**Prof. Abraham Patchornik (Patcho)**

Prof. Patchornik was a brilliant chemist, who enjoyed an international reputation as a leader in the fields of bioorganic chemistry and photochemistry, as well as being an innovator in the use of functional polymers as chemical reagents. Abraham was born in Ness Ziona, the great-grandson of Reuben Lehrer (a.k.a. Reuven Zangvil Patchornik), who in 1883 became a legend when he purchased and built, the settlement of “Nachalat Reuven” in Wadi Hanin, a settlement that went on to become the town of Ness Ziona.

As a member of a family that was primarily involved in various branches of agriculture, Abraham started out as a young worker on the family farm—the accepted and expected path at that time.  At a young age he was already asking questions and investigating his environment, arriving at early solutions to typical problems on the farm. It was here that he realized his love of science in general and of chemistry in particular.  There was no high school at that time in Ness Ziona, so he was forced to travel to the “Gymnasia Re’alit” in Rishon LeZion—a long distance in those days.  When he began studying chemistry, he set up a small laboratory for himself at home where he could conduct his many experiments undisturbed.  His path to studying chemistry at the Hebrew University was not an easy one; the Gymnasia he had graduated from was not recognized by the Department of Education of the Jewish National Council (this was before the establishment of the State of Israel), and Abraham had to take the “external” Bagrut examinations—all this in parallel with his work in the family farm.

The Patchornik family did not look favorably upon Abraham’s plan to study in university rather than assume his place on the family farm (orchards, honey bee breeding and other branches of agriculture), as was customary in Ness Ziona in those days.  The only encouraging and supportive voice was that of his mother, and he enrolled in University with her blessing.  At first he wasn’t accepted to study chemistry and was directed to study mathematics and physics; it was only at the end of his first year that he realized his dream to study chemistry at the Mt. Scopus campus of the Hebrew University.  All studies were cancelled with the outbreak of the War of Independence, and Abraham was drafted into the IDF.  As a student of chemistry, he was assigned to the Engineering Corps; he was injured in the battle of Latrun, and fought in the Galilee. At the end of the war, with the disconnection of Mt. Scopus campus from Jerusalem, he completed his chemistry studies in university classrooms and laboratories scattered throughout West Jerusalem.

In 1952 Abraham began his doctoral studies under the mentorship of Prof. Ephraim Katchalski (soon to be Katzir) in the Biophysics department of the Weizmann Institute of Science, and his thesis title was “Polyamino Acids as a Model for Proteins”. He completed his doctorate in 1956.  That same year he traveled to the United States to pursue post-doctoral studies at the National Institutes of Health (NIH).  In 1958 he returned to Israel and joined the scientific staff of the Department of Biophysics at Weizmann.

Abraham led and developed many areas of research in chemistry, and became a leading world figure in the chemistry of peptides, supra-molecular chemistry, chemistry using insoluble functional polymers, bioorganic chemistry, photochemistry and analytic chemistry.  His findings were published in more than 200 scientific publications.

Abraham was a “Shomer Masoret” (traditionalist) and named many of his findings, methodologies or chemical reactions, after parables, customs or events connected to Jewish tradition.  What follows is a sampling of the varied chemical reactions he developed, together with the names he chose to assign to them:

* Abraham and his group in the Biophysics department developed new chemical procedures for selected cleavages of protein chains at defined amino acids – tryptophan, cysteine, serine, histidine, phenylalanine, proline and hydroxyproline, methionine, and glutamic acid.  He named them “Protein circumcisers”. Patcho was among the first in the world to develop uses for insoluble functional polymers in unique chemical reactions for the preparation of fine chemicals in laboratory and industrial scale quantities, at very high yields and at particularly high levels of purity.  Among others, these innovations included the following:
* “**Matchmaker Chemistry**”: A process by which two different molecules, A - the “groom” and B - the “bride”, are connected to two insoluble polymeric carriers located in separate containers.  Molecule C -functions as the soluble “matchmaker”—removing the “bride” molecule from its carrier and transferring it in solution to the polymer-bound “groom” molecule, thus creating the desired soluble molecule A-B.
* “**The Wolf and the Lamb Reaction**”: In this system two chemically reactive molecules (one the “wolf” and one the “lamb”) are bound to two separate insoluble carriers, thus preventing any spontaneous chemical reaction between them (the “wolf” cannot attack the “lamb”).  By rational use of soluble reactants it is possible to prepare and isolate final and intermediate products, which are usually unstable in a system where all the components are in a mixed solution.
* **Bioorganic Photochemistry** was an area of research that Abraham pursued from the beginning of his early days at Weizmann until after his retirement.  He prepared photosensitive organic molecules to selectively protect functional groups or specific sites in proteins or other polymers.  When the protective agents completed their job, it was possible to remove them under very mild conditions by photo radiation, using visible light.  This method was used in the synthesis of peptides and other bioorganic molecules in solution. Another use for this type of chemical reaction was named “Enzyme Resurrection”. In this method he demonstrated the inactivation of an enzyme by blocking its active site using photosensitive inhibitors, and at the end of the process inhibition could be reversed using photo radiation—thereby “resurrecting” the enzyme.
* “**Biological Chips**”:  Abraham demonstrated that it was possible to use photosensitive chemicals to mask solid surfaces, such as polymers, glass and metals, selectively and reversibly. Today, this technique is the most widely used, and useful, of all of his discoveries in photochemistry. It is used in the preparation of various types of chemical or biological chips, in which solid surfaces are coated with thousands of different molecules.  Among other things, these biochips enable the simultaneous analysis of thousands of biological reactions. Their primary importance is in research and diagnostics.
* **Quantitative Analytical Chemistry** is another area of interest Abraham integrated with all his other research topics. He ascribed great importance to quantitative determination, at any given time, of all the components of the systems his research group was working on. Thus, in parallel to whatever research projects were being conducted by the group, he developed methods for quantitative analysis of all the components of those systems—in a mixture, without the need for isolating the individual component under examination.

The common denominator of all his analytical methods was their simplicity and high reliability. Abraham was not given to taking pride or resting on the laurels of his many scientific achievements, with the possible exception of what he called, with great affection, “**My Chanukiah**”. The nine candles in his candelabra symbolized the nine students he mentored who went on to become professors in Israel (seven of them at the Institute): Shmuel Shaltiel z”l, Mordechai Sokolovsky, Meir Wilchek, Mati Fridkin, Yigal Burstein, Marian Gorecki, Menachem Rubenstein, Yoram Schechter, and Yehiel Shai. Many of his other students entered fields of industry, and made their mark in senior positions in project initiatives, administration, research and development.

Abraham was devoted not only to his students, but also to other students in the department; he especially enjoyed the humorous pranks that were common amongst them. Some of the top scientists in the country, who as students led these mischiefs, owe him the “last chance” they were granted to complete their studies at the Feinberg Graduate School of the Weizmann Institute.  Scientific research was always Abraham’s primary interest but, unlike most of his colleagues in the Institute, it did not prevent him from promoting potential applications of his research results. Upon joining the Department of Biophysics, he proposed establishing a “company” for the commercial production of fine biochemicals based on knowledge gained in the department. Professors Ephraim Katzir, Michael Sela and Arye Berger joined this initiative. During the first year, Abraham served as scientist, administrator and marketing salesman for the new company. In 1960, with the establishment of “Yeda”, the commercial arm of the Weizmann Institute, this job was passed on to them. In time the company was sold to “Miles”, and eventually to “Sigma”. Throughout his career Abraham continued in his efforts to promote applied aspects of his research, and over 40 patents are registered in his name.

From 1970-1973 Abraham served as the first chief scientist of the Ministry of Development. In 1972 Abraham was appointed Head of the Department of Organic Chemistry at the Weizmann Institute, and filled this role for seven years. From 1987, and for the next twenty years, he served as an advisor to Ministers of the Israel Police and to the Police Forensic Department. In 1988 he was awarded the Rothschild Prize in Chemical Sciences. When he retired he established the PCJ Chemicals Company for fine chemicals, where he continued to develop his ideas.

Alongside his work in this company, he focused on research into the history of Ness Ziona, as well as its preservation for future generations, at the “Beit Harishonim” in his town. In a similar vein, he led a series of get-togethers of “The Storytellers”, in which Institute veterans reminisced about “the old days” of The Daniel Sieff Research Institute and The Weizmann Institute of Science. Abraham was an opinionated scientist, but also pleasant-mannered and always smiling and happy, direct but never blunt. Like a pomegranate, he sprouted a profusion of novel ideas, and it was necessary to learn to filter them all in order to be able to fully realize even some. Research projects that were already completed didn’t interest him anymore, even if they were not yet published; he had already moved on to the next challenge.

In the past few years, bowing to his declining health, Abraham retired from all his activities.

Abraham passed away at the age of 88, in his hometown of Ness Ziona. His image will remain engraved in our memories and in our hearts. His students and colleagues in the Institute, here in Israel as well as abroad, are pained by his loss and send sincere condolences to his wife Tzipa, to his children Nona, Shuki, Shahar and Guy, and to the entire Patchornik family.

Prof. Yigal Burstein