in Europe). Hopkins graduates would move on to run medical schools at Harvard, Yale, Columbia, Rochester, and others, and would transform them to Hopkins standards.

Welch was the driving force behind all this, and he continued to press for change. He began directing the flow of millions of dollars into research to laboratories and researchers he deemed worthy. One of his protégés would spearhead the effort to force minimum standards on medical schools and on physicians themselves. Within 25 years of accepting his post at Johns Hopkins, Welch would have overseen the transformation of medicine in this country, and that transformation allowed the American scientific community to catch up with and in some areas surpass their colleagues in Europe.

Meanwhile, the assault on infectious diseases continued in laboratories across Europe, and real results were appearing. The germ theory had opened the floodgates for researchers. In 1880 Pasteur successfully vaccinated animals against cholera, then anthrax. Cholera and typhoid were being contained for the first time, based on an understanding of how they spread. Then finally, in 1891 in Berlin, researchers successfully cured a patient suffering from diphtheria using an antitoxin. It was the first actual cure of the new era. Researchers in New York City learned how to mass-produce the antitoxin, and it became widely available. Doctors now had an actual tool to prevent and cure deadly disease. It would be the first of many.

The field of medicine was now a science, and the reductionist revolution was nearly complete. Its successes were created in the laboratory (and increasingly in the operating theatre as well). The fields of pathology, epidemiology, chemotherapy, forensic science, bacteriology, were all exploding. The battleground of medicine had moved from the physician's office to the laboratory.

The magnitude of the paradigm change from the days of Hippocratic thought was stunning. For two millennia, health was understood to be a reflection of balance at a systemic level. Now the focus had shifted from the macro to the micro, from the whole system to the minute parts. Reductionism was the order of the day, and Hippocrates had given way almost completely to Descartes. Medicine was now a study of tiny things, the smaller pieces of the machine, that could only be seen with help. The microscope was the most powerful tool in the researchers arsenal, and it symbolized the shift – it brought the world of tiny things to light. The modern cures were imparted from the outside, to do battle with the microscopic, external invaders that attacked the body.

And research was where the action was. The next big development would involve the research institution that would become a model for the scientific world. In 1901, overseen by William Welch, the Rockefeller Institute for Medical Research was founded.

The Institute and Its Mission

“Here is an institution whose value touches the life of every man that lives... Who has not felt the throbbing of desire to be useful to the whole wide world? Here at least is a work for all humanity, which fully satisfies and fills that glorious aspiration... Your vocation goes to the foundations of life itself...”²

Frederick Gates to the staff of the Rockefeller Institute
on the tenth anniversary of the laboratories, 1914

The Rockefeller Institute's purpose was straightforward – to give scientists the resources to do research in medical fields. It had a broader aim than the European institutes, most which focused primarily on infectious diseases. Rockefeller aimed at the full scope of medical practice. In addition to studying infectious disease, its scientists would explore surgical techniques (paving the way for organ transplants) and would begin research into cancer (Peyton Rous, a Hopkins grad doing research at Rockefeller, discovered in 1911 that a virus can cause cancer, and half a century later he won a Nobel Prize for his efforts). They also did the basic work that would lead to one of the great scientific feats of the 20th century, the mapping of the DNA molecule.

Welch picked a protégé, Simon Flexner, to head the new institute. Flexner created the institute in his mold – “sharp, edgy, cold”.³ He was described as rough, brilliant and intimidating. He was feared, by some of the best scientists in the world. He demanded only the best to work for him, and would dismiss those whose work he believed did not match his standards. But he could be patient and nurturing when he saw promise, and he gave wide latitude when he saw a researcher with real talent. He also valued openness and debate, friction and disagreement, and he sought out individualists, mavericks unafraid to think in new directions, and encouraged regular, lively exchanges of ideas. His goal was to create not an institute but a living organism, and the result was an environment that was equally demanding and exciting, provocative and creative.

From the beginning, the new institute regularly made headlines, not just in America but internationally. It immediately had a huge impact on the scientific world and on the public as well. Accomplishments were publicized, often and with much fanfare. The press loved Flexner and his institute, and he loved them back. Although it had its critics who mocked the publicity machine, Rockefeller quickly became to research what the Hopkins had become to medical study and training – the place to be for a scientist wanting to make a name for themselves in research. The Rockefeller Institute would be involved in, and often at the center of, seemingly every significant medical development in America for some time to come.

This era, the late 19th-early 20th century, has been referred to as the golden age of American medicine. Major discoveries were occurring seemingly every day, vaccines and treatments for some of humanity's deadliest diseases were appearing, and the biological sciences were the center of the medical universe. Many of the processes for preparing cultures, conducting research, treating infectious disease, etc., that were developed during those early days, are still in practice today, and in some cases the early researchers achieved results with patients that were superior to more modern pharmaceutical approaches. The great plagues that had stalked mankind for centuries – smallpox, cholera, typhoid, bubonic plague, yellow fever - were being contained and lives were being saved from epidemic by the millions.

Ida Rolf, Chemist

This was the scientific culture in which Ida Rolf started her professional career. She had earned her undergraduate degree from Barnard College in 1916, and officially began working as a technician at the Rockefeller Institute in 1917. At about the same time she also began her doctoral studies at Columbia University. So she was accepted as a biological chemist, at the zenith of the biological science-driven revolution in scientific medicine, at the institution that was ground zero for laboratory research in America, arguably the most prestigious place in the world for a scientist to work.

It is commonly thought that she was accepted because of a lack of qualified men at the time – the boys were off at war and so women were given a chance to study and practice in the scientific arena. This may partly explain her acceptance to Columbia (she didn't begin her studies at Columbia until late 1917, after the U.S. entry into the war), but probably not to Rockefeller itself. She apparently had some connection to the Rockefeller family of organizations in New York City while still an undergraduate at Barnard. An April 3, 1916 entry in the Barnard College newspaper mentioned Ida Rolf, then a senior soon to graduate, as an alternate for a fellowship, and noted that she was “doing work in chemistry at the Rockefeller Foundation”.⁴ The Rockefeller Foundation was a charitable foundation, also established by the Rockefeller family, which at the time focused on the sciences, public health and medical education. It is not known whether she actually worked for the Foundation, or whether the entry was a misstatement and she already was doing work for the Institute. But at any rate, this was over a year before the United States entered World War 1.

Rockefeller had many women employees at the time, but most were apparently only in lower or entry-level positions. It was much less likely for a woman to advance up the rungs of the scientific ladder. In 1918 Ida Rolf returned to Barnard to talk to undergraduates about employment at Rockefeller. She reported that “...in all the laboratories women are employed without discrimination and hold many responsible positions”.⁵

However, in “A History of the Rockefeller Institute”, George Washington Carver makes almost no mention of women scientists in that early era. All of the department heads and numerous associates and assistants are mentioned, along with their work, and there is scarcely any mention

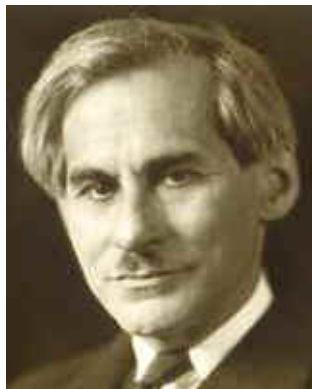
of any woman. In a description of the head of the Chemistry laboratory, Carver notes “approximately 40 men”⁶ passing through his lab during his tenure. The author describes an organization that was almost exclusively the domain of men, at least at the level of researchers.

Most of the women who were employed at Rockefeller very probably began either in administrative positions or started as technicians in the laboratories. Moving up was the challenge. Ida Rolf was apparently one of the very few who did advance.

Dr Rolf was officially first listed as an employee at the Institute sometime in 1917. She also began her studies in Biological Chemistry at Columbia in late 1917. At the time, Rockefeller was basically functioning as a postdoctorate university. Almost all the scientists already had their PhD’s before being hired. However, like Ida Rolf, several others began as technicians and used their work at Rockefeller to earn PhD’s from Columbia. Most scientists would spend a few years – five to seven at most – at the Institute, then leave to take University positions or work in industry. Only a very few would become full Members, with lifetime tenure.



Simon Flexner



Phoebus Levene

Dr Rolf was soon working in the Chemistry Laboratory as an Assistant to Phoebus Levene. Levene was brought to the Institute by Flexner in 1905 and two years later was named as a full Member and was appointed as head of the Chemistry Laboratory.

He had emigrated to the U.S. in 1893 and like Ida Rolf, enrolled in Columbia and began his research in chemistry. Over the course of his professional life, he contributed a huge body of research in biological chemistry, across several areas of interest. He is most known for two major contributions (and one major mistake he made) with regard to the discovery and understanding of the DNA molecule.

Levene was cultured and highly educated, conversant in six languages, an art lover, generous and popular with his colleagues. He also was in some ways an imperfect fit for Rockefeller. Flexner was initially concerned that Levene was “esoteric in his scientific interests”⁷ (the meaning of that statement is unknown, but it leads to a curiosity about whether Levene, as Ida Rolf’s direct supervisor, influenced her in her own esoteric pursuits during the 1920’s). He also had developed a reputation as an ineffective administrator – the practical details of running a laboratory often escaped him.

Levene had another quality that may have eventually led to Ida Rolf’s restlessness at Rockefeller. All the department heads had full control over their laboratories. Some gave their assistants and associates wide leeway to follow their own research interests. Levene was at the other extreme – his assistants were expected to do only research that Levene himself found compelling. They had little freedom to explore their own interests, and as a result, he

developed fewer prominent scientists than the other department heads. This led Flexner to express concern in 1919 that Levene's scientists "...were not being trained for independent work."⁸ His department had a lot of churn – scientists would leave, looking for other opportunities. As popular and well-liked as he was, and despite his reputation as an excellent teacher, he didn't have a gift for developing talent.

Dr Rolf was named as an assistant in 1918. In 1920 she received her PhD from Columbia and in 1922 she was promoted to Associate, the highest non-tenured position for a scientist at Rockefeller. She remained as an Associate until her departure. From 1919 to 1927, she published fifteen research articles that are known, in addition to her doctoral dissertation, mainly on two phosphatides, lecithin and cephalin.



The laboratory of P.A.T. Levene, about 1909

Dr. Rolf's role, through most of her time at Rockefeller, was to further explore the structure and nature of lecithin and its chemical cousins (the phosphatides were one of Levene's personal areas of interest). It was the step-by-step, detailed work of laboratory science – how to extract lecithin efficiently from egg yolks, how to more exactly determine its chemical structure. Her published papers are, in a word, dry (one scientist who has read them, describes them as a wonderful cure for insomnia).

Rolf's research was all co-authored with Levene - his name always appeared above hers in their papers. It was common at the time to have heads of laboratories put their name on any research that came out of their laboratory, regardless of whether the laboratory head had actually participated in the study. So it is not known whether he actively worked with her in her published research or simply acted as supervisor.

Two Wars

Through the early years of Ida Rolf's tenure at Rockefeller, the work and environment of the Institute was heavily influenced by two wars. The first was World War I. Although the war began in Europe in 1914, President Woodrow Wilson was determined throughout his first term to keep the country out of the conflict. His campaign theme in his 1916 re-election campaign was "He Kept Us Out of War." He did not finally request that Congress declare war until April 1917, after a series of German submarine attacks on American merchant ships. The war draft was instated in May 1917.

As soon as war was declared, virtually every public and private institution in the country was converted in one form or another to the war effort. This included most educational institutions. After America committed to the war effort, there was some fear at Rockefeller that scientists would be lost, either to enlistment or to the draft.

So Flexner arranged to have the entire Institute incorporated into the army. The Rockefeller Institute officially became Army Auxiliary Laboratory Number One. Scientists received officer rank and were saluted by sergeants, who were abundant in the hallways, holding rank over janitors and technicians (which at the time would have included Dr. Rolf). The work of the staff was changed. Most researchers either began instructing military doctors or shifting to war-related research. At least one biochemist studied poison gas. Another worked on bomb-making materials. Others trained army doctors in treating infectious disease. As a technician (and as a woman), Ida Rolf likely would not have been offered a commission. There is no record that she was offered one, and it is likely that she spent much of her time during her first years in classwork and doctoral work at Columbia.

The second war, and one in which Dr Rolf might have played a minor role, was waged at laboratories worldwide, and with a much deadlier enemy. In late January 1918, in Haskell County, Kansas, a local doctor began noting patients suffering from what seemed to be a particularly violent, fast-developing and deadly form of influenza. It is believed by epidemiologists that a local soldier home on leave later carried the flu back to his army base, where it gradually worked its way across the country, across the ocean on troop ships, and eventually to almost every corner of the earth. It was the likely beginning of what became the deadliest plague in human history, the influenza pandemic of 1918-1919, with a worldwide death toll estimated as high as 50-100 million lives lost.

It is difficult to conceive today of the level of hysteria and paralyzing fear that swept the country (and the rest of the world) as the virus spread slowly from one city, one army base, one state to another. It was a strain of flu never seen before, characterized in part by the speed and ferocity with which it killed. Countless cases were recorded worldwide in which people who showed no symptoms at all, suddenly were struck down and dead within hours. And unlike most influenzas, it struck the most viciously at the most vigorous members of a population – somehow, it attacked the immune systems of the healthiest people so suddenly that their own immune response killed them, and killed them with a breathtaking speed. Using the upper estimates of the death toll (which are conceded by many epidemiologists today to very probably be reasonable estimates), 5% of the world's population was killed, and an unusually high percentage of that number were young adults, the healthiest members of the population. Most of the deaths took place worldwide during a horrific twelve week span in late 1918.

The epidemic was made worse by the propaganda machine that was in full force to rally support for the war effort. The government didn't want fear of influenza to distract the country from a total support for the war, and so accurate and truthful information about the danger was not communicated to the public until too late in city after city. The army ignored the advice (the pleadings, more accurately) of its own surgeon general and didn't take adequate safeguards, and its bases were devastated by the virus.

In the hardest hit communities, public and private business simply shut down – no one wanted to go near anyone else. Entire households died, time and again, because no one would go near their home to help, afraid of the virus. The supply of doctors and nurses was hopelessly inadequate to make even a minimal impact in most areas.

By late 1918, when the deadly second wave of the epidemic was in full force and the magnitude of the crisis was tragically apparent, a massive worldwide research effort had already mobilized to isolate the influenza virus, to find effective treatments, and to develop a vaccine. The scientific community focused its attention (as much as possible with the war still in full sway) on the disease. The Rockefeller Institute was no different, and some of its best and most well-known scientists would tackle the problem and later spend most of their professional lives on influenza-inspired research.

It is possible to make some guesses about the nature of Ida Rolf's research. Her work was centered on the nature of phosphatides, and in particular, lecithin. Lecithin plays a key role in the structure of cell membranes – without it, cells couldn't maintain their structure distinct from their surroundings. Lecithin was discovered in 1846, and by the time of Dr Rolf's work at Rockefeller, was a source of curiosity in biochemistry. Some of the interest may have had to do with the nature of viruses.

When a virus attacks the body, much of the life-or-death action takes place at the cell membrane. It is at the membrane that the virus attempts to attach grappling hooks and bind itself to the cell (or in the case of influenza, to slip into the lung cell itself and totally avoid detection by the immune system). So an understanding of lecithin's role in the structure of the cell membrane would be important to understanding what actually occurs at the virus' point of attack.

It is not known if Dr Rolf's work with lecithin took place in the context of the Rockefeller Institute's focus in the midst of the influenza epidemic, to understand the nature of how a virus attacks the body. But it is worth noting that Levene paid very little attention to lecithin until early 1918, then published dozens of articles and papers on the subject, with Ida Rolf and others, until the 1930's when he seemed to lose interest in it. So her work was probably partly pure science and possibly at least in part stimulated by influenza and infectious disease research.

From Chemistry to Physics

In 1925 Dr Rolf applied for a leave of absence to study in Europe. She had wanted to continue her studies in Europe ever since graduating from Barnard, like countless other scientists had done since the late 19th century, but the war prevented her from traveling. By 1925, from the tone of letters she wrote to Simon Flexner during her leave, she was in need of a rest and break from her work, and was increasingly restless at the Institute. She was granted the leave late in the year, and in January 1926 she sailed for France to begin her trip by studying at the Pasteur Institute.

While she was en route, Flexner wrote her. He enclosed a check for \$200 to help pay for her stay in Europe, and he confirmed what she was feeling about her relationship with Rockefeller. He said in part, "I have thought for some time that you had both received and given services to the Institute which about fulfilled the advantages to us both."⁹ He encouraged her to begin looking, soon after her return to America, for another position. (This is pretty consistent with what is known about Flexner. Ida Rolf had been employed at the Assistant/Associate level for seven years, about the maximum time for most non-tenured employees to stay with the Institute. Flexner was never shy about telling scientists what he thought was best for them, and when it was time to go.)

Dr Rolf received the letter while in Paris. She replied in a handwritten note to Flexner. "... I am in complete accord with your opinion that the period of maximum efficiency of that tenure, for both the Institute and myself, is past."¹⁰ She went on to describe her relief at not having to make the decision to leave the Institute. She expressed her gratitude towards Flexner and Levene for the opportunity they had given her and her sense of obligation to repay them for the chance afforded by the leave of absence. She sounded both relieved and excited, describing her adventures in learning French and her studies at the Pasteur Institute.

Dr Rolf, in "Rolfing and Physical Reality", mentions studying physics in Zurich during her leave, and visiting Geneva to study homeopathy.¹¹ Not much else is known about her time in Europe, including when she returned.

(How exciting must it have been to study physics in Europe in 1926? The 1920's were possibly the most exciting period in the history of physics, and Europe was the scene of the drama. Heisenberg, Schrodinger, Niels Bohr, Einstein and others were hashing out the details of quantum mechanics, creating an entire new physics and changing our understanding of the universe at a rapid-fire pace. Ida Rolf began her shift to physics at almost precisely the moment that the world of physics was experiencing a paradigm shift every bit as significant as that ushered in by Descartes.)

Two more papers later appeared in 1927, coauthored by Dr Rolf and Levene, concerning lecithin and cephalin. They possibly represented work she completed before her leave, or possibly she returned to complete her work before parting ways with the Institute. Her tenure at Rockefeller was officially over in 1927, when she left the world of scientific medicine for good. Approximately 14 years after her last scientific article was submitted for publication, around 1940, she saw her first client, a piano teacher in the Bronx, doing the work that would later develop into structural integration.

*"And you see all of this is a something, which if you are really considering man,... you have to think of in those terms, because this is the man, the man is the energy field, the energy consolidation....In terms of the orthodox methods used by your doctor, in general they are dealing with the chemistry of the body. They are not dealing with this low man on the totem pole, this forgotten man, this forgotten element of the body, this element of the actual physics of the body."*¹²

Ida Rolf, 1966

Ida Rolf had begun her career as a product of the biggest paradigm shift in the history of medicine. From the 1920's to the early 1940's her professional shift took her from scientific medicine back to wholism. There is irony in her trip to Europe. During the last decades of the 19th century, American scientists had made their pilgrimages to Europe to embrace the biological sciences. It was where they could go to study the tiny things, so they headed towards the microscope. Decades later she made her pilgrimage as a scientist as well, but it also symbolized her transition. She began the leave as a biological chemist, studying at the laboratory founded by Louis Pasteur. Then she left the microscope behind and in Zurich, studied mathematics and physics, the language of energy. Just as Descartes was achieving supremacy in American science, she headed back to Hippocrates.

Wholism, To and Fro

Meanwhile, wholism had taken a hit during the scientific paradigm's emergence as a dominant force. During the vacuum the American medical world experienced in the 19th century, several wholistic disciplines had emerged. Homeopathy and Natural Hygiene arose in the early 1800's, then in the last decades of the century, chiropractic, naturopathy and osteopathy were developed. All were firmly in the wholistic tradition, all dedicated to the Hippocratic goal of supporting a return to systemic balance as the basis for healing. All enjoyed varying degrees of public favor (John D Rockefeller had a homeopathic physician even as he was forming his namesake institute.)

However, the early 20th century was not kind to the new modalities. The political and cultural environments were swinging almost totally in favor of biomedicine. In 1910, commissioned by the Carnegie Foundation, the Flexner Report was issued, authored by Simon Flexner's brother Abraham. Its aim was to examine the conditions in American medical schools, and it was a scathing indictment, recommending that 80% of all medical schools be shut down. But it focused on homeopathic and osteopathic schools as well, and it was blistering in its assessment of their activities. The report used the terms "utterly hopeless", "absurdly inadequate", and "fatally defective" to describe the wholistic schools that Flexner visited. He regarded chiropractic as not even worthy of consideration, calling chiropractors "unconscionable quacks" and recommending that "the public prosecutor and the grand jury are the proper agencies for dealing with them". He regarded wholistic or alternative approaches as "indefensible"¹³ in the new era of scientific medicine.

Out of the Flexner Report, wholistic schools and practitioners came to be viewed, by the medical world and to a degree by the public at large, as incompetent at best, and as frauds at worst. At the same time, William Welch was using his powers to direct the flow of research money in the field, and the money decidedly did not flow in the direction of any of the wholistic disciplines. As a result, wholistic practitioners were left marginalized on the fringes of health care.

(One of the ironies of Dr Rolf's career is that the brother of her boss at Rockefeller - and she had a great deal of admiration and respect for Simon Flexner - had as his partial goal the eradication of the field in which she would later spend most of her professional life.)

Einstein and Wholism, Part Two

But while reductionism was reigning supreme in the medical world as the 20th century dawned, the scientific world was about to undergo another tectonic shift. Hippocrates was about to fight back, and in the unlikely person of a Swiss patent clerk. In 1905, Albert Einstein published two papers, one on special relativity theory and one that would help develop quantum theory (Max Plank had introduced the idea that energy is quantized five year earlier). In 1916, while Ida Rolf was graduating from Barnard College, Einstein added gravity to the mix to present his general relativity theory. (Gravity according to Einstein is not a force as Newton claimed, but a warping of spacetime. The Earth doesn't move in an elliptical orbit around the sun; rather, it moves in an apparent straight line through the curvature of space.)

The implications of relativity theory and quantum theory, and their impact on science and culture in the 20th century are way beyond the scope of this article (Fritjof Capra alone has several books on the subject). But 20th century physics – especially quantum theory - set a scientific framework by which wholism could be understood and appreciated. It also showed Descartes to be wrong, or at least limited, in at least one key way.

Descartes believed in a physical universe made of discrete parts, which could be studied and understood. Quantum theory has shown this not to be the case. At the smallest, most fundamental level – the atomic level – the smallest particles are not discrete things, but are more accurately thought of as interconnections (the word “particle” itself is inadequate and misleading at the atomic level). Quantum theory leads not to things, but to constant relationship. The world can be broken down into parts to a point, but as the parts get tinier and tinier, they become something else, less accurately thought of as parts and more accurately as a complex web of relations.

Descartes also believed that there is absolute truth in science, and that truth can be proven by the scientific method. Fritjof Capra argues in “The Turning Point”, “Twentieth century physics has shown us very forcefully that there is no absolute truth in science, that all our concepts and theories are limited and approximate.”¹⁴ The critics of reductionism argue that the scientific method, while useful and powerful, has its limits in understanding reality.

(A note about relativity theory is useful here. Einstein never believed that his theory should or could be accurately applied to moral or metaphysical matters. A great many philosophers and physicists believe that Capra and others have misused relativity theory by making claims about its application to relativism in other arenas. Quantum theory is a different matter, and Capra is probably on firmer ground by applying it to broader issues.)

“The world thus appears as a complicated tissue of events, in which connections of different kinds alternate or overlap or combine and thereby determine the texture of the whole.”¹⁵

Werner Heisenberg

“Your security comes only from relationships...A Rolfer’s only secure ground in a body is to establish balanced relationship. That is your secure ground, and it is not possible to convert it into something that is solid like a wall.”¹⁶

Ida Rolf

Research and the Two Paradigms

It is easy to understand how the biomedical revolution came to dismiss wholism. Scientific medicine and the modern scientific method make for a perfect marriage. Both are firmly rooted in Cartesian assumptions...the universe is composed of discrete parts that can be isolated and studied and understood. Relationships between the parts do matter, but the nature of each part can be studied and understood in isolation from the others.

The contributions of the reductionist approach to medicine have been enormous. An obvious example is modern surgery and trauma care. Another example is the area of infectious disease, where countless lives have been saved because of the discoveries made by scientific medicine. The great plagues that killed millions throughout human history are now largely preventable and treatable. (Ironically, many of the breakthroughs in fighting the great plagues validated Hippocrates – keeping the water supply clean, washing hands, keeping the environment clean of waste, were some of the early breakthroughs that helped to arrest the deadliest diseases.) The scientific method has provided a model for rigorous inquiry that has been adopted by all the sciences.

However, in many ways, we are witnessing today the biomedical revolution taken to its logical extreme. If humans are biological machines, then biology is the answer for all problems. What we now see are drugs introduced for every conceivable affliction, every aberration from the norm, physical and emotional. The marriage of the scientific method and biological medicine has resulted in Viagra, Prozac, and the little purple pill.

On the other hand, wholism and the scientific method make for an uneasy relationship. One of the basic assumptions of wholism – the primacy of relationship, the interrelatedness of all aspects of the universe – makes studying the parts to be much more of a challenge. Wholism by its very nature resists the notion of isolating – the act of isolating for the purposes of research, will lead to a result that is incomplete and partial.

So the question arises: can effective research be done within the wholistic paradigm? To use our field as an example (and has there ever been a more thoroughly wholistic discipline? The human being considered as a relationship within gravity – Einstein and Heisenberg would have been proud), what part of structural integration is the key part - the sequence of the series? The relationship between the practitioner and client? The techniques used? The experience and training of the practitioner, or their hands-on skill, or ability to listen, or their intelligence, or capacity for compassion? The client's willingness to change? Which session makes the most difference? How do you possibly separate out those factors from the whole of the process?

A vivid example of the difference between the two paradigms is the placebo effect (standardly defined as the improvement in health not attributable to treatment). The Cartesian paradigm regards the placebo effect as a factor to isolate out to gauge a treatment's effectiveness. Wholism embraces the placebo effect – the client's belief, psychology and expectations about the treatment are a vital part of the treatment itself. The very definition of placebo, useful in reductionism, is meaningless in wholism.

Having said that, there is much that wholism can learn from Descartes. From its beginnings, wholism has had a problem with rigor. It has traditionally been too easy and tempting for wholistic practitioners to write off their failures or missteps without rigorously testing their ideas, and without making sure that their treatments actually do what they claim they do. There was some truth to Abraham Flexner's critiques of wholistic schools. They made claims that they never bothered to verify. To this day, wholistic practitioners too often claim benefits for their approach, without a shred of anything other than self-selected "successes" as proof.

This is a challenge for structural integration, even though our field claims not to cure or treat anything. We as a profession have a strong desire for research, to validate our field's effectiveness. But effectiveness at what? What do we want research to prove about our field? Do we desire proof that it improves overall health and vitality and functioning (defined by what?) To prove our effectiveness, research must start breaking our work, or its effects, down into pieces. Does it improve balance? Does it lessen pain? Does it provide more energy (and proven by what means)? Does it strengthen the immune system? Does it lessen or alleviate the symptoms of a variety of diseases and conditions?

It is a fair question to ask ourselves exactly what we want from research. It is also important to note that research is, to a large degree, a phenomenon of another paradigm. As useful and powerful and insightful it will be to interact with the Cartesian paradigm and the world of scientific research, it may also be useful to remind ourselves that we are not of that paradigm. Our assumptions are fundamentally different from theirs. Descartes may be a wonderful dance partner, worthy of spending time with and learning from, but he goes home to a different bed than ours.

But Ida Rolf was from that world, and she was a scientist long before she created structural integration. So I would throw out a couple of reasons that research is vital to our field, among the many other worthy reasons for us to continue to press for the scientific community to poke and prod us.

First, we need our feet held to the fire, as does every discipline that makes claims about its effects on health and well-being. It is good and healthy and honest to be rigorous, and to have our claims and beliefs examined continually. As children of Hippocrates, that is the greatest lesson we can learn from Descartes – continuing to ask hard questions about our work and what it does, and inviting others to do the same, and paying attention if the answers do not meet our expectations or hopes.

Second, it honors our founder and her spirit of inquiry. Through her, we have our roots in Descartes. The woman who created our field was raised professionally in the world of scientific medicine, and her story is the story of two paradigms, not one. To honor her best, and to honor the spirit of our own beginnings, means honoring the best of both worlds.

Epilogue

By the middle of the 20th century, the Rockefeller Institute's glory days as the center of American medical research were over for good. In 1955, the Institute began admitting graduate students for the first time. Its vitality could no longer be maintained as purely a research institution, and admitting students was an acknowledgement on the part of its leadership that times had changed. In some ways it had become a victim of its own success. In large part because of the Institute's influence, a career in teaching and research had become so desirable that graduate schools, with their ongoing dialogue between teacher and student, had become the hotbeds of research. Rockefeller could no longer compete with colleges for the best and brightest scientists. In 1965 it would officially change its name to Rockefeller University. During its prime in the early part of the 20th century, it had been at the center of a revolution in medicine, the place to be for pure scientific research in the biological sciences and the most important scientific institution in America. But its moment in the sun had passed.

At about the same time, in late 1954/early 1955, Ida Rolf taught her first structural integration class west of the Mississippi River, at the Kansas City College of Osteopathy and Surgery. At the time, she called her creation Postural Dynamics, and taught it in roughly the same ten-session series format that she would still be teaching two decades later. In almost every way imaginable it was a world apart from her professional beginnings almost forty years earlier, in the chemistry laboratory at Rockefeller. But...in the class, she and her students conducted two research projects, including a study of the effects of her work on cholesterol levels. As enormous as her professional leap had been, she was still poking and prodding with the spirit of a scientist, straddling two worlds.

So, what next? Ida Rolf courted Descartes and then chose Hippocrates, but that was her story. Now we as a profession have choices to make. We are a young field, already with some self-inflicted wounds, trying to fit the pieces back into a coherent and healthy whole. We get to grapple with how to define ourselves, who we are, how to speak about our work and how to relate to a wider world of medicine and health that often does not share our sensibilities, how to adapt while the sands continue to shift. We face questions in how and when to meet others halfway, when to play on their turf, when to stand our ground, and how to continually stay rigorous with ourselves. Our choices fan out before us, continually. We write our story now.

Endnotes

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