

## Fr. Eduard Vitoria Miralles\*

Alcoi 1864 – Barcelona 1958

Fr. Eduard Vitoria Miralles was born in Alcoi (Alacant, *sp.* Alicante) on August 25<sup>th</sup> 1864, the youngest of seven children. When he was just four, his father died. In 1874 he began his baccalaureate studies as a boarder at St. Joseph's School, run by the Jesuits in Valencia. Academically he was an excellent student. In 1881, after finishing the baccalaureate, he went to Madrid University to study Mathematical Sciences. He remained at Madrid for four years but did not graduate because, as he said: *"the great enthusiasm that I felt at first, diminished little by little."* He said of his studies: *"I was devoted to the study of mathematics, and I made a fairly good provision of it"*. The reality was that he had a different idea going round in his head;



Figure 1. Fr. Vitoria in 1955.

to become a Jesuit. Finally, on September 20<sup>th</sup> 1886 he entered the Veruela Noviciate in the province of Zaragoza.

After finishing his noviciate and studies of humanities and philosophy, in 1892 he embarked on a degree in Physico-chemical Sciences, first at Barcelona University, and then at Valencia, where he graduated in June 1896. He was the first student to graduate from the recently created Science Faculty of Valencia University. He was awarded the grade of "excellent" and won an extraordinary prize.

With his decision to undertake a degree in Chemical Sciences the long gestation of the Chemical Institute of Sarrià (IQS) began. It is interesting to recall what Fr. Vitoria commented at the start of his studies: *"[When arriving at the faculty] I found myself, stepping into a new land, towards which I had never felt affection because, although during my baccalaureate studies at school and then again later, I had twice studied chemistry, on both occasions I studied it badly and with no relish, as then little attention was paid to the subject and the student passed the course simply by learning off by heart, without ever so much as touching a test tube."* Here Fr. Vitoria reveals his vocation as an experimenter. He used a small laboratory, *"to prepare compounds and perform tests that helped me to better understand what I was studying."* He applied this same learning technique later when he founded the Ebre (*sp.* Ebro) Chemical Laboratory.

Once he had finished studying Theology and Spirituality and was ordained a priest, in 1902 Fr. Vitoria went to the famous Leuven University to prepare his doctoral thesis in chemical science, under the direction of the prestigious professor Louis Henry. He synthesized trichloropropanol-2 by the then recently invented Victor Grignard method. He was awarded the degree with the highest possible qualification on July 22<sup>nd</sup> 1904. Let us pause for a moment and consider the unusual decision to send a young Jesuit to a foreign country to undertake doctoral studies in a positive science. The explanation is quite apparent within the context of the end of the 19<sup>th</sup> century, when scientific rationalism appeared clearly incompatible with religious belief. Given this situation, Jesuit Superiors worldwide decided to create intellectual institutions that would be a testimony to the fact that there is no opposition between faith and science. In Spain, Fr. Lluís Adroer, Jesuit Provincial of Catalonia from 1897 to 1903, was prominent in this effort. He can be considered the father of three institutions that were created in Roquetes (Tarragona) at the beginning of the 20<sup>th</sup> century: the Ebre Astro-

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nomical Observatory, the Ebre Chemical Laboratory and the Ebre Biological Laboratory.

When Fr. Vitoria came back to Catalonia, in addition to the experience of having worked in a great and prestigious scientific laboratory, he brought with him apparatus that could not be found in Spain at the time. The apparatus was to be a great innovation for the institute that he hoped to found. He chose the village of Roquetes, near the Astronomical Observatory, as the location for his laboratory. He built a three-storey structure. On the ground floor he installed the new Chemical Laboratory, which was inaugurated on October 1<sup>st</sup> 1905, just over a hundred years ago. It housed independent laboratories for the chemistry of carbon, mineral analysis, quantitative analysis, organic analysis and electrolytic processes. In addition, there was a classroom, a warehouse and a very select library.



Figure 2. The laboratory in Roquetes (1905).

The fundamental reason for locating the laboratory in Roquetes was that it was close to the Philosophy and Theology Faculties where Jesuit students went to class. The location thereby facilitated their initiation in scientific studies. Furthermore, it facilitated dialogue between those working in natural science and the professors of philosophy and theology, who represented Christian humanistic thought. While working alongside other scientists he began to prove himself to be a great teacher. Fruit of this work were the several doctoral theses that were published. In this first germ of what was to become the IQS there was no defined curriculum. Fr. Vitoria alternated theoretical lectures with personally directing students' work in the laboratory. He adapted the studies to the ability and interest of each of them.

The Roquetes period was without a doubt the calmest of Fr. Vitoria's life. With a relatively reduced educational task, he spent a great part of his time preparing and writing some of his most important works. This required of him, as he writes in the prologue to one of his books, "many and delicate laboratory experiments."

Among these works the following are worthy of special note:

*Manual de química moderna (Modern Chemistry Manual)*: appeared in 1910; 14 editions published; more than a hundred thousand copies.

*La Catálisis química (Chemical Catalysis)*: a voluminous book of almost 600 pages; appeared in 1911; praised by the Barcelona Academy of Sciences. It is the first work in Spanish on this subject, which was still a very recent development when the book appeared.

*Prácticas químicas para cátedras y laboratorios (Chemical practices for faculties and laboratories)*: appeared in 1912; contained numerous observations derived from the accomplishments of the author.

In 1916 the Theology and Philosophy Faculties of the Catalan Jesuits were transferred to Sarrià (a village near Barcelona) the Ebre Laboratory was also transferred there, and became the Chemical Institute of Sarrià. One factor that helped this change of location was Fr. Vitoria's conviction that in Barcelona he would find a more propitious atmosphere for scientific research. This did indeed prove to be the case. Studies were structured into a cycle of three years: the first year on mineral chemistry, the second on mineral analytical chemistry and the third on the chemistry of carbon. Every day students received one hour of theoretical lessons and worked for six hours in the laboratory. This experimental work was tutored by the same lecturers who imparted the theoretical lessons. The plan was conceived as a postgraduate course aimed at chemistry or pharmacy graduates. In October 1916 twenty-four students began studying there. Gradually students coming straight from baccalaureate schools applied to study at the IQS to complement the degrees they were taking in other faculties. In 1940, the IQS restructured its curriculum into a graduate programme. In 1936, when the Institute was closed due to the Spanish civil war, there were 57 students at the IQS.

Meanwhile Fr. Vitoria's fame was growing. In 1917 he was named Fellow of the Barcelona Academy of Sciences and Arts. In 1924 he was invited to give a series of lectures at the universities of Buenos Aires and La Plata. These lectures were collected into a book titled *The Argentine Lectures*. In 1928 was named Corresponding Fellow of the Buenos Aires Academy of Medicine.

In 1921 he founded the journal *Afinidad*, currently the oldest running journal of chemistry in Spanish language. At first it was the Newsletter of the incipient IQS Alumni Association, but it was soon transformed into a genuine scientific journal. In 1925 the president of the IQS Alumni "association wrote: "... we must focus our efforts in order to transform our *Afinidad* into a journal worthy of our Institute and its partners, with the contribution of selected and original articles and unpublished works that could bring it "recognized authority."

In 1927 Fr. Vitoria published *La Química del Carbono*, which was a genuine step forward in organic chemistry education.

In 1929 the IXth International Meeting of the Society of Industrial Chemistry was held in Barcelona. 20 countries were represented. Fr. Vitoria was named President of the 9th section, which grouped together work dealing with organic products.

On January 28<sup>th</sup> 1932, as a result of the Government Decree dissolving the Society of Jesus in Spain, the IQS was abandoned. The apparatus, material, books and products were dis-

tributed among different students' homes. For many days there were no laboratory sessions, but the theoretical lectures were given in private houses. Finally, on February 18<sup>th</sup>, gathered together in a house at 14 Pomaret street, a new institute was formed. The new director was a young lecturer, a graduate in Physical Sciences and a close collaborator of Fr. Vitoria's: Juan José Muñoz. The new institution was named the Academia Muñoz.

In summer of that year Fr. Vitoria rented a house located at 8 Anglí street, on the corner of Dr. Carulla street, from Mr. Ramon Par-Tusquets. It was a large house with a considerable garden and permission to construct a building for laboratories in it. With contributions from students' parents and some sponsors, the building was erected at a cost of 154,000 pesetas. On October 17<sup>th</sup> the academic year was inaugurated at the new site. The name of this new institution was the Centro de Estudios Químicos. It was run by Mr. Muñoz under the legal protection of the educational organization *Scientia*. This is how the IQS functioned until it closed in July 1936 when the Spanish civil war began. With the courageous help of the young lecturer Dr. Pere Ribosa, Fr. Vitoria escaped secretly from religious persecution, and fled to Italy where he remained until the end of the war.

On October 1<sup>st</sup> 1939, after months of reconstruction work and recovering a great part of the apparatus and library volumes, the IQS opened its doors once more. Fr. Vitoria, who had turned 70 in 1934, had handed the direction of the Institute over to Fr. Salvador Gil; born in Valencia in 1890, a student from the first year of the IQS, who had a doctorate from Freiburg University in Switzerland. This man from Valencia proved to be deeply European minded and was the person to open wide the doors of the IQS. He turned the company into a modern centre of further education that gradually oriented itself towards chemical engineering. This in no way meant relinquishing the ideal of working towards the construction of a world in agreement with God's plans; it just meant doing it in a different way, in accordance with the changing times.

It was not easy for Fr. Vitoria to watch the evolution of the institute that he had conceived. As if following some natural law of life, now that the institute had come of age it was becoming independent of its father. The original concepts that Fr. Vitoria continued to consider the most appropriate for the institute had become too narrow and it was extending its horizons. Fr. Vitoria continued researching and publishing papers. He also maintained his role as director of the journal *Afinidad*. In 1946 the Spanish government awarded him the Grand Cross of Alfonso X el Sabio.

As the culmination of his work, it is possible to indicate the homage rendered to him in 1955 on the occasion of his ninetieth birthday and the fiftieth anniversary of the founding of the Institute. A chemical products and industrial activities exhibition was organized. Different companies participated, many of them created by IQS chemists; a total of 142 stands were mounted. There was also an exhibition of Spanish books on chemistry with more than 1200 editions and some incunabula. Fr. Vitoria was decorated with the gold medal for Merit at Work and visited by the Minister of Education, Mr. Joaquin Ruiz

Jiménez. Finally, on May 7<sup>th</sup> a solemn academic session took place attended by numerous personalities from the Spanish and European academic world. They included Prof. Clemens Schopf from Berlin, Prof. Bruylants from Leuven, Prof. Cathala from Toulouse and Prof. L. Chardonnens from Freiburg. At this act Fr. Gil made a resounding speech and Fr. Vitoria delivered some touching words of gratitude and farewell.



Figure 3. Fr. Vitoria and Joaquin Ruiz Giménez (1955).

In March 1958, he attended the laying of the first stone of the pilot plants building; evidence of the industrial direction the IQS was taking. Fr. Vitoria died in Barcelona on September 22<sup>nd</sup> 1958; his body rests in the St. Ignatius chapel of St. Maur Church, in Alcoi, his native city.

Eduard Vitoria Miralles was an exceptional scientist, an enthusiastic experimenter and a genuine pioneer of chemistry in Spain. He worked towards a chemistry free from aprioristic speculations, that is based on laboratory work and which from this builds theories by inductive reasoning.



Figure 4. Fr. Vitoria working at the laboratory with Professor Manuel Sanz (1957).



A little-known anecdote concerning Fr. Vitoria centres around the total solar eclipse that was observable from Roquetes on August 30, 1905. The Chemical Laboratory had not been finished and so he could not experience the occasion as he would have wished. Nevertheless, he wanted to inaugurate scientific activity at the laboratory with a work referring to the eclipse, due to the proximity of the astronomical observatory and given the importance of the event.

To this end he planned a set of experiments to compare the intensity of the light at the moment of total eclipse with that emitted by the moon in its different phases. He used the chemical method developed by Bunsen and Roscoe based on the synthesis of hydrochloric acid, from chlorine and hydrogen, by the catalytic action of light. During the short period of illumination by the solar corona he only observed hydrochloric acid formation corresponding to a rise of 39 mm in a capillary column. He repeated the experiment later, for the same period of time, with the moon in its first quarter and obtained a column of 30 mm. When he performed it with a full moon, he obtained 82 mm. According to this, illumination by the solar corona is between the illumination corresponding to a half and a three-quarter moon. Nevertheless, Fr. Vitoria observed more light at the moment of the total eclipse than at full moon. He had no doubt about either the reliability of his laboratory results or the certainty of his visual observation. After much reflection he attributed this apparent contradiction to the passage of clouds, which, without stopping, were crossing in front of the sun and whose diffuse light increased the sensation of clarity.

This anecdote is very interesting to me because it simultaneously shows the scientific curiosity of Fr. Vitoria and his determination to match experimental data with reality. Moreover, I

believe that it is the first experiment in photochemistry carried out in Spain, and it was performed with very few means and highly accurately.

Like all of us, he was also a product of his time: he was a staunch enemy of new customs and fashions. Strangely, he was a declared enemy of sport *"because it is completely unworthy for a gentleman to run in underpants before the eyes of the world."* When he met a student who had injured himself in a sporting activity, he showed a certain joy because he thought that perhaps his misfortune would move him away from such an unworthy practice forever.

The strong personality of Eduard Vitoria and his tireless working spirit did not always make it easy for his colleagues; he was a tireless worker and he did not tolerate those around him resting. Witness to this was his most faithful collaborator, the Jesuit David Riera, who was his right-hand man for more than 30 years as the IQS administrator and manager. When, one holiday afternoon he went for a walk with his companions, he had to hear from the lips of the institute's founder: *"Go off on your walk, meanwhile the rest of us will do the work!"* Fr. Vitoria would not accept that somebody had insufficient courage to perform a task; he would answer that the fact of the matter was that he did not want to do it. For him, to want to do something meant to be able to do it.

Finally it is correct to say that Fr. Vitoria was a Jesuit in the strict sense of the term. He had a stout spirituality, expressed with the language and the devotions of his time. To the best of his ability he tried to put into practice throughout all the actions of his life the words that Saint Ignatius of Loyola left as the motto of the Society of Jesus: *Ad Majorem Dei Gloriam* (for the greater glory of God)."