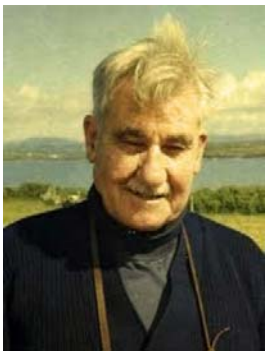
Prof. Enrique Balech (1912–2007)



As an eminent taxonomist and a pioneering scientist worried about the damages that human beings are causing to the planet Earth, Enrique Balech left an indelible mark. A man of great integrity died on 26 August 2007 in Necochea, Argentina, a few days after his 95th birthday.

Balech was born in Telén, in the province of La Pampa, Argentina, on 17 August 1912. In 1937 he finished his studies at the Instituto Superior del Profesorado "J. V. González" in Buenos Aires, where he became a high school teacher of Natural Sciences. At the beginning of his career he worked on freshwater protists at the Museo Argentino de Ciencias Naturales "B. Rivadavia" (MACN), first as an honorary associate and later as a chief of the Protistology Laboratory. During this period he worked on testate amoebae, ciliates and euglenoids. In the 1940s, he left Buenos Aires and moved to Necochea where he worked in marine sciences at the Estación Hidrobiológica de Puerto Quequén until 1947, when he was fired due to political reasons, three years after he was given an award by the Argentinean National Academy of Exact, Physical and Natural Sciences. Then, Balech worked as ahigh school teacher and continued his scientific research while working at home.

He was internationally known as a scientist, and just as importantly he was a teacher who mentored generations of students in biological sciences. Although he has worked with many plankton groups, like tintinnids, his most important contributions were on thecate or armored dinoflagellate taxonomy. In order to achieve more experience, during the 1950s he traveled abroad. In 1951, he spent two boreal summer months at the Station Biologique de Roscoff, France, thanks to a fellowship from the French Government. As a result, he published a pioneering paper on sand dwelling dinoflagellates. Later, he traveled to the Scripps Institution of Oceanography, CA, USA, where he spent several months in 1957 and 1958 working on plankton of the Pacific Ocean funded by a grant of the Simon Guggenheim Memorial Foundation. During that stage he described

two new genera of dinoflagellates, *Fragilidium* and *Scrippsiella*, the latter dedicated to Scripps. He returned to the United States in 1964 to work for a year at Texas A&M University. During this time he increased the number of known dinoflagellate species of the Gulf of Mexico from 76 to 262 and reported on their distribution. He developed great knowledge and understanding of dinoflagellate morphology by examining samples from very diverse origins, from cold waters like Antarctica, temperate waters like the SW Atlantic, California current or France to tropical waters like the Caribbean Sea and the Gulf of Mexico. He characterized the cingular and sulcal plates of many genera that were not known and considered that they were necessary for a modern diagnosis. Balech's plate interpretations and modification of Kofoid's plate tabulation system is widely accepted. Based on sulcal and cingular characters he moved all the marine species of the genus *Peridinium* to the new *Protoperidinium*, which became the dinoflagellate genus with the most described species. This represented an important change in dinoflagellate systematics. Balech revised many genera from different families (*Podolampas, Goniodoma, Pyrodinium, Pyrophacus, Palaeophalacroma and Dinophysis*). He proved the existence of a sulcus in *Podolampas*, and was the first to recognize the heterogeneity of the genus *Gonyaulax*. He concluded as Abé, that *Dinophysis* and *Phalachroma* have great similarities in their theca. He also validated many old dubious taxa with more complete redescriptions.

Using dinoflagellates as bioindicators to identify different water masses and currents, he contributed to a better understanding of dinoflagellate occurrence and distribution.

Regarding harmful algae, in 1973 he warned about the possibility of an outbreak of PSP in Argentina and he identified the cause of some human fatality cases as well as the causative species and provided assessment. Since then he focused his work more on toxic dinoflagellates. Using his own samples as well as others provided by colleagues from all over the world, he carried out an impressive study of the genus *Alexandrium* describing many of its species and redescribing the type species of the genus, *A. minutum*. He transferred many species previously considered to be in other genera, e.g., *Gonyaulax*, to this genus. His important monograph on *Alexandrium* provided essential information on how to identify and differentiate species, some of which are toxic. Balech made important contributions to the taxonomy of many other harmful dinoflagellates in the genera *Pyrodinium, Dinophysis, Prorocentrum and Ostreopsis*. Due to his outstanding work on the taxonomy of harmful dinoflagellates he was recognized for his achievements at the Third International Conference on Toxic Dinoflagellates held in St. Andrews in 1985.

As he did much of his work at home, when he retired as a teacher in 1982, he became a full time researcher, as he used to say. Despite being officially retired he carried out and published some of his most relevant works, e.g., the monograph on *Alexandrium*, the book "Los Dinoflagelados del Atlántico Sudoccidental" (his magnum opus, as he called it), and, among other studies, two new contributions to the genus *Protoperidinium*.

All those who have had the privilege of meeting him, appreciate his interesting and stimulating letters written on very thin paper or typed with a typewriter given to him by Matt Murphy of Sherkin Island, Ireland. Often his letters were accompanied by detailed drawings of some species. He also used his skill as an illustrator and artist to draw caricatures of his colleagues where he showed his great sense of humor.

Enrique Balech had a very serious concern about the environmental degradation of the Earth as he showed in his book "Geocidio. La destrucción del planeta" ("Geocide. Destruction of the Planet") published in 1978 and in short articles about, for example, topics like how overfishing can affect marine resources. As he grew up in La Pampa, he was also an expert in horses. At a workshop on taxonomy in Sherkin Island, Ireland, when he was 77 and complaining that he was too old to travel by plane, he was observed riding a horse. Enrique could talk with you about anything and the conversations went from science to cultural history, wars, and even languages. He was a great proponent of Esperanto and would encourage all that he met to learn it. As a person he was warm, humorous, and giving. As a scientist he was detailed, observant and a pioneer.

Rut Akselman, Santiago Fraga and Karen Steidinger
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El profesor Enrique Balech es un prestigioso científico argentino nacido en la provincia de La Pampa el 17 de agosto de 1912. Se graduó de Profesor en Ciencias Naturales en el Instituto Superior del Profesorado "J. V. González" de Buenos Aires en 1937, con el promedio más alto de su curso.

Se especializó en el estudio del plancton marino, siendo una autoridad mundialmente reconocida y consultada por investigadores y gobiernos.

Recibió Beca de estudios del Gobierno de Francia en 1951 y la Beca Guggenheim de EE.UU. (1957 – 1959). Fue profesor en diversos colegios secundarios y profesorados de Buenos Aires y Necochea, dejando con su labor docente, generaciones de estudiantes formados en ciencias biológicas. Fue jefe del Jefe del Laboratorio de Protistología del Museo Argentino de Ciencias Naturales, 1937-1947; Investigador del Consejo Nacional de Investigaciones Científicas y Técnicas (1962-1981); Investigador Visitante del Departamento de Oceanografía de Texas A&M University (1946-1965); Jefe de la División de Biología Marina y de la Estación Hidrobiológica Puerto Quequén del Museo Argentino de Argentino de Ciencias Naturales "Bernardino Rivadavia", entre 1960 y 1982; y miembro del Comité Argentino de Oceanografía. Fue miembro Correspondiente de la Academia Nacional de Ciencias Exactas, Físicas y Naturales; Presidente de la Segunda Reunión de Coordinación Internacional de Estudios de los Océanos Australes; Senador de la Academia Internacional de Ciencias de San Marino. Dirigió y formó en estudios del plancton marino a numerosos investigadores argentinos y del exterior, así como también fue invitado a participar en investigaciones conjuntas por científicos de todo el mundo.

En la década del 60 realizó estudios que le permitieron describir el comportamiento de las corrientes marinas del Atlántico Sudoccidental, basándose en el análisis de la composición específica de los organismos del plancton (principalmente dinoflagelados). El mapa de corrientes marinas propuesto por el profesor Balech fue confirmado más de dos décadas después por medio de los estudios satelitales. Descubrió numerosas especies nuevas para la ciencia de organismos planctónicos y fue referente mundial en el tema.

Recibió prestigiosos premios por su labor científica, como lo acreditan el Premio "Eduardo L. Holmberg", el Premio otorgado por la Sociedad Científica Argentina, especialidad Zoología, el Premio Konex Diploma al Mérito en Zoología (1993) y la distinción otorgada por única vez en reconocimiento a su labor pionera por sus pares en la tercera Conferencia Internacional sobre Dinoflagelados Tóxicos. Además, participó en numerosos congresos nacionales e internacionales, describió por primera vez para la ciencia numerosas especies de dinoflagelados, publicó numerosos artículos científicos y libros, entre los que se destacan:

"Introducción al Fitoplancton Marino" - Editorial EUDEBA, 1978.; "Geocidio" - Editorial de la Flor, 1978; "Los dinoflagelados del Atlántico " - 1988.

El Prof. Balech fue un reconocido especialista y un conocedor cabal de toda la Naturaleza y en su libro, Geocidio, denuncia con claridad y contundencia las consecuencias del uso irracional que está haciendo la humanidad del planeta Tierra.

Reproducido del prefacio de: Balech E. (2010) Cambios biológicos del color del agua de mar (mareas rojas o alocromías marinas) e intoxicaciones por consumo de mariscos. CONICET. Buenos Aires (Argentina), pp. 1-19.

A True Pioneer

Looking at the life of Prof. Enrique Balech

By Matt Murphy

The career of Prof. Enrique Balech (second from left), a world authority on dinoflagellates, spanned nearly 70 years.

GOING through life I have always been impressed and influenced by people with humility, kindness and understanding. I have been fortunate in meeting many who fit into that mould. However, there are few that I can say have always been the ultimate master in the field they work. One such person was Professor Enrique Balech from Argentina – the world authority on certain phytoplankton.

In 1987, we organised a workshop at the Marine Station "The Problems of Toxic Dinoflagellate Blooms in Aquaculture" on the island. I invited 12 scientists from around the world who were involved in red tide research. Most were experts in their field. Amongst those was a 79-year-old Argentinean Professor who I was told by Prof. Barrie Dale of Oslo University, who helped organise the workshop that he was a world authority on dinoflagellates (an important group of plankton causing many red-tides). Because of his age, I insisted he stay in my home. Oh, what a wonderful decision on my part as he, like me, was an early riser. We had breakfast together around 6am each morning and he talked to me of his long life as a scientist.

As a student he had decided to study bats but he became enthusiastic about the microscope and this began his life-long love for phytoplankton. This was away back sin 1934 in the Museum of National Science in Buenos Aires, Argentina. Freshwater phytoplankton was his first research but he soon moved on to marine research

At the same time he taught in a high school for a livelihood. In 1941 he began studying marine phytoplankton, especially tintinnids and dinoflagellates.

He returned to teaching in a high school from 1947 to 1961 to earn a salary. All this time he continued with his phytoplankton work. In 1961 he was appointed to the Mar Del Plata Institute which was created for marine researchers by three universities. In 1962 he resigned and was immediately appointed by the President to the National Council of Science as an investigator with full independence and a salary. He retired in 1981 as a principal investigator as he found himself becoming too much of a bureaucrat. As he said, he became an amateur scientist again! Listening to him talking I wondered was he ever anything but an amateur, given the difficulties he had in earning a salary.

I asked him had he a modern microscope? Smiling, he said: "I still use the same one for over 50 years, but I do need a good typewriter; the one I have is not very good."

Enrique Balech in 2002.

He left Sherkin with a new electric one, with the compliments of some of us at the workshop. He said that when looking at phytoplankton he drew much as drawings gave him time to look at detail; with the photographs one misses a lot. He made his own camera lucida (an optical device used to make accurate drawings from images seen in the microscopeaid) from string, a mirror, a can and pieces of timber. As he spoke I started to think of the other scientists at the workshop who were from major institutes world-wide, and who worked on microscopes costing thousands and thousands of pounds. Yet despite their sophisticated equipment, when we all sat around the table for dinner in the evenings and discussed marine matters, all present let the final word to the man they recognised as the true master.

In our hours of talking this great man never once bemoaned the fact that he had so little of the material things in life. One thing is sure, he had an abundance of contentment and happiness. As he talked I mentally compared him with some of those scientists in his field world-wide who were so convinced of their own greatness and so full of arrogance.

Enrique being the humble man that he was did not tell me fully of his achievements as a scientist. I found out later that he worked on plankton from many areas of the world. In his Antarctic work based on samples from 12 cruises he discovered 60% of the species accepted today from that region. His studies from the Gulf of Maine and the Caribbean increased the records from 76 to 262 species. From the south-western Atlantic he produced the most important monographic work for the Southern Hemisphere and one of the greatest for any oceanic region, in which 375 species are described, most not mentioned before in the region.

More of Enrique's studies were on plankton from the Mediterranean, the Arctic, Baltic, North Java and Philippines Seas.

In 1980 he was the first to recognise that two men in Argentina who had eaten shellfish had died from the paralysing shellfish poison (PSP), produced by dinoflagellates and transmitted by mussels. He guided the investigations and from then on he devoted his work to the study of the dinoflagellates which produced the toxins, included in the genus *Alexandrium*. He gathered material from around the world, such as Thailand, Borneo, Sumatra, Kamchatka, New Zealand, Tasmania, Turkey and many other places. Of course as he was the world authority on this work, numerous specialists from South America, Mexico, USA, Canada, Europe and Australia were guided by him.

Another side to Enrique's studies was oceanography. In 1957, he had undertaken oceanographic work on the California coast whilst at the famous Scripps Institute and Hopkins Marine Station. In 1964 he spent time at the Department of Oceanography of Texas University on further oceanographic work.

In his oceanic studies of the seas off Argentina he was able to show that those seas were poor for fish production - much less than the seas off Peru and Africa. He felt that Argentina was at risk of overfishing and that this called for attention. He was a prophet before his time. The above is but the tip of the iceberg of the oceanic studies Enrique carried out.

My great privilege was to publish his monograph on the genus *Alexandrium*. Whilst on Sherkin he mentioned he had finished this work but no one had offered to publish it. I immediately said I would, not of course telling him I had no idea where the money would come from. The manuscript had to be translated into English so I had time to put together the funding. At the back of my mind I hoped the sales would bring back the cost of printing. With such a specialised book, it took a while for the sales to equal the costs but I was so happy I did what I did.

Enrique died on 27th August 2007 at the age of 95. He still had students studying under him almost to the end. Incredible to think he had a career that spanned nearly 70 years. He wrote a number of books and published over 130 scientific papers but his greatest achievement was as a teacher – as Dr Karen Steidinger stated in a tribute to him in the monograph we printed for him: "He is a skilled scientist who willingly shares his knowledge and time to explain how to look for and recognise the smallest detail. He is careful and meticulous in his approach and technique, and most importantly he is a teacher. He recognises that we will always be students and need to continually learn."

Red tide research worldwide has many researchers. No one has replaced this great genius. Sadly a few believe they can but they are more interested in their image and spend little time over the microscope. What is so sad is that some of these seem to be able to command much funding, yet no one questions the results. The worrying thing is that there are some hardworking scientists in institutions world-wide who want to try and follow in the footsteps of Enrique Balech but in the modern world so many funding agencies are taken in by image, and worthy scientists don't receive funding. To them I say, remember Enrique Balech who carried out his work of almost 70 years on not very modern microscopes, which in today's institutes would be museum pieces. To the funding agencies I say that identifying phytoplankton may not have a prestigious image within science, but the fanciest of molecular investigation of phytoplankton is of very limited use unless the species is correctly identified (otherwise the investigators literally don't know what they are talking about!).

He never waved his own flag but in 50 years time his work will still be the reference for scientists needing to identify certain phytoplankton species. The likes of Enrique we will not see again.

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