



**The *Biological Psychology* of José Ingenieros,
some biographical points, and Wilhelm
Ostwald's (Nobel Prize Chemistry, 1909)
introduction to the 1922 German edition**

by

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SUMMARY: One of the earliest recorded works in Biological Psychology was published in 1910 by Argentinian psychiatrist José Ingenieros (1877-1925), Professor of Experimental Psychology at the Faculty of Philosophy and Letters of the University of Buenos Aires. Ingenieros, a multifaceted personality and prolific author and educator, has been considered a 'luminary' for young generations, ahead of his time, and was famous for his lapidary aphorisms. Physician, philosopher and political activist, he was the first psychologist who tried to establish a comprehensive psychological system in South America. His long list of publications includes 484 articles and 47 books, which are generally categorized in two periods: studies in mental pathology and criminology (1897-1908) and studies in philosophy, psychology and sociology (1908-1925). Some of his books continue to be published and to be best-sellers in the Spanish-speaking world; however, his works were never particularly available to English-speaking audiences. In the present study we present an overview of Ingenieros' life and work, and an account of his profoundly interesting work *Principios de Psicología Biológica*, in which he analyzes the development, evolution and social context of mental functions. It is a hope, eighty years after his death, to bibliographically resurrect this ardent champion of reason in the English biomedical and psychological literature. We also provide the original German and an English translation of the Introduction contributed by Nobel laureate Wilhelm Ostwald (1853-1932) to the 1922 German edition of Ingenieros' Biological Psychology, pertinent to the energetic principles Ingenieros adopted and the study of Psychology as a natural science.



1. Introduction



Fig. 1. José Ingenieros (1877-1925). Portrait from cover of special issue of *Nosotros* (Editorial, 1925b). The signature in the lower frame is from the dedication of doctoral thesis by Ingenieros to his friend Emilio Zuccarini.

José Ingenieros (Fig. 1), one of Argentina's estimable intellectuals, continues to be a highly read author in Latin America to this day. Dubbed by del Forno (1950) 'luminary of a generation' (Fig. 2), Ingenieros has illuminated with his ideas the way to generations of intellectuals, and continues doing so today. The scope of the present study, a different version of which has already been published (Triarhou and del Cerro, 2006) is two-fold. First, to introduce to the English

Schmidt, 2003; Schandry, 2003) – we nonetheless note two landmark publications from two other pioneers in the brain sciences. In a remarkable confluence, 1895 was an *annus mirabilis* for coupling psychology with neurohistology, having seen the light of two independently conceived works on neurobiological schemes of mental phenomena: Cajal's 'Conjectures on the anatomical mechanism of ideation, association and attention' (Ramón Cajal, 1895), and Freud's posthumously published theoretical treatise *Project for a Scientific Psychology* (Freud, 1966).

In a striking convergence of ideas, Freud, like Cajal, in the wake of certain theory of sleep being caused by brain cells' *amoeboidism*, postulated that learning might produce prolonged changes in the effectiveness of the connections between neurons and that such changes could subserve a mechanism for memory. Updated, this view is still entertained by neuroscientists as Eric Kandel (1981). Moreover, Freud (1966), in a manner relevant to the scope of Ingenieros' Psychology, wrote: "The intention is to furnish a psychology that shall be a natural science: that is, to represent psychic processes as quantitatively determinate states of specifiable material particles, thus making those processes perspicuous and free from contradiction". According to Barondes (1993), Freud had in mind that the units of such a natural science, the 'specifiable material particles', would be neurons, the cells of the nervous system, whose structure and organization he had helped elucidate in his extensive neuroanatomical studies (Triarhou and del Cerro, 1985; Shepherd and Erulkar, 1997; Guttman and Scholz-Strasser, 1998; Pearce, 2003; Ochs, 2004).

In the aftermath of the *fin du siècle* physicochemical and neurobiological repercussions on psychology, books on 'Biological Psychology' develop and expand ideas present in the writings of José Ingenieros. In the German literature there are the works of Lungwitz (1925), Bleuler (1932) and Leonhard (1961), and the more modern accounts of Birbaumer and Schmidt (1989), Köhler (2001), Gall *et al.* (2002), and Schandry (2003). In the French literature, one finds the

works of Delmas-Marsalet (1961) and Pellet (1999). Likewise, in the English literature, one encounters works by McDowall (1941), Kimble (1973), Groves and Schlesinger (1979), Kalat (1980), Hall (1983), Klein (1999), Rosenzweig *et al.* (1999), Wickens (1999), Toates (2001), Martin (2003), Pinel (2003), and Weiner *et al.* (2003).

In Ingenieros' *Principios* we come upon the scheme of a synthetic system of psychology weaved from positivist philosophy – with a heavy emphasis on the science of experience – and the principles of physical chemistry, and inditing the phenomena of psychic functioning at the ontogenetic, evolutionary and social levels, while leaving some room for metaphysics. At a time when Psychology was still closely associated with Philosophy, from which it had sprung – or which, according to another view, it had actually spawned (Reed, 1997) – efforts to draw it towards the principles of biological energetics and biological generative processes should be welcomed with today's perspective.

It is refreshing, to say the least, to find a clear proposition for psychology as a natural science, presented almost a century ago by a highly learned and copious writer of *opera* that span from politics to philosophy, through the way of neurology, psychiatry, psychology, criminology, history, critical essay, morals and sociology. In our opinion, Ingenieros deserves a place in the tradition of physician-psychologists – *quod vide* Ernst von Feuchtersleben, Wilhelm Wundt, William James, Ivan Pavlov, Vladimir Bechterew, Sigmund Freud, Eugen Bleuler, Alfred Adler, Carl Gustav Jung, Jean Piaget and the akin all the way to Eric Kandel – who have made valuable contributions to the emergence of psychology as a biological science during its formative years in the 19th and in the 20th centuries. We trust that the present report and its predecessor (Triarhou and del Cerro, 2006) may signal the proper historical placement of *Principios* among key historical works in Biological Psychology.

We provide the complete 'synthetic conclusions' of Ingenieros from the first Spanish edition (Ingenieros, 1913a) and a translation of

Ostwald's introductory commentary from the German edition (Ingenieros, 1922a). We also provide some biographical data on Ingenieros and Wilhelm Ostwald. Ostwald was the German chemist and philosopher, Nobel Prize winner who contributed the Introduction to the German edition of *Principios*, and whose physical theories Ingenieros refers to in five of the ten chapters of his book.



2. Life and work of José Ingenieros (1877-1925)

2.1. Biographical note

Numerous biographies of José Ingenieros have been published (Barreda, 1925; Colmo, 1925; de la Mendoza, 1925; Fernández, 1925; Bermann, 1925; 1926; 1929; 1933; Mouchet, 1925; Mouchet and Palcos, 1925; Ramos, 1925; Schiaffino, 1925; Zavalla, 1925; Riaño Jauma, 1933; del Forno, 1950; Bagu, 1953; 1963; Ponce, 1957; Torchia-Estrada, 1967; Gottheld, 1969a; 1969b; Laplaza, 1977; Ardila 1989; Rodriguez Kauth, 1996; Díaz Araujo, 1998; Murillo-Ramos, 2001). Furthermore, Ingenieros' daughter, writer Delia Ingenieros de Rothschild (pseudonym Delia Kamia), produced an 'Anthology' (Kamia, 1961), which also contains a biographical note. A synoptic timeline of Ingenieros' life and corresponding world events is given in Table 1.

José Ingenieros was one of two sons – Pablo was the other – of Salvador (don Salvatore) Ingegneros (1848-1922) and Mariana (doña Ana) Tagliavía, a family – including Tagliavía's father José – of revolutionary tradition and friends of Mazzini, Garibaldi, and Malatesta. Although there is not a perfect agreement in the available records (reviewed in detail by Díaz Araujo, 1998), the most likely scenario is that 'Giuseppe Ingegneros' was born on 24 April 1877 at Vía Candelaí Nº 45, Palermo, Sicily (Fig. 3). The original last name of the family, Ingenieros, was Spanish in origin, and had been 'semi-

italianized' to Ingegneros at the time of emigration to Sicily prior to Salvador's birth there; it was 're-castillianized' by José Ingenieros after 1912 for his European publications.

	Ingenieros' life and work	Events in science and the world scene
1900	Graduates from Medical School; H.G. Piñero establishes Psychological Laboratory at University of Buenos Aires	Freud publishes <i>Die Traumdeutung</i> ; Max Planck develops quantum theory; Lewandowsky coins term 'blood-brain barrier'
1902	Founds <i>Archivos de Criminología, Medicina Legal y Psiquiatría</i>	Kennelly and Heaviside discover ionosphere; Cuba becomes independent from Spain
1903	Publishes <i>Simulación de la Locura</i> and <i>La Simulación en la Lucha por la Vida</i>	De Vries discovers mutations in plants; Wright brothers make first successful flight; Panama gains independence
1904	Appointed Professor of Psychology; awarded National Academy of Medicine Gold Medal	Pavlov awarded Nobel Prize in Medicine; Russo-Japanese War (1904-1905)
1905	Travels to Europe (1905-1906). Entertains racist views about the poor, the Black, etc., later rejected.	Einstein publishes <i>Special theory of relativity</i> ; Norway peacefully gains independence from Sweden
1906	Returns to Buenos Aires	Cajal and Golgi awarded Nobel Prize in Medicine; Jakob starts modelling brain higher functions on the interference of stationary waves; Sherrington publishes <i>Integrative action of the nervous system</i>
1907	Founds <i>Instituto de Criminología de la Penitenciaría Nacional</i>	<i>Mauritania</i> makes maiden voyage from Liverpool to New York; Russian Alexander Scriabin composes <i>Le Poème de l'Extase</i>
1908	Professor of Experimental Psychology; forms <i>Sociedad de Psicología</i> ; publishes <i>Sociología Argentina</i>	Austrian Gustav Mahler composes ninth symphony; Salvador Allende born in Valparaíso
1909	Elected President of Argentina Medical Association	Ostwald awarded Nobel Prize in Chemistry; Brodmann publishes <i>Vergleichende Lokalisationslehre der Großhirnrinde</i> ; Freud visits Clark University
1910	Separate chapters of <i>Psicología Genética</i> appear in <i>Argentina Médica</i> ; article <i>Psicología Biológica</i> appears in <i>Archivos</i>	William James dies in Chocorua, N.H.; Titchener publishes <i>A text-Book of Psychology</i> ; Mexican Revolution (1910-1917); Portugal proclaimed a Republic; Tolstoy dies near Caucasus
1911	Publishes <i>Psicología Genética</i> ; self-exile to Europe (1911-1914)	Cajal's <i>Histologie du système nerveux</i> published in Paris; Jakob publishes a brain circuit better known as Papez' 1937 description; Bleuler coins term 'schizophrenia'
1912	Visits European Universities	Balkan Wars (1912-1913); <i>Titanic</i> sinks
1913	<i>Principios de Psicología Biológica</i> and <i>El Hombre Mediocre</i> published in Madrid	Watson publishes article in <i>Psychological Review</i> ; Albert Schweitzer builds Lambaréné Hospital in Gabon
1914	Marries Eva Rutenberg; <i>Principes de Psychologie Biologique</i> published in Paris	Cajal completes publication of <i>Degeneration and regeneration</i> in Madrid with support from Spanish physicians of Argentina; outbreak of WW I
1915	Founds <i>Revista de Filosofía</i>	Romain Rolland awarded Nobel Prize in Literature; <i>Lusitania</i> torpedoed by German U-boat off coast of Ireland
1916	Attends Washington, D.C. conference; publishes <i>Criminología</i> ; fifth edition of <i>Principios de Psicología</i> in Buenos Aires	Einstein publishes <i>General theory of relativity</i> ; Argentinian composer Alberto Ginastera born; <i>Britannic</i> sunk after striking mine in Aegean Sea
1917	Professor of Ethics; publishes <i>Hacia una Moral sin Dogmas</i>	D'Arcy Thompson publishes <i>Growth and form</i> ; Russian Bolshevik Revolution
1918	Publishes <i>Proposiciones Relativas al Porvenir de la Filosofía</i>	Max Planck awarded Nobel Prize in Physics; end of WW I
1919	Meets President Hipólito Yrigoyen; sixth (final) edition of <i>Principios de Psicología</i> published in Buenos Aires	Watson publishes <i>Psychology from the standpoint of a behaviorist</i> ; Treaty of Versailles signed
1921	Publishes <i>Los Tiempos Nuevos</i>	Einstein awarded Nobel Prize in Physics; Argentinian composer Ariel Ramírez born
1922	Father dies. Writes <i>Las Fuerzas Morales. Prinzipien der Biologischen Psychologie</i> published in Leipzig	Neurobiologist Fridtjof Nansen awarded Nobel Peace Prize; Jacinto Benavente awarded Nobel Prize in Literature; U.S.S.R. established
1925	Travels to México and France; dies in the morning of 31 October from complications of meningitis	von Economo and Koskinas publish <i>Die Cytoarchitektonik der Hirnrinde des erwachsenen Menschen</i> , paying homage to Cajal, Kaes, and Christfried Jakob

Table 1. Timeline of events in José Ingenieros' life, and parallel events of relative interest in neurobiology, science and the international scene during the first quarter of the 20th century.



Fig. 3. Ingenieros as a child at ages 3, 4, 7 and 11, photographed, respectively, in years 1880 (photography by Giannone, Palermo), 1881, 1884 (photography by J. Vigouroux, Montevideo) and 1888. (Sources: first and third photographs, Fernández, 1925; second and fourth photographs, P. Ingegneros, 1927).

The family moved from Italy to South America soon after Buenos Aires had become the Federal Capital in 1880. According to brother Pablo, José received his first instruction in Montevideo, Uruguay in 1881 at the age of four years (Fig. 3), under the direction of the notable educationist Aurelia Viera (P. Ingegneros, 1927). In 1885 he was enrolled in the 'Instituto Nacional', directed by educationist Pedro Ricaldoni. The family settled in Buenos Aires in September 1885. Already a child prodigy at age seven (Fig. 3), Ingenieros completed his primary education at the 'Catedral al Norte' (not yet an elegant quarter) and in 1888 was enrolled in the 'Colegio Nacional Central de Buenos Aires', obtaining the baccalaureate in 1892. His father, a journalist, had a book shop, and urged his son José to read, write, correct proofs and translate into English, Italian and French from early on; he was already translating Petrarca at eight.



Fig. 4. (*Upper*) Ingenieros giving a neurology lecture in San Roque Hospital, today Ramos-Mejía, in 1903 (from P. Ingegneros, 1927). (*Lower*) A 1910 photo with colleagues José María Ramos-Mejía, Francisco de Veyga and Lucio V. López (from Fernández, 1925).

In 1893 Ingenieros entered the University of Buenos Aires. In 1897 he obtained a degree in Pharmacy, and in 1900 he graduated from the Medical School. As a medical student, he collaborated with the review *Atlántida*. In 1898, he had the opportunity of meeting José María Ramos-Mejía, who started as being his professor and with whom he ended up maintaining a close friendship (Fig. 4).

Ingenieros married Eva Rutenberg in 1914 (Fig. 5); they had four children, Delia, Amalia, Julio and Cecilia. Nevertheless, he did not resign thereby all of his habits as a bachelor. Poet Eduardo Moreno (1906-1997) recalled, «A review of my teen years: listen, I already

frequented the dancehalls around Plaza Italia and one night I saw José Ingenieros and also a man of letters, Alberto Ghirardo, entering a local called "Palermo" located one block from Santa Fe Avenue. They were going to that venue to dance tango. They, as well as many others at that time, had a passion for tango. Tango was not plebeian, it did not belong only to the neighborhood or the tenement houses. That is something to highlight.»



Fig. 5. (Upper) Ingenieros in 1913 in Switzerland during his engagement to Eva Rutenberg (from Barreda, 1925). (Lower) With wife Eva and four children in April 1925, before his trip to Europe and México (unpublished photograph provided by *Caras y Cerebras* magazine to Barreda, 1925).

José Ingenieros died at 7:00 in the morning of 31 October 1925 at Calle Cangallo 1544, Buenos Aires, at the age of 48 years (Fig. 6). Based on the observed symptoms, which had been related by Ingenieros himself, medical colleagues of the time suspected a severe meningitis that resisted treatment with an eventual loss of consciousness, result of an earlier sinusitis, frontal neuritis and nasal abscess. With his last act culminated Ingenieros' anticipated desire in *Las fuerzas morales* (published posthumously), "to have the happiness of dying before aging". His wife Eva survived him by 30 years; their young daughter passed away in 1995 and the eldest in 1996.

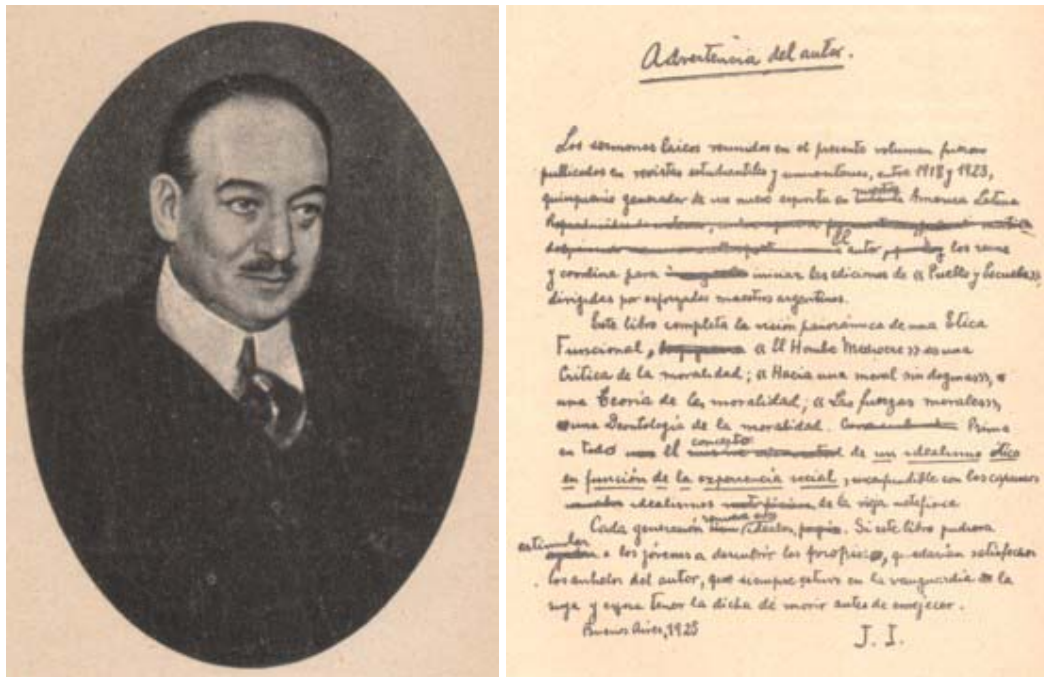


Fig. 6. Last portrait of José Ingenieros (*left*), a few days before his death in October 1925 at the age of 48 years (from P. Ingegnieros, 1927); the last manuscript of Ingenieros (*right*), the prologue written in 1925 for *Las fuerzas morales* (from Editorial, 1925b).

Among the many commemorations for Ingenieros, at least three journals dedicated special issues posthumously (Editorial, 1925a; Editorial, 1925b; Editorial, 1933). To honor the name of José Ingenieros, the Cultural Center of the Faculty of Medicine of the University of Buenos Aires was named after him ('Centro Cultural José Ingenieros', Facultad de Medicina, Universidad de Buenos Aires, Paraguay 2155,

Buenos Aires, Argentina, www.fmed.uba.ar/cultura), as well as a popular sector of the Buenos Aires conurbation, many streets, and cultural associations across the country.

2.2. Academic posts

Ingenieros dedicated his first professional efforts to nervous and mental pathology. He was named Head of the Clinic of Nervous Diseases (*Clínica de Enfermedades Nerviosas*) of the Faculty of Medicine of the University of Buenos Aires. The Laboratory for the Clinic was located in the insanes' asylum and it was directed by German-born neuropathologist and neurobiologist Christfried Jakob (who took on Argentinian citizenship as Christofredo Jakob, 1866-1956). Jakob taught Ingenieros neurohistological techniques. Ingenieros often attended Jakob's lectures, worked in the Laboratory, and was also present at the Service of Observation of the Mentally Ill of Argentina's Federal Police (*Servicio de Observación de Alienados de la Policía Federal Argentina*), which he would head as Director two years later. Ingenieros proposed for the first time to open outpatient units in public institutions for the treatment of neurasthenia, hysteria and other diseases that did not require hospitalization, and he held the view that public hospitals should serve for education and practice. Between 1902 and 1903 he offered courses in Neuropathology and Clinical Semiology at the Faculty of Medicine (Fig. 4).

In 1904 Ingenieros substituted as Professor of Psychology at the Faculty of Philosophy and Letters of the University of Buenos Aires. In 1908 he obtained the Chair of Experimental Psychology in the Faculty of Philosophy and Letters.

On 30 May 1911 the Governing Council of the Faculty of Medicine nominated him unanimously from the list of candidates for the Chair of Legal Medicine. In making the final decision, the President of Argentina (at the time Roque Sáenz-Peña) vetoed the nomination and instead appointed the second runner-up. The episode caused In-

genieros to openly express his anger against the President in a public letter. Ingenieros considered such an act of interference as government immorality, and treated Sáenz-Peña as the implied 'mediocre man' in his book *El hombre mediocre* (Ingenieros, 1913b; 2001). He distributed his books among friends and institutions, and moved to Europe in a self-imposed exile between 1911-1914, to return to Argentina three years later, after Sáenz-Peña's death.

In 1917, due to a temporary absence of Dr. Rodolfo Rivarola, he occupied the Chair of Ethics, and worked on developing the definitive form of his book *Hacia una moral sin dogmas* (Towards an ethic without dogma) (Ingenieros, 1917). In 1918 he was named Academician of the Faculty of Philosophy of the University of Buenos Aires. For this opportunity he prepared as a discourse his *Proposiciones relativas al porvenir de la filosofía* (Ingenieros, 1918), a text directed at transforming philosophical studies. Yet the meeting was adjourned due to the University Reform's turmoil, the new academician being received without reading it. Although Ingenieros did not directly participate in the Reform Movement, he did give his support to the students, and later, reformist leaders underscored his intellectual influence in their generation. After World War I he became Vice Dean of the Faculty of Philosophy and Letters. Ingenieros resigned all teaching and administrative posts at the University of Buenos Aires in 1919.

2.3. Travels in the Americas

In 1901 Ingenieros travelled to Uruguay to participate in the Second Latin American Scientific Congress held at Montevideo. In 1916 he attended the Second Panamerican Scientific Congress in Washington, D.C., by special invitation from the Carnegie Endowment for International Peace. There he presented a paper entitled *La Universidad del porvenir* (The University of the future) (Ingenieros, 1916b), which in the meantime had also been published in Spain by Vértice Editorial, Barcelona. In 1925, in a special invitation from the Mexican government, he visited México and was named distinguished guest.



Fig. 7. Ingenieros at Rome, walking through the Campidoglio's doorway to participate in the 1905 Psychological Congress (*upper*), and with novelist Manuel Gálvez (*middle*) (from P. Ingegneros, 1927 and Schiaffino, 1925, respectively). Walking in Paris during the same year (*lower*) in the company of cartoonist-caricaturist Pedro Zavalla, known as Pelele (from Zavalla, 1925).

2.4. *Travels to Europe*

Ingenieros made three trips to Europe, when he was 28, 34 and 48 years old. The first trip, between 1905-1906, was to attend the Fifth World Congress of Psychology in Rome (Fig. 7), where he chaired the Session on Pathological Psychology. Taking advantage of being in Europe, he spent time in Spain as well. He visited European Universities, lecturing on topics in his specialty, and contributed articles to professional journals (Figs. 8, 9), such as *Archives d'Anthropologie Criminelle* (Ingenieros, 1904a), *Revue Neurologique* (Ingenieros, 1905a), *La Presse Médicale* (Ingenieros, 1906a), as well as *Nouvelle Iconographie de la Salpêtrière*, *Revue de Psychologie*, *Rivista di Sociologia*, *Neurological Journal* and *Prese Medicala Romana*, before returning to Buenos Aires in 1906 (P. Ingegnieros, 1927; Ponce, 1957; Van Der Karr and Basile, 1977).

He compiled the impressions from his two years in Europe in a series of non-scientific articles in two versions entitled *At the margin of science*, which was published in Valencia (Ingenieros, 1906b), and *Crónicas de viaje* (Ingenieros, 1908). The latter work has been criticized by some undeniable racist portrayals of the poor, the native and *negros* encountered in the travel's scale ports, which portrayals Ingenieros later rejected and criticized himself. Rodríguez Kauth (1996) calls this travel's period a "stage of cognitive dissonance". The first version includes brief essays, commentaries and discourses, many of which had appeared in Buenos Aires in the newspaper *La Nación*, and were complementing the series of articles also published in Valencia in the book *Italy in science, life and art* (Ingenieros, 1905b).

Upon his return to Argentina, he tried to tie to the high society of Buenos Aires and to join the Jockey Club. He was not accepted. Some say that a socialist and (outspokenly) atheist was not what the Jockey Club, the ultimate inner circle of the rich and powerful, wanted as a fellow member; others, that Ingenieros had indiscreetly revealed that a relative of a Commission's member had been his patient.

When the Chair in Legal Medicine was not granted to him, he went on his second European trip, between 1911-1914: his self-imposed exile. In the course of that period, he expanded his scientific studies at the Universities of Paris, Geneva, Lausanne and Heidelberg, and systematically began to give room to his philosophical inquietudes. He again spent time in Spain, editing and publishing, among other works, the 1913 Madrid editions of *El hombre mediocre* (Ingenieros, 1913c) and *Principios de Psicología Biológica* (Ingenieros, 1913a).

His third and last European trip took place in 1925 as a guest of the French Government in order to attend the festivities marking the centennial of Charcot's birth. He returned to Buenos Aires in September 1925, the month before his demise.

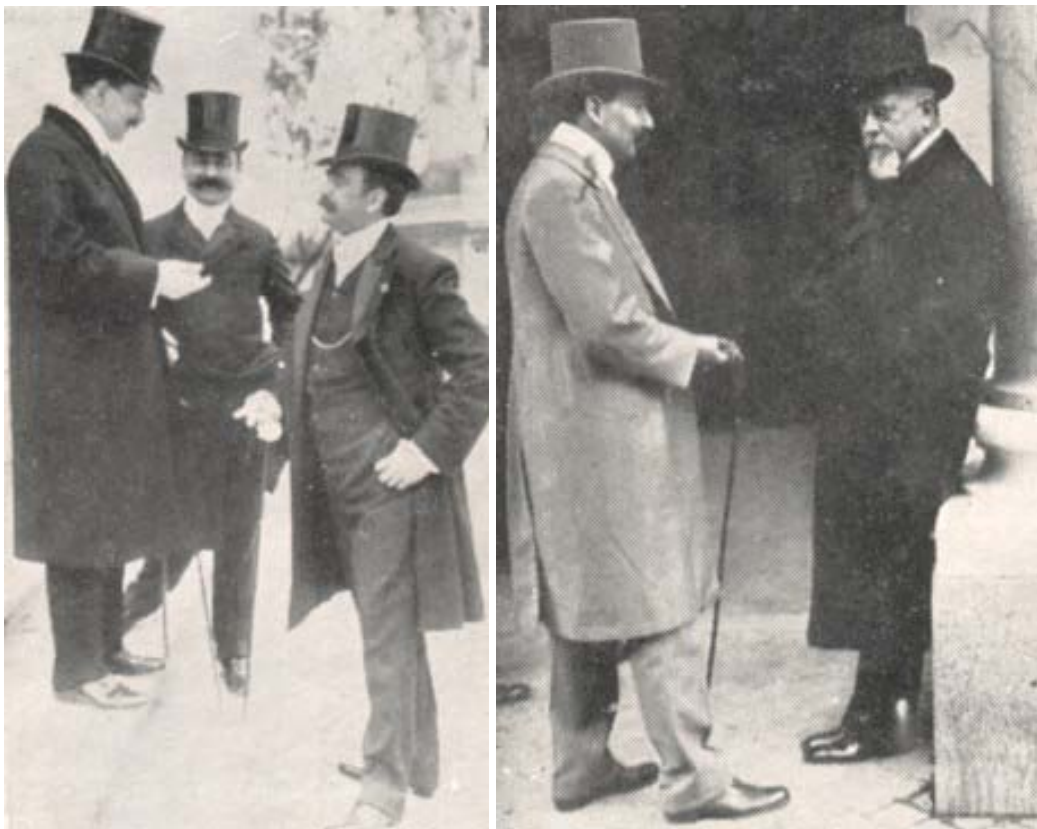


Fig. 8. Ingenieros in 1905 in Paris with Payo Roqué (*left*) and in casual conversation with General Julio A. Roca (*right*). Pictures tell much more about the man than any text. For a 28-year old Argentinian to be in Paris, it was an unequivocal demonstration of personal success. Further, the intellectual, ultraliberal professor, is chatting with the General – former president – Roca, embodiment of the most rancid Argentinian ‘oligarquía’ (from Colmo, 1925).



Fig. 9. Frontispiece of French journals where articles appeared in 1904 and 1906 (Ingenieros, 1904a; Ingenieros, 1906a).

3. Publications and other intellectual activities

3.1. Scientific journals and literary works

In 1899 Ingenieros joined the *Revista de Criminología Moderna*. That same year he was 'discovered' by a would-be friend, professor and mentor, Dr. Francisco de Veyga (Fig. 4), who designated him secretary of redaction of *La Semana Médica* (Medical Weekly), which would see him as one of its regular collaborators.

In 1900 he reported his work in Psychopathology and Criminology in a small pamphlet under the title *Dos páginas de Psiquiatría Criminal* (Ingenieros, 1900). Another one of his first publications, shortly after graduating from Medical School, was a famous critical essay about the book *La Ciudad Indiana* (The Indian City) by Juan Agustín García; the essay appeared in *Revista de Derecho, Historia y Letras* (Review of Law, History and Letters).

In January 1902, at the suggestion of de Veyga, Ingenieros co-founded with Ramos-Mejía the journal *Archivos de Criminología, Medicina Legal y Psiquiatría*. A bimonthly publication, it was the official journal of *Sociedad de Criminología* (Society of Criminology). In 1903 the title of the journal was changed to *Archivos de Psiquiatría y Criminología Aplicadas a las Ciencias Afines* and continued to be published regularly under the editorship of Ingenieros until December 1913 (Fig. 10). During the years of his editorship, Ingenieros himself contributed to the journal 90 articles (Ingenieros, 1914b); the topics he covered were diverse, ranging from the physiology of the cerebellum (Ingenieros, 1905c) to the pathology of psychosexual functions (Ingenieros, 1910a) and the psychology of genius (Ingenieros, 1911c). His very first article on 'Biological Psychology' appeared in 1910 (Ingenieros, 1910b), and all the remaining chapters of the book under the title 'Genetic Psychology' appeared the following year (Ingenieros, 1911a). In 1911, Ingenieros also published in the *Archivos* the first version of six of the eight chapters of *El hombre mediocre* (Ingenieros, 1911b).

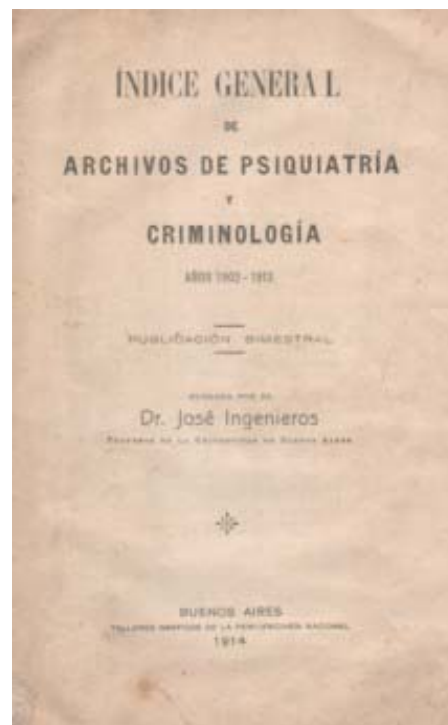


Fig. 10. General index of *Archivos de Psiquiatría y Criminología* for 1902-1913, the years that Ingenieros edited the journal.

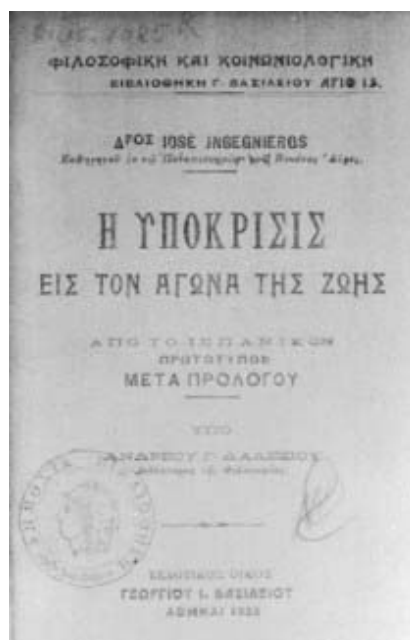
Articles in the *Archivos* of especial interest, by other authors, include those of Argentinian philosopher and writer Macedonio Fernández (1874-1952) on the problem of genius (Fernández, 1902) and by Christofredo Jakob on the relationship of psychology to cerebral histology and cortical biology (Jakob, 1911; 1913). Ingenieros also solicited or reproduced articles by European authors, including one of Cajal's classical essays on the neuron doctrine (Ramón y Cajal, 1907).

In 1913, while in Europe, Ingenieros announced to Helvio Fernández that he was suspending the publication of *Archivos*. Fernández continued the journal as the *Revista de Criminología, Psiquiatría y Medicina Legal*, a title maintained from 1916 to 1935, a period in which Jakob published his neurobiological synthesis on the issue of memory; from 1936 to 1950, the journal became *Revista de Psiquiatría y Criminología* (information based on the Catalogues of Periodical Publications of the National Academy of Medicine of Buenos Aires and the Library of the School of Medicine of the University of Zaragoza).



Fig. 11. (Left) Ingenieros in 1904, the year following publication of *La Simulación de la locura* (from Colmo, 1925). (Right) Frontispiece of book resulting from his doctoral thesis (Ingenieros, 1903). (Next page) 1923 Greek translation by Dr. A. G. Dalezios, Georg I. Vasileiou Publishing House (Philosophical and Social Library, no. 15), Athens.

In 1904 the National Academy of Medicine of Buenos Aires awarded Ingenieros the gold medal (*Premio de la Academia de Medicina*) for best medical work published nationwide, for his book *La simulación en la lucha por la vida*, which had formed his doctoral thesis – where he affirmed that the struggle of the classes is one of the manifestations of the struggle for life – and *Simulación de la locura*. Those two works, included in a single 500-page long book (Fig. 11), probably the first South American book on feigned insanity, were published by *La Semana Médica* (Ingenieros, 1903). An Italian translation of the work was published a year later in Torino (G. Ingegneros, 1904). A critical review of the work – consisting of the synthetic conclusions of the two studies – appeared in French (Ingenieros, 1904a) that same year (Fig. 9). A Greek translation of the book was published in Athens two decades later (Ingenieros, 1923).



From 1904 on Ingenieros published studies dealing with hysterical phenomena (Ingenieros, 1904b, 1906a) and their relation to art as well, particularly music (Ingenieros, 1907). The work was honored by the Medical *Académie* de Paris. In this framework, he contended that "the auditive, visual, phonative, and graphic images special of the music language are localized in anatomical sub-centers included, re-

spectively, within the centers of Wernicke, Kussmaul, Broca and Exner, accounting for the localizations for every kind of performance, such as violin and piano." This sharply factual presentation was contested by a disciple of Jakob, José Tiburcio Borda (1869–1936), as being rather a theoretical supposition, not yet enough grounded on empirical results. (The divergence created some mutual reserve, which did not prevent to collaborate again after the 1910 American Scientific International Congress. Following the Congress Jakob himself was invited to contribute to the *Archives*). Ingenieros based his criticized studies on the work of Charcot and Janet, and also made references to the work of Breuer and Freud. Francophile Ingenieros initially received Freud through French authors, specially the well-known critique that Pierre Janet dedicated to Freud in 1913. His 1919 book *Histeria y sugestion* sold repeatedly in several editions, at a time when many Argentinian intellectuals were going back and forth to Europe, especially Paris, and growing an increasing interest in unconscious and dream phenomena (Vezzetti, 1996; Puig 2004). Later on Ingenieros abandoned psychotherapy and wrote *La locura en la Argentina* (Madness in Argentina), centering his interest on dementias as a social phenomenon.

In 1908 Ingenieros founded the *Sociedad de Psicología* (Society of Psychology); its first President was the eminent researcher Horacio G. Piñero, who in 1900 had established the first Psychological Laboratory in the University of Buenos Aires. Ingenieros was elected President of the Argentina Medical Association in 1909 and President of the Society of Psychology in 1910.

In 1915 Ingenieros founded the journal *Revista de Filosofía*, which continued publication until 1929 (Ingenieros and Ponce, 2000). In 1915, Ingenieros also produced, in association with Severo Vaccaro, a popular – rather than academic – collection, entitled *La cultura argentina*. Between May and June 1916 he published the complete text of *La cultura filosófica en España* (Philosophical Culture in Spain) in *Revista de Filosofía* (Ingenieros, 1916d).

The Complete Works (*Obras Completas*) of José Ingenieros were published in 20 volumes by Elmer Editor in Buenos Aires in 1957 (Ingenieros, 1957a); the list of titles is reproduced in Fig. 12. Another edition, in 8 volumes, gathered on the basis of the compilation of Ingenieros, and of Aníbal Ponce after Ingenieros' death, was published by Mar Océano in 1962, with prefaces and the collaboration of Julio L. Peluffo, Héctor P. Agosti and Gregorio Weinberg (Ingenieros, 1962).

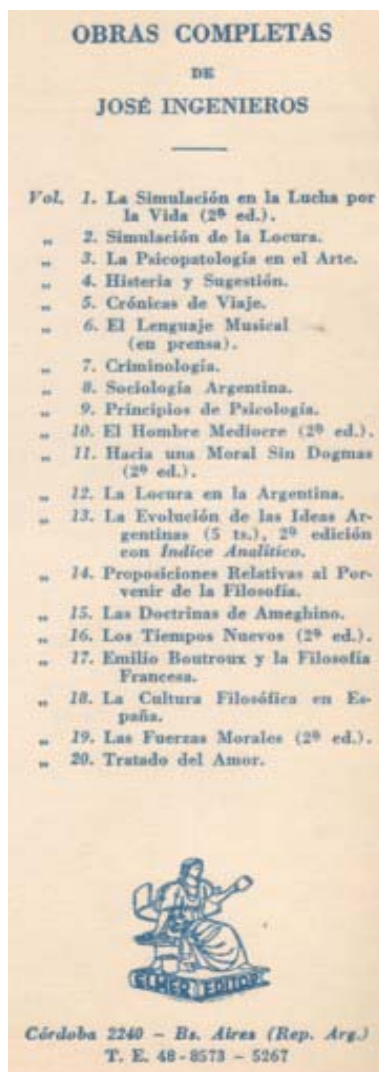


Fig. 12. Titles of books contained in the 20-volume 1957 edition of *Obras Completas* by Elmer Editor.

3.2. Political activity

As a medical student, on 7 December 1894 Ingenieros was appointed secretary of the University Socialist Center. It had been

formed by renowned socialist Juan B. Justo (1865-1928), who later married another physician, Ingenieros' friend and Jakob's student, socialist activist Alicia Moreau. Ingenieros published the first piece of his noteworthy work *¿Que es el Socialismo?* (What is Socialism?) on 1 May 1895 in the periodical *La Vanguardia*. He also directed the left weekly magazine *La Montaña* and by then wrote that money was dirty and infectious. Nonetheless, in 1902 he was 'invited' to resign affiliation with the Socialist Party, after attending one of their gatherings in black tie outfit. As Ángel Rodríguez Kauth is probably right in calling this vital stage one of cognitive dissonance, one may be sure that such outfit was not intended to upset his comrades. By then and until around 1910 Ingenieros distinguished himself by his refined attire, as shown in the winter photographs: immense frock-coat, stove-pipe hat, giant white collar, red waistcoat, and sometimes a gold breastpin with the sportful legend, "*Arbiter Elegantiarum*".

In 1903 Ingenieros was designated, by the Municipality of the City of Buenos Aires, as a Commissioner with the aim of studying the hygienic and social conditions of the working and marginalized sectors. His diagnostic proposal was considered a monument of socialist thought on the topic.

In 1919 Ingenieros accepted an interview with President Hipólito Yrigoyen – who was beginning a 14-year period in government, having won elections with his Radical Party, after a Roque Sáenz Peña's initiative introduced the secret ballot in 1916 – in order to exchange opinions with him on the social and political crisis that the country was experiencing. A written account of the encounter has been given by Ingenieros' daughter Delia (Kamia, 1957).

In 1920 Ingenieros adhered to the progressive group *Claridad* (=Glasnost!) that Anatole France and other intellectuals had founded in France. In his 1921 work *Los Tiempos Nuevos* he defended the Bolshevik Revolution and was critical of the intervention policy of the United States in Latin America. In 1922 he proposed the foundation of *Unión Latinoamericana* (Latin American Union). In 1923 he

founded a monthly, *Renovación*, an anti-imperialist combative organ. He used to sign under pseudonym *Julio Barreda Lynch* (not to be confused with his young friend Ernesto Mario Barreda, 1899-1958) or *Raúl H. Cisneros*. In 1925 he co-authored, with socialist leader Alfredo L. Palacios, the founding act of Unión Latinoamericana, and forswore his crude racist declarations of yore, some affirming that Blacks seemed "closer to apes than to civilized men, ... All that is done in favor of the inferior races is anti-scientific. At most, one might protect them so that they die out agreeably." Unforeseen death prevented him to accordingly revise his old stick-in-the-mud lines.

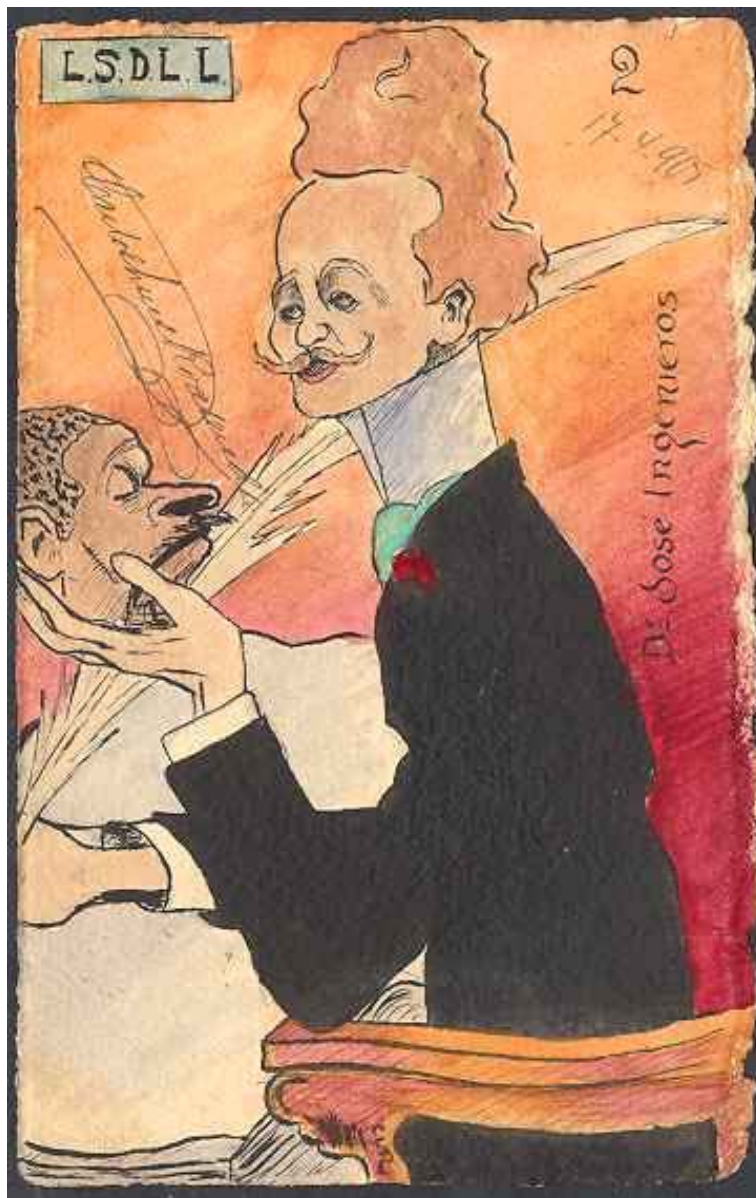


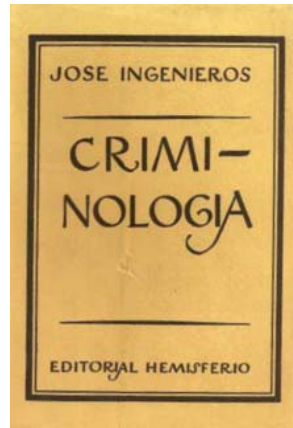
Fig. 13. Social critique: an Argentinian postcard dated 1905 (previous page) satirizes the fact that by the time José Ingenieros, a well-known public figure, had been unable to relinquish descriptive distance when dealing with certain human groups. This "lack-of-empathy" critique of late grew into insisting that he thereby helped to make persuasive the consensus about existing social exclusions. Such demeanor, at times, is contrasted with the acts of another neurobiologist in the same Argentine tradition, Ramón Carrillo (1906-1956), who – as the comparison has it – as a Minister of Health did not reinforce a sector's political hegemony by stigmatizing the disqualified social sectors ("medicalization"), portraying them in exclusion-legitimizing biological scenarios. In order to include and protect the whole population Ramón Carrillo built some 400 hospitals or sanitary public institutions – not precisely contributing to the survival of the fittest – and decentralized their operation. Yet not always is stressed that Ingenieros did not enjoy any similar power, and that he retracted his former views on the mentioned human groups.

3.3. *Studies in Criminology*

In 1896 Ingenieros wrote some essays on Sociology and Cultural Anthropology. He had already begun to show signs of his later professional and intellectual curiosities. The writings unfolding in *Criminología* were united for the first time under *Dos páginas de Psiquiatría Criminal* (Ingenieros, 1900). He inaugurated *Archivos de Criminología, Medicina Legal y Psiquiatría* with his article 'Valor de la psicopatología en la antropología criminal' (Ingenieros, 1902), which was to form the basis for developing his later and quite famous text *Criminología* (1916c) that would be published in seven editions by 1919 (Ingenieros, 1957b; 1962).

Essays, written between 1899 and 1901, had by 1905 been reorganized and translated into English, French, Portuguese and Italian, and published in various reviews. Most of these appeared in Italian in a volume entitled *Nuova classificazione psicopatologica dei delinquenti* (G. Ingegneros, 1907); a Spanish translation not mentioning a translator's name appeared in Peru without knowledge of the author (Ingenieros, 1908). After corrections and additions, the work was re-edited for the Institute of Criminology of Buenos Aires and published in 1910 by the Imprenta de la Penitenciaría Nacional (Press of the National Penitentiary Institute), in which inmates were working as a part of their rehabilitatory training. Including the part on Criminal

Psychiatry, it was reprinted two years later in Madrid under the title *Criminología* (Ingenieros, 1912). A sixth edition appeared in 1916 in Buenos Aires (Ingenieros, 1916c); that text forms Volume 7 of the 1957 edition of *Obras Completas* (Ingenieros, 1957b) and was used for a Portuguese translation by Brazilian Professor Haeckel de Lemos as well.



On 6 June 1907 Ingenieros founded the Institute of Criminology of the National Penitentiary of Buenos Aires (Instituto de Criminología de la Penitenciaría Nacional de Buenos Aires), a clinic for the study of criminals and mental patients, of which he became first director, an office he held until 1914 (del Olmo, 1999; Sánchez Sosa and Valderama-Iturbe, 2001). As director of the *Servicio de Observación de Alienados* at first, and heading the *Instituto de Criminología* subsequently, he kept collecting and revising his material over ten years, also taking into account contemporary European criminological doctrines. In the spirit of the 'Positive School' he pointed to the influences of the modern philosophy of law, taking into account the biological and sociological bases that form the foundations of Criminal Jurisprudence, and transforming Criminal Anthropology into a Criminal Psychopathology by defining the social value of criminal behavior and by providing a new classification of criminals based on clinical observations.

Criminology covers topics such as the new philosophy of law and criminal law, the crisis of contemporary penal legislation, postulates

and program of criminology, causes of criminality, the value of psychopathology in criminal anthropology, the psychopathology and social unadjustment of criminals, clinical and psychological fundamentals and psychopathological classification of criminals, the theoretical postulates of juridical positivism, the new bases of social defense, criminal psychiatry and the dangers of defective penal legislation. Of special interest is the proposition that "ethical norms are constituted as a result of social experience ... In higher animal species, the fact manifests in a hundred ways that can be read in the treatises of anecdotal Zoology or a *Zoological Psychology*. In humans we observe it in every instance" (Ingenieros, 1957b; Díaz Araujo, 1998).

To understand Ingenieros' position and impact, one has to consider the sociopolitical situation in Argentina at the time of his most prolific criminological activity. One of his main concerns was immigrants (Peset, 1983); moreover, his theoretical conclusions were drawn from the study of prisoners, most of whom were immigrants, in this case white anarchists. As mentioned, like other members of the 'Enlightened Minorities' of the 1880s generation, also Ingenieros expressed certain prejudices in some of his works. Yet he attempted to explain criminality in psychopathological terms.

Such a wave of massive migration was taking place in Argentina that, by 1890, the country was receiving more foreigners than any other Latin American nation. It is estimated (Rock, 1977) that between 1857-1916, over 4,750,000 immigrants entered a country that would in the years to come be marked by an unstable society, oligarchy, conflicting relations between ruling class and immigrants, the resonance from the world financial crisis of 1890, workers overexploitation, abominable urban living conditions and increased crime among the immigrants' concentration around the port of Buenos Aires, demonstrations, strikes, and a workers movement reaching the highest level in all of Latin America between 1890-1918, (Rock, 1977; Godio, 1979; del Olmo, 1999).

These events during the last years of the 19th century and the first decade of the 20th century are the context for Argentina's criminological boom. On the other hand, the development of the Italian 'Positivist School' was considered fundamental in correcting problems such as crime and became most significant in Argentina following the 1885 Rome Congress on Criminal Anthropology (del Olmo, 1999).

Its highest expression was the creation in 1907 of the Institute of Criminology at the National Penitentiary of Buenos Aires. It was considered the first in the world to scientifically study prisoners with the aim of arriving at an adequate treatment regimen for their readaptation. Lombroso's teachings were closely followed (Blarduni, 1976).

Francisco de Veyga and José Ingenieros were given the responsibility of developing and applying the Italian Positivist School to Argentina's criminal policy. Their official positions enabled them to integrate theory and practice. Francisco de Veyga, a forensic doctor, created, in 1897, the first course of Criminal Anthropology and Criminal Sociology in the Faculty of Medicine of the University of Buenos Aires. While he was director of the Police Service, he nominated his pupil Ingenieros as clinical chief of the Police Service.

De Veyga is recognized for pioneering clinical criminology in Argentina, but José Ingenieros consolidated the direct study of criminals. In 1890, de Veyga started the Forensic Psychiatry Clinic at the same prison, appointing his pupil as director. In 1902, he changed its name to the Psychiatric and Criminological Clinic, where Ingenieros created, the following year, an Experimental Psychology Laboratory as the first attempt to apply psychology to the study of criminals in Argentina. In 1907, Ingenieros became director of the new Institute of Criminology of the National Penitentiary of Buenos Aires, where he remained until 1914, when he resigned. He developed a questionnaire for observing and examining criminals, called the *Psychological and Medical Bulletin*, which continued to be applied by those who followed him. The National Penitentiary of Buenos Aires, and within it

the Institute, became so well known that it was visited by internationally prominent figures.

Aside from their official posts, both doctors engaged in intense intellectual activity. In 1902, de Veyga founded the *Archives of Psychiatry and Criminology*, appointing Ingenieros as director. The statement of mission in the inaugural issue of 1902 mentioned that the journal had as its aim "to spread the scientific study of abnormal men – especially criminals and the insane – as well as the conditions of the psychological environment that affect them". It was soon the best-known Argentinian journal internationally, with frequent contributions from specialists from various countries. When the Institute of Criminology was created in 1907, the Archives became its official journal.

Criminología is considered to be the first book on clinical criminology published in the world (Pinatel and Bouzat, 1974). In it, Ingenieros developed the 'Scientific Program' applied to the study of criminals at the Institute. He divided criminology into three areas: (a) criminal etiology, *i.e.* the causes of crime; (b) clinical criminology, the study of the multiplicity of criminal acts to establish the degree of danger; and (c) criminal therapy, determining the social and individual measures needed to assure society's defense by the correction of the criminal.

Although Ingenieros' *Criminology* is based on the fundamental premises of the Italian Positivist School, he aired his disagreements with Lombroso and Ferri in a paper entitled *The classification of criminals*, which he presented in 1905 at the Fifth International Psychology Congress in Rome (Fig. 7). For him, criminal morphology was similar to that of all degenerates; the difference between criminals and the rest, he believed, could be discovered in the field of psychopathology. In this regard, Ingenieros wrote the following: "The development of a new orientation in the study of criminals to complement the Italian Positivist School, according to scientific criteria gathered in the clinic and the laboratory, is imminent. The study of anthropologi-

cal abnormalities is destined to give way to psychological abnormalities" (Ingenieros, 1957b). Thus, Ingenieros stressed the relationship between crime and insanity. To him, crime was the product of abnormal psychic functioning, which explains why he has been considered the founder of the psychopathological school of Criminology.

3.4. El hombre mediocre

Ingenieros was probably the most important positivist in the Argentinian tradition. Yet so eclectic he was, that his ideas frequently exceed the positivist discourse. As Lorena Betta (2005) has it, "his thought receives contributions from a most diverse variegation of cultural and philosophical movements. Influences come from positivist and evolutionist roots, include the modernist, romantic, and spiritualist lineages, and continue until reformist marxism and the revolutionary wing. In this combination play a part thinkers such as Darwin, Spencer, Sarmiento, Lenin, Trotsky, Lunacharsky, Ruben Darío, José Martí, Rodó, Vasconcelos, Emerson, Barbusse and Nietzsche." He rejected traditional religious formulations of problems as falsely posited. The true metaphysical questions arise out of, yet beyond, the sciences. But because they concern matters of which we have no present experience, they are more adequate to generate hypotheses rather than dogma. Ingenieros was gripped by evolution and saw the possibility of human perfectibility. It brought special problems to his views. Emerenciano Ramírez Villasanti (2001) points that in order to formulate his convictions in a framework of evolutionary materialism, Ingenieros developed deterministic interpretations of human and natural affairs. This poses special conundrums in matters of ontology and ethics, as determinism results incompatible with any aspiration of intentional perfecting. This makes Ingenieros the moralist to collide with Ingenieros the scientist, an inflection point that was specially addressed by his follower Gregorio Bermann (1894-1972) in his 1918 thesis probing determinism and free will. Ingenieros yet went ahead by pointing that ideals themselves are hypotheses for the improvement of human nature.

In *El hombre mediocre* (Ingenieros, 1913b, 1913c, 2001), a work that rivaled José Enrique Rodó's *Ariel* in its impact upon Latin American youth, Ingenieros saw ideal values as being the production of a creative élite, which is typically thwarted in its moral ambitions by mediocre human beings (Smart, 1999).

Mediocrés are massified persons unable of forming or striving for an ideal, who thus panic about originality, rejecting creation and bustle to espouse apathy and stability. For reformists, then, professors were "mediocre men". Their social function was providing stillness rather than progress. In contrast, "superior" people distinguish the needs of the time and use their talents to fulfill them. For them, ideals are motivating factors for individual and social progress. Anyone so doing is "young" by definition, and definitionally young men are the ultimate formulators of ideals and those who will bring about a better future. Yet narrowing this broad notion of youngness, Ingenieros argued that human perfectibility is a privilege of the biological youth: only physically young men strive for perfection and take action toward it. Reformists of course identified themselves as Ingenieros's "superior men" and wished that the university was the place in which male students would be educated in the traits of "the new man" – not by the old professors, certainly.

Biased readings notwithstanding, the pages of *El hombre mediocre* – his work par excellence and a most important work in Social Psychology, taught even today at many Universities worldwide as a masterpiece of morality, social philosophy and literature – constitute the severest and most eloquent critique against all those who, in the name of vulgarity and mediocrity, are against the progress of the individual in one's eternal fight to procure an ideal. Through an accuracy of opinions and communicative accent of sincerity with neither ties nor prejudices, the book deserves without a doubt to be considered of exceptional value, offering in its pages an inappreciable treasure of a live and lasting education.

3.5. *Philosophical naturalism and evolutionary positivism*

'Positivism' was a philosophical stance comprising scientific, deterministic, psychological, evolutionary, biological and sociological topics. Positivists admired Darwin and prized Comte and Spencer as their philosophical heroes. Preference for one or the other gave rise to evolutionary or social positivist tendencies, respectively. Positivists rejected *a priori* and intuitive methodologies and praised science as providing the most reliable knowledge about humans and the universe, and tried to produce syntheses of scientific findings in which they elucidated the nature of physical, biological, psychological and social phenomena (Rabossi, 2003).

The number of Latin American positivist thinkers is large, and their extraction and importance diverse; it is generally agreed that Ingenieros, along with Venezuelan-Chilean Andrés Bello (1781-1865) and Cuban Enrique José Varona (1849-1933) were among the most original and influential. Originality in this case means variation around positivist nuclear tenets. For example Ingenieros' contribution, as dissected by Oscar Terán (1986, 2000), shows its originality in its superposition of ideological periods, passing from anarchizing socialism to latinoamericanist anti-imperialism (e.g., Ingenieros 1922b) through Spencerian positivism and the mounting moralist tendencies crystallized in *El hombre mediocre*. Other important positivists in Latin America, all revolving around the positivist notional hard core with their own style of variation, were Gabino Barrera (1820-1881) and Luis Villoro (b. 1922) of México and Carlos Vaz Verreira (1871-1958) of Uruguay (Gracia and Millán, 1995).

The list of original pieces produced during the positivist period by Latin American philosophers includes Ingenieros's *Psicología Genética* (1911a) and later *Psicología Biológica* (1913a). Through it, Ingenieros helped to introduce Auguste Comte's positivism into Argentina; he called it 'Genetic Psychology' (Corsini, 2002). Evolutionary positivism gained particular popularity among several scientists at the University of Buenos Aires, including Ramos-Mejía, palaeontologist Florentino

Ameghino (1853-1911), sociologist Carlos Octavio Bunge (1875-1918, Mario Bunge's uncle) who called for biology-like social evolution to curb revolution, and Ingenieros, who, although they did not formally found a school (Martí, 1998), did have considerable influence.

In *Genetic Psychology*, Ingenieros begins as a committed evolutionist, but admits the need for improvement, feeling that inductivism neglects the speculative aspect of science. As a solution, in his book *Proposiciones relativas al porvenir de la Filosofía* (Propositions about the Future of Philosophy) – a program to define philosophy along scientific positivist lines – he proposes an experiential metaphysics that could generate future scientific hypotheses (Ingenieros, 1918; 1960).

Proposiciones is one of his most original works; in it, Ingenieros exposes a version of positivism that made metaphysics possible. He maintains that it is possible to recognize, in all form of experience, an 'experiential remainder' (*residuo experiencial*) that is not unknowable, although it does not have a transcendental character.

Ingenieros also found evolutionary ethics unable to account for human ideals and in his *Hacia una moral sin dogmas* – an attempt to ground ethics on idealism and evolutionary theory – he pursues an idealism that can only be justified in evolutionary terms (Ingenieros, 1917; 1961). But "An ideal is a gesture of the spirit to perfection". Thus, rather than the familiar methods of material stimulation to boost up the development of productive forces, in *Las fuerzas morales* he regarded moral incentives as the motive force of social progress.



4. Principios de Psicología Biológica

4.1. Publication history

According to the introductory note of the definitive sixth edition (Ingenieros, 1946), the work initially appeared in 1910 in separate chapters in the publication *Argentina Médica*. The chapter 'Biological Psychology' appeared in *Archivos* in 1910 (Ingenieros, 1910b), when Ingenieros was 33 years old (Fig. 13). In 1911, all of the chapters were published under the title *Psicología Genética* (Ingenieros, 1911a) and the subtitle *Historia natural de las funciones psíquicas* in a special volume of *Archivos de Psiquiatría y Criminología* (No. 10, January-April 1911).



Fig. 13. Ingenieros at age 33 in 1910, the year the first article on 'Biological Psychology' appeared in *Archivos* (from Editorial, 1925a). He then attended the American Scientific International Congress as President of both the Argentina Medical Association and the Society of Psychology of Buenos Aires.

The first publication of Ingenieros's Psychology in independent book form happened in 1913 (Fig. 14, *left*) under the title *Principios de Psicología Biológica*, as part of the series *Biblioteca Científico-Filosófica* published by Daniel Jorro, Editor, Calle de la Paz, 23, Madrid (Ingenieros, 1913a) and printed by Luis Faure, Alonso Cano, 15, Madrid.

A French translation of the Spanish edition, prepared by R. Delpeuch, was published in 1914 in Paris (Fig. 14, *center*) by Librairie Félix Alcan, Boulevard Saint-Germain, 108, as part of their series *Bibliothèque de Philosophie Contemporaine* (Ingenieros, 1914a), printed by Imprimerie Paul Brodard, Coulommiers. Th. Ribot soon wrote an analysis of that work in *La Revue Philosophique (Paris)* (No. 7, 1914), which in a Spanish translation was published in *La Semana Médica* in November 1914 in Buenos Aires (Ingenieros, 1916a).



Fig. 14. Frontispiece of the three European editions of the ‘Principles of Biological Psychology’: the 1913 Spanish edition (*left*), the 1914 French edition (*center*), and the 1922 German edition (*right*).

An authorized German translation (Fig. 14, *right*) of the first Spanish edition, prepared by Julius Reinking, with an Introduction by Nobel Laureate and notable figure of German science and letters Professor Wilhelm Ostwald of Leipzig, was published in 1922 by Verlag von Felix Meiner, Leipzig (Ingenieros, 1922a), printed by Druck der

Spamerschen Buchdruckerei. Ostwald, a chemist and philosopher, had been awarded the Nobel Prize for Chemistry in 1909.

Between 1913 and 1916, five successive editions of the work were published in Buenos Aires. The revised fifth edition (*'corregido por el autor, con un apéndice, y aligerado, al mismo tiempo, de notas que son innecesarias para lectores ya versados en las disciplinas filosóficas modernas'* – i.e., 'corrected by the author, plus an appendix; and unburdened from notes uncalled for readers already knowledgeable in modern philosophical disciplines'), appeared in 1916 under the shortened title *Principios de Psicología* (Ingenieros, 1916a) from Talleres Gráficos de L. J. Rosso y Cía, Belgrano 475, Buenos Aires (Fig. 15, left). It carried the following subtitles that specified its fundamental criteria: *I – Fundamentos biológicos de esta ciencia natural. II – Su posición en la filosofía científica. III – La formación natural de las funciones psíquicas. IV – El método genético* (I – Biological fundamentals of this natural science. II – Its position in scientific philosophy. III – The natural formation of psychic functions. IV – The genetic method).



Fig. 15. Frontispiece of the last two Buenos Aires editions under the shortened title *Principios de Psicología*: (left) the fifth edition of 1916; (right) a later (1946) printing of the sixth and definitive edition of 1919.

The sixth and definitive edition (*'nuevamente revisada por el autor, y su texto puede considerarse definitivo'*) was published in 1919

in Buenos Aires by L. J. Rosso. A modern printing by Editorial Losada, S.A., Buenos Aires followed (Ingenieros, 1946), printed on 20 December 1946 at Artes Gráficas Bartolomé U. Chiesino, Ameghino 838, Avellaneda, Buenos Aires (Fig. 15, *right*).

The definitive edition of *Principios de Psicología* forms volume 9 of the Complete Works (*Obras Completas*) of José Ingenieros, published in 24 volumes between 1930 and 1940 by Ediciones L. J. Rosso, Buenos Aires (Ingenieros, 1937); volume 9 of *Obras Completas* published in 20 volumes in 1957 by Elmer Editor, Córdoba 2240, Buenos Aires, and printed by Talleres Gráficos de la Técnica Impresora S.A.C.I., Córdoba 2240, Buenos Aires (Ingenieros, 1957a); and included in volume III of the 8-volume set of *Obras Completas* published in 1962 by Ediciones Mar Océano, Buenos Aires (Ingenieros, 1962).

To our knowledge, the work was never translated into English. Perhaps 21st century science will value the *Principios* in a manner disconnected from the political disposition of its author. One may speculate on the reasons for the neglect, be as they may mixed religious, political and social. Even as an insider, Ingenieros remained an outsider. He was loved by liberal intellectuals and students, but hated by the 'establishment', even when he became part of it, as University of Buenos Aires Professor, Police Laboratory Director, and so forth.

4.2. Prefatory remarks by Ingenieros

Ingenieros (1913a) begins his 3-page Preface with the definition that "Biological Psychology studies the natural formation of psychic functions in the evolution of living species, in the evolution of human societies, and in the evolution of individuals"; and continues: "Its more general results allow the establishment of a System of Genetic Psychology, comprised of Comparative (Phylogenetic), Social (Sociogenetic), and Individual (Ontogenetic) Psychology".

Continuing in the Preface, he iterates: "We conceive Psychology as a Natural Science that conforms to the more general hypotheses of

Scientific Philosophy; we treat its problems with the help of the criteria of deterministic evolutionism. The genetic method in Psychology – applied in different fashions by Spencer, Romanes, Ardigó, Ribot, Baldwin, Sergi and several others that we cite – furnish the elements which, placed in harmony with the data of auxiliary sciences, allow already to establish its more general laws and to coordinate them in one system ... In considering Psychology as a Biological Science, we do not restrict the domain; the genetic method, applied to the study of the Philosophical and Social Disciplines, permits the reconstruction of the formation of Logic, of Morality, of Aesthetics, of Sociology, of Law, etc. and to study them as Natural Sciences reposed on Psychology”.

And he concludes the Preface in the following words: “In formulating the essential principles of our academic teachings, we propose to contribute to the establishment of Biological Psychology as a Natural Science and conforming to the genetic method, and to make it enter into the general system of Scientific Philosophy, which continually elaborates and rectifies its hypotheses following the natural rhythm of experience”.

4.3. Structure and subject matter

All editions contain the original Preface that is dated 1910. The first edition (Ingenieros, 1913a, 1914a, 1922a) contains the Preface and ten Chapters, denoted by Latin numbers I through X.

The fifth edition (Ingenieros, 1916a) contains an ‘Advertencia de la 5ª Edición’ dated 1916, the original Preface from 1910, the ten Chapters of the previous editions, and an Appendix that consists of a 34-page essay titled ‘Los fundamentos de la psicología biológica’, previously published in the May 1915 issue of *Revista de Filosofía*.

The sixth edition (Ingenieros, 1946) contains an ‘Advertencia de la 6ª Edición’ dated 1919, and the original 1910 Preface, while the ten

chapters are now re-structured in an Introduction plus nine Chapters denoted by Latin numbers I through IX.

All editions conclude with a 10-page section titled *Conclusiones sintéticas* (Synthetic conclusions), which is a compilation of all of the Conclusions sections that mark each Chapter's ending.

The titles of the ten Chapters of the first five Spanish editions, published between 1913 and 1916 (as well as those of the 1914 French translation and the 1922 German translation) are the following: I: Scientific Philosophy. II: The natural formation of living matter. III: Biological energetics and psychic functions. IV: Psychic functions in the evolution of species. V: Psychic functions in the evolution of societies. VI: Psychic functions in the evolution of individuals. VII: The natural formation of conscious personality. VIII: The natural formation of the function of thought. IX: Psychological methods. X: Biological Psychology.

The contents of the definitive sixth Spanish edition (published in 1919 and reprinted in 1937, 1946, 1957 and 1962) are structured as follows: Introduction: Science and Philosophy. I: The natural formation of living matter. II: The natural formation of psychic functions. III: Psychic functions in the evolution of species. IV: Psychic functions in the evolution of societies. V: Psychic functions in the evolution of individuals. VI: The natural formation of conscious personality. VII: Intellectualism and Rationalism. VIII: The genetic method. IX: Concept and definition of Psychology.

One notes the following modifications in the sixth definitive edition (Ingenieros 1946): Chapter I of the previous editions now becomes Introduction: Science and Philosophy; Chapters II-VII are re-numbered as Chapters I-VI, retaining their exact titles, with the exception of Chapter III, which instead is named Chapter II: The natural formation of psychic functions; Chapters VIII-X are renamed and become, accordingly, Chapters VII: Intellectualism and Rationalism, VIII: The genetic method; IX: Concept and definition of Psychology.

4.4. Summary of the text of Principios de Psicología Biológica

We have provided a complete English translation – to our knowledge, the first ever presented – of *Conclusiones Sintéticas* (Triarhou and del Cerro, 2006), based on the first Spanish edition of the work (Ingenieros, 1911a; Ingenieros, 1913a). It is reproduced below. Each one of the ten chapters is headed by its original title in the book. The three diagrams that formed part of the original publication are included as Figures 16, 17 and 18; a selection of authors to whom Ingenieros makes reference are mentioned at the end of each chapter.

I. Scientific Philosophy. – “The knowledge of reality is a natural result of the empirical experience, always relative and limited. Imagination allows to exceed its data, through the formulation of hypotheses that depart from it and which seek to be ratified by it. A science, at each moment of its formation, expresses the laws of its actual experience and the hypotheses of its possible experience. Experience, a fundamental of the sciences, was also the basis for all philosophy. There is no science without hypothesis, there is no philosophy without experience. Their natural formation is progressive. The particular pace of the sciences and of philosophies may at times disagree because of the disparity of methods used to treat their respective problems; but, in general, the formation of both follows the pace of experience and is effected as a function of the social environment.

Scientific philosophy is a system of hypotheses founded on the most general laws demonstrated by particular sciences to explain the problems that exceed the current or the possible experience. It is a system in continuous formation. It has methods, but has no dogmas. It corrects itself with the pace of varying experience. Elaborated by people evolving in an environs that evolves, it represents an unstable equilibrium between growing experience and rectified hypotheses. The most general results of the sciences converge to demonstrate three fundamental hypotheses: the unity of the real, its incessant

evolution, and the determinism of its manifestations. These must apply to resolve the metaphysical problems: the origin of matter, of life and of thought.

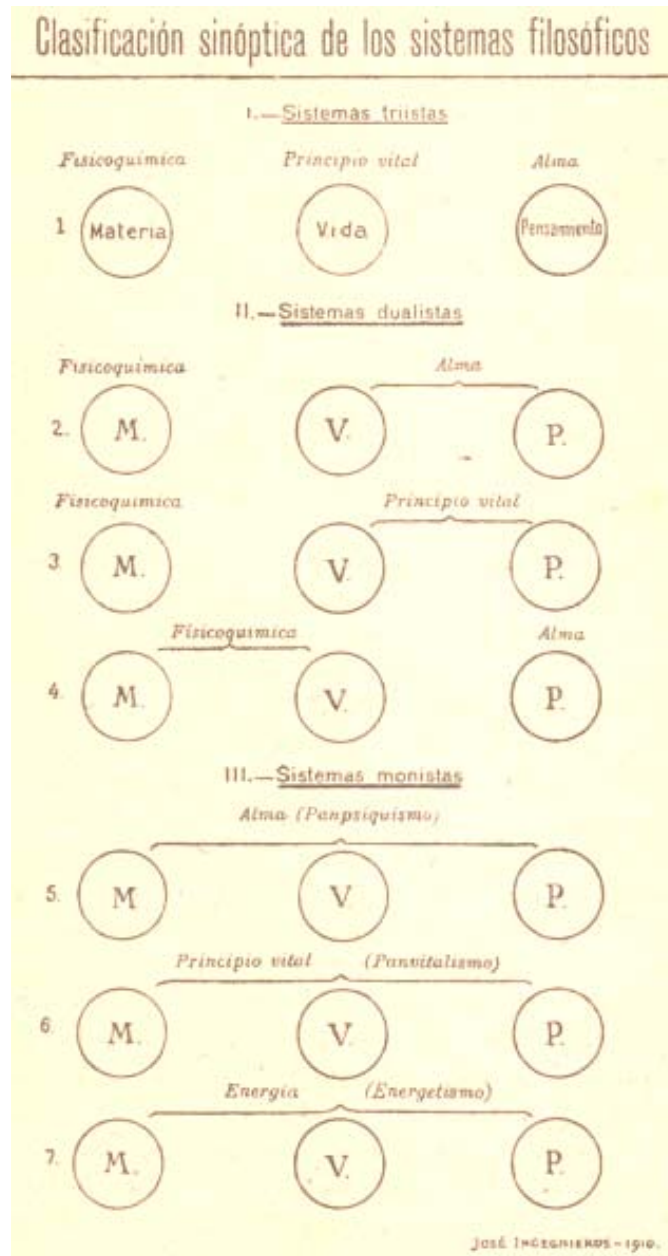


Fig. 16. Synoptic classification of philosophical systems, dated 1910. From *Principios* (Ingenieros, 1913a).

All science is characterized by the impersonality of its methods, which are the natural results of experience; all philosophy is characterized by the systematic unity of its hypotheses. Intuitionism finds

that metaphysical problems are inaccessible to the means of scientific methods; criticism finds that reality is heteromorphous and escapes all unitary or systematic explanation. Scientific philosophy tends, on the other hand, to be a system of hypotheses founded on experience and proposes to explain the unknown on the basis of the known: it is a metaphysics of experience."

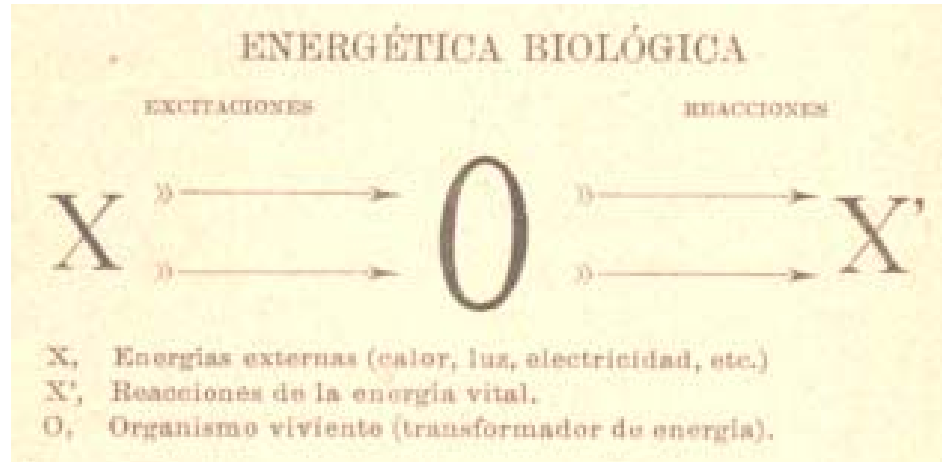


Fig. 17. Diagram of biological energetics according to Ingenieros (1913a).

Among the writers and scientists Ingenieros cites are Ardigó, Ribot, W. James, H. Spencer, Bacon, Spinoza, Kant, Newton, Fichte, Lamarck, H. F. Osborn, Metchnikoff, W. Ostwald, as well as Plato, Aristotle and Euclid.

II. The natural formation of living matter. – "The natural formation of living matter can be explained by means of a unitary hypothesis, evolutionary and genetic.

On the basis of the most general assumptions of modern energetics on the constitution of matter, its diverse states or forms may be conceived as an uninterrupted series of energy condensations, derived from each other through the transformation of their atomic-molecular structure (morphogenesis) and characterized by the acquisition of properties (physiogenesis) that allow to differentiate them. The states of matter actually known are stages of a series whose terms we largely ignore, and which could be discovered with time.

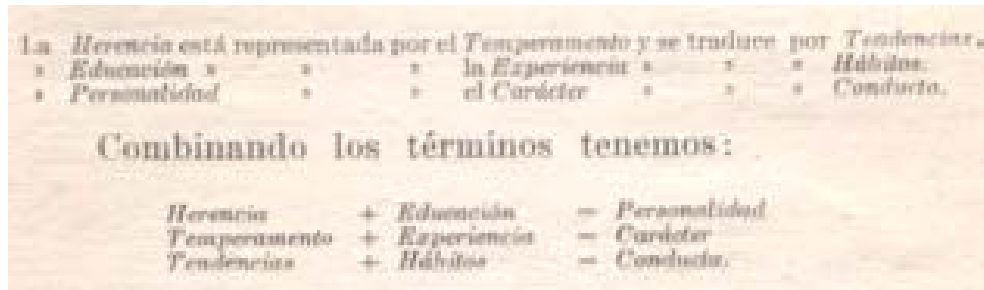


Fig. 18. Components of behavior and their combinations and yields, according to Ingenieros (1913a).

The states of matter, evolutionary in a constant course, constitute the «species» of matter, whose structure and properties «evolve» over periods of time that cannot be evaluated in relation to the human life-span; that is why their transformations escape physical chemistry, and science can occupy itself with the states that present to our actual experience as if their structure and properties were invariable.

The genetic study of living beings reveals that all «varieties» of protoplasts constitute a single physico-chemical «species», in the structure of which dominates the colloidal state, and among the functions of which assimilation is essential; either of these is already apparent in certain states of non-living matter, tending at the same time to bring it closer to living matter, in the course of the «evolution of the species of matter». Its «variations» determine innumerable «equilibrium forms» represented by biological species, varying at the same time their «functions of adaptation».

The artificial formation of living matter is improbable, because one ignores the «phylogeny» of the species of matter. On the contrary, its natural formation can be considered as a permanent result of the «variability» of the «species» of matter more immediate to it by its structure and their functions, although it escapes our actual experience because of its extension in time.”

Authors mentioned by Ingenieros include J. Moleschott, Claude Bernard, Pasteur, Virchow, Bergson, Ostwald, as well as Heracleitus, Aristotle, Pythagoras, Epicurus, Galen and Paracelsus.

III. Biological energetics and psychic functions. – “Biological functions are the result of incessant energy permutations in stationary systems. Energy disequilibria of the environment determine disequilibria in the organisms. The capacity of re-establishing equilibrium depends on assimilation, which accumulates energy and restores a release necessary for adaptation. We define excitation as a modification of the conditions of the physico-chemical equilibrium of an organism, by the action of energies that are exerted on the environment where it lives. We define movement as a release of energy accumulated in living beings in order to re-establish the equilibrium modified by excitation. There exist as many elementary forms of excitability and mobility as there are the species of energy that act on living beings and modify their conditions of physico-chemical equilibrium. Pluricellular organisms act as batteries of energy accumulation.

The conditions of energy equilibrium between a chemical species and its environment determine its morphological characters; the forms of living beings depend on the equilibrium conditions characteristic of the chemical constitution of their protoplasm, in relation to those of their environment. Variations in the chemical constitution are correlated with morphological variations: living organisms possess the form determined by their conditions of energy equilibrium.

In the course of biological evolution, psychic functions are functions of adaptation to the environment. Their natural formation is continuous, based on the elementary properties of living matter: excitability and motility. The development of every function is accompanied by variations in the organic structure: at each moment of development, the form of the organs represents the degree of function, reaching in the higher vertebrates a complex neurological architecture. The «fundamental biopsychical law» establishes the strict correlation between the degree of psychic functions and the structure of the organs which achieve them.

The property of conserving a structural modification as a consequence of every preceding energy disequilibrium, constitutes «mem-

ory», an essential condition for the natural formation of «experience». Every excitation in connection with prior experience is a «sensation». The functional variations and the structural modifications produced in the course of the evolution of species constitute the «phylogenetic experience»; in the course of the evolution of social groups, the «sociogenetic experience»; in the evolution of individuals, the «ontogenetic experience»."

Ingenieros mentions G. Bruno, G. Sergi, Lugaro, Du Bois-Raymond, Jacques Loeb and his tropism theory, and Ostwald. As well as mentioning Empedocles and Parmenides, he quotes Aritotle's statement that "the soul is the entelechy of the body", formed on the opinion he attributes to Philolaus, that "psychical processes are an action of bodily factors".

IV. Psychic functions in the evolution of species. – "Psychic functions develop in a progressive and continuous manner in the course of the evolution of species, without varying their identity or their nature; they are functions destined for the adaptation of living beings to their environment. They present differences in degree, conditioned by the sum of experiences acquired by each species, but not differences in nature: their extreme terms are protoplasmic irritability and creative imagination.

The evolution of psychic functions is concomitant with the evolution of the organs that exert them: biogenetic law. The enormous differences in degree that we observe in diverse species correspond to enormous differences in morphological evolution. Psychic phylogeny and organic phylogeny are correlative.

The continuity of the natural formation of psychic functions imposes the application of the genetic criterion in its study. All the results of comparative psychology converge on demonstrating the mental descent of humans in accordance with the laws of transformism."

In this Chapter, the author cites Anaxagoras, Socrates, Plato, Aristotle, Plutarch, the Stoic and Cynic philosophers, Ovid, Galen and Celsus; Descartes, Cuvier, Buffon, Erasmus Darwin, Lamarck, Spencer, Darwin, Th. Huxley, Haeckel, H. Piéron, W. Wundt, G. Romanes, Holmgren; neuroanatomists Ramón y Cajal, van Gehuchten, Golgi, von Lenhossék and Christofredo Jakob, and paleontologist Florentino Ameghino.

V. Psychic functions in the evolution of societies. – “Sociology studies the evolution of our animal species in an environment favorable to its existence and reproduction. Human societies are animal colonies that possess the functions and the organization best adapted to the conditions of the environment in which they live, varying in accordance with it. Economic phenomena are a special case of biological phenomena; political economy is the application to the human species of biological laws that govern the struggle for life in all animal societies.

Collective psychic functions manifest themselves as beliefs and practices (customs), accompanied by an organization of social structure (institutions). The variations in collective mental functions are correlative to the variations of social organization: biogenetic law. The continuity of social experience is represented by social heredity (tradition); its transformations depend on acquired variations (innovation). «Progress» is the improvement of functional and structural adaptation of a society to the conditions of the environment in which it lives.

Collective psychic functions develop in a progressive manner and continue, from primitive peoples to civilized societies; the general history of beliefs accompanies the general history of institutions. Each particular society would reproduce that general evolution, if the conditions of environment and race did not differ. In the diverse social

classes, coexisting in a society, the stages that those traversed during the natural formation of social experience remain superimposed.

In societies, psychic functions bear the same «biophylactic» significance as in the individual. Morals and law, which are the most typical expressions of variations in social experience in customs and institutions, are presented as a function and an organization destined to protect society.”

In this Chapter, Ingenieros mentions Spencer, Le Bon, J. Moleschott, Darwin's *Descent of Man*, Wundt's *Folk Psychology*, as well as his own *El Hombre Mediocre* and *Criminología*. The adjective «biophylactic» and noun «biophylaxis», which Ingenieros adopted since around 1900 and are rather distinctive of Jakob's tradition, mean «life-protecting» and denote one of the values of the term «adaptive» in evolutionary context. (Curiously, it has been also retained in the Far East – particularly in Japan, Korea and Viet-Nam – yet with a non-evolutionary meaning, as a nonspecific defense reaction of the body, e.g., phagocytosis, vascular and other reactions of inflammatory processes. It therefore is especially used in Microbiology and Immunology, and a State Department of Biophylaxis exists in Tokyo.)

VI. Psychic functions in the evolution of individuals. – “The natural formation of the personality is conditioned by the environment: individual experience is formed as a function of social experience. Normal personality, though variable, is one from birth to death; one may distinguish in it three periods: organization, improvement, and involution. Individual psychic functions do not have a sudden origin, they constitute a continuous development; they do not appear, they are formed progressively; they do not enter the organism preformed from the outside, they are produced by the development of potential tendencies accumulated by heredity in the reproductive germs.

In the background of the already constituted personality subsist the hereditary tendencies and indications which constitute the «mentality of the species»; in its secondary formations is reflected the «social mentality»; the variations acquired by the individual constitute its «individual mentality».

Individual personality undergoes an involution in inverse order to that of the formation of the experience; first disappear its original variations, later its social acquisitions, and finally congenital innate tendencies.

In individual developmental unfolding, the evolution of psychic functions is concomitant with that of the organs engaged in executing them: biogenetic law.

Mental inequality among individuals is the first postulate of biological psychology. The differentiation of individuals, following their diverse education, is the second. The third postulate is the continuous variation of individual mentality, which ceases with death.

Biological heredity constitutes the temperament and translates into tendencies. Education constitutes the individual experience, represented by acquired habits. Individual personality is the result of variations of heredity by means of education: it constitutes the character and manifests itself through behavior.”

Ingenieros makes extensive reference to the neuroanatomical studies on morphogenesis of His, Edinger, Ramón y Cajal, Kölliker, Déjèrine, Bechterew, Nissl, Lugaro, Meynert, Vogt and Marinesco; further, he cites philosophers Theophrastus and Sully, and refers to his own *Simulación en la Lucha por la Vida*.

VII. The natural formation of conscious personality. – “«Consciousness» is not an «entity» inextensible and immaterial, it is not a «faculty» synthesizing the psychological phenomena, it is not an «epiphenomenon» dominating the physiological phenomena, it is

not a «directing or creative force» of psychic activity. «Consciousness», as *reality*, does not exist; one may only regard it as the abstraction of a *quality*, common to certain biological phenomena in determined conditions.

Ancient philosophers and contemporary psychologists readily confuse as «consciousness» two classes of distinct functional processes: certain *particular conscious phenomena* or «states of consciousness» (in which case «consciousness» is an extrinsic quality of the phenomena and depends on their relations to prior experience) and *conscious personality* or «ego consciousness» (in which case «consciousness» is a continuous synthesis of individual experience).

The possibility and the degree of conscious activity are conditioned by the sum of experience acquired by each species in the course of phylogenetic evolution. The natural formation of experience is determined by the systematization of variations in structure and function, fixed in living beings by memory, organized in habits and transmitted as instinctive tendencies.

The conscious character of certain biological phenomena depends on their relations with the individual personality (excitation is a sensation only in relation to prior experience and forms part of the consecutive experience); it is a quality subordinate to particular conditions of cerebral activity, produced in accordance with the more general laws that govern all reality subject to our experience.

In phylogenetic and ontogenetic evolution, conscious activity is useful for the new adaptive reactions of living beings in the incessant variations of their environment, implying an improvement of «biophylactic» function or protective of the organism.

«Conscious» personality is a progressive acquisition in the course of individual experience. Continuity of experience determines the functional unity of personality, which is incessantly variable like experience itself.”

In Chapter VII Ingenieros mentions Plotinus, Paracelsus, H. Bergson and W. James.

VIII. The natural formation of the function of thought. – “The function of thought is not attributed to any special faculty, it is a natural and synergistic result of experience. It develops progressively and must be studied with the methods of genetic psychology: in the evolution of species, of races and of individuals. The natural history of intellectual operations can only be established by comparing those of humans with those of other animals, those of the civilized with those of the primitive, those of the adult with those of children.

Through this biological function living beings know the variations of the unstable environment in which they evolve: knowledge of reality is a natural formation in the course of experience. Thought is not an entity which precedes it, it does not exist in itself; it is a result of relations between its data. Experience being variable, thought is in continuous formation.

The real modes of thought are infinite; they are essentially indistinct, they represent progressive steps in a continuous series, from the simple to the composite. In lower animal species, in primitive races and in children, reasoning is simple: these forms persist in civilized and adult humans, next to others more evolved. There exists an uninterrupted continuity among sensations, general images, elementary judgements and higher forms of reasoning. Their natural result is the formation of beliefs, which are synthetic, systematizing and dynamogenous. Belief is the natural form of thought: biological logic is a natural history of beliefs. We humans believe prior to applying logical rules of perfect reasoning; all new experience happens through already preformed beliefs and influences the acquisition of consecutive experience.

Correct reasonings are exceptional: common reasonings are extralogical. The real manners of thinking consist of reasonings that classical logic disdained: to it, man would be an illogical and irrational

being. For biological logic, man is a natural being: it studies its functions. The rationalistic systems, being not founded on experience, are false, they do not correspond to reality.

The highest result of the function of thought is the formation of ideals; imagination, based on experience, elaborates beliefs toward future human improvement. An «ideal» is a hypothesis: it is formed like it and it serves like it. In ancient dogmatic idealism that spiritualists place on absolute, rigid and aprioristic «ideas», scientific philosophy counters an *experimental idealism* that refers to the «ideals» of perfection, incessantly renovated, plastic, evolving like life itself.”

Citations include Plato, Hippocrates, Democritus, Soury, Ostwald, and *El Hombre Mediocre*.

IX. Psychological methods. – “Psychology studies functions that are formed in the course of biological evolution; it is a genetic science and one that must adopt the *genetic method*.”

The observation of psychic functions can be effected under conditions similar to those which allow us to observe other biological functions. All their particular methods are observational: introspective and extrospective, direct and experimental, sensory and instrumental. Their efficacy depends, initially, on the personal aptitudes of the psychologist, which may vary in each case, from mediocrity to genius.

Extrospective observation is the single method which can be extended to all forms of evolution of psychic functions. Introspective observation allows us to know a small part of the psychic functions in individual evolution. Experimental observation, standardized beforehand, can only be applied to a restricted number of elementary psychic processes of individuals; in a minor scale, it can be used to essay other animal species, and sometimes in social psychology.

Extrospective observation is fundamental; introspection and experimentation are its valuable auxiliaries”.

Ingenieros discusses and builds upon the works of Descartes, Spinoza, Comte, Claparède, P. Cabanis, Gall, Haeckel and W. James.

X. Biological Psychology. – “«Psychology is a natural science that studies the psychic functions of living beings». Such study is not restricted to conscious functions, which are one aspect of psychic activity, neither to human functions, which are one aspect of its long phylogenetic formation.

The psychophysical parallelism is not a philosophical doctrine, it is a provisional attitude which has allowed to reconcile contradictory doctrines for the adoption of a particular method. «Wundtism» is not necessary anymore, it even obstructs the formation of definitive general doctrines. The insufficiency of experimentalism does not imply an insufficiency of the scientific methods, of which it only represents one aspect, and not the most important, in the genetic method.

Neoidealism has reinstated the old spiritualism, by adopting the fundamental data of biological psychology, without accepting its hypotheses. «Bergsonism» affirms the excellence of the intuitive method in opposition to the experimental method: it conceives philosophical intuition as a faculty antecedent to experience and superior to the natural formation of scientific hypotheses. In its application to psychology it is reduced in fact to a rehabilitation, more or less literary, of introspection and the old speculative methods.

Against the philosophical insufficiency of certain experimentalists and the uncertain speculation of certain intuitionists, biological psychology adopts the genetic method to study the natural formation of psychic functions, based on the broadest experience to establish less uncertain philosophical hypotheses. Its actual formula, against those tendencies and methods, would be: «Neither Wundt, nor Bergson».

Psychology occupies a lower order than biology in scientific philosophy; but, on the other hand, it embraces all the classical philosophical and social disciplines. Its experience cannot constitute a total

explanation of the universe, but it serves as a basis for a general interpretation of the function of thought in all thinking beings. The biological concept and the genetic method offer to analysts a general orientation, which will make their efforts more fruitful, and to synthesizers a base of experience increasingly ample and secure; marching to distinct step in the same path, the former and the latter, will concur in enunciating psychic functions to a unitary explanation of nature.”

In the last chapter, Ingenieros makes reference to Spencer, William James, Haeckel and Ostwald.



5. Wilhelm Ostwald (1853-1932)

5.1. Life and work

Chemist, physicist and natural philosopher Wilhelm Ostwald (Fig. 19) was born on 2 September 1853 in Riga, Latvia (then Russia). He studied chemistry at Dorpat University from 1872-1875, an academic milieu also influential on Christfried Jakob through his teacher and friend Adolf von Strümpell (Oddo and Szirko 2006). Ostwald's initial appointment was as Assistant at the Physics Institute under Arthur von Oettingen, and subsequently in the Chemistry Laboratory under Carl Schmidt; in 1877 he became Lecturer at Dorpat University, and in 1881 Professor of Chemistry at Riga Polytechnicum. In 1887 he accepted a Professorship in Physical Chemistry at Leipzig University. Ostwald remained in Leipzig until his retirement in 1906, with a short interruption in 1904-1905 as first exchange professor at Harvard. His pupils included Jacobus Henricus Van 't Hoff (Nobel Chemistry Prize 1901), Svante Arrhenius (Nobel Chemistry Prize 1903), Walther

Nernst (Nobel Chemistry Prize 1920), as well as Gustav Tammann and Johannes Wislicenus.

Ostwald began his experiments in 1875, investigating the law of mass action of water in relation to problems of chemical affinity, with special emphasis on electrochemistry and chemical dynamics. His pioneering work in the field of electrochemistry led to the discovery of the 'law of dilution' that is named after him. Ostwald became one of the founders of classical Physical Chemistry. He was awarded the Nobel Prize in Chemistry for 1909 'in recognition of his work on catalysis and for his investigations into the fundamental principles governing chemical equilibria and rates of reaction'.



Wilhelm Ostwald

Fig. 19. Wilhelm Ostwald (1853-1932). (From nobelsoftware.com/vedci/images; signature facsimile from Zott, 2003).

A tireless writer, he published numerous textbooks in German, including *Lehrbuch der allgemeinen Chemie* (Textbook of General Chemistry, 1884), *Grundriss der allgemeinen Chemie* (Outline of General Chemistry, 1889) and *Hand- und Hilfsbuch zur Ausführung physikalisch-chemischer Messungen* (Handbook and Manual for Physicochemical Measurements, 1893). It is interesting to relate that the Spanish translator of Ostwald's *Elements of Chemistry* (Ostwald, 1917) was Catalan chemist, physicist and naturalist Modesto Bargalló Ardevol (1894-1975). He was one of the scientific and intellectual adventurers of the twentieth century – who later went on exile to México, becoming professor at the National Polytechnic Institute and publishing important books on mining and metallurgy. He had also compiled a booklet titled *Los pensamientos de Cajal sobre la educación* (Cajal's thoughts on education), published on 1 May 1924 in Madrid, to honor the second anniversary of the glorious retirement of the savant Spanish histologist (Bargalló, 1924).

In 1887 Ostwald founded *Zeitschrift für physikalische Chemie*, editing 100 volumes by 1922. In 1889 he founded *Klassiker der exakten Wissenschaften*, of which 250 volumes have been published. In 1894 he founded the *Deutsche Elektrochemische Gesellschaft* (German Electrochemical Society) which in 1902 became *Deutsche Bunsen-Gesellschaft für angewandte physikalische Chemie* (German Bunsen-Society for Applied Physical Chemistry). In 1902 he founded *Annalen der Naturphilosophie* and had edited 14 volumes by 1921.

Ostwald showed a rounded interest in the physical sciences. From his retirement in 1906 at age 53 on, he found a new sphere for his scientific and organizational talents. Besides a physical, analytical and technical chemist, Ostwald was a quick-witted philosopher, ardent reformer and leader of international movements, enthusiastic popularizer of science, poet and painter, trying to put into application the aesthetic principles on which he worked during the last two decades of his life; he elaborated his views towards an abundant and complex

philosophy of nature that incorporated sociology, psychology, ethics and aesthetics (Schummer, 2001).

Ostwald published his widely read collection of biographies of natural scientists under the title *Große Männer (Great men)* in 1909 in Leipzig (Ostwald, 1909). Ostwald investigated the psychological causes of scientific productivity. He categorized scientists as 'romantic' and 'classical' types. To the revolutionizing 'romantic', ideas come fast and thick and must find quick expression; his main concern is to get a problem off his hands in order to make room for the next. For the ground-up builder 'classical' type, the concern is to perfect his product by working it over so exhaustively that no contemporary might be able to improve upon it. He wrote that "great men exist so that others can become even greater".

For Ostwald, sociology occupies the highest place in the system of sciences; within sociology, the science of genius or prominent, culture-creating humans, stands on top. Under these criteria the book contains studies on the sociobiology of genius through examples of scientists like Michael Faraday, Justus Liebig, Hermann Helmholtz and Johannes Müller.

Ostwald's philosophy was an all-embracing scientific world-view, based on three principles: an experimentalist epistemology, a metaphysical priority of energy over matter, and a strong belief in societal progress by means of science, technology, and social organization. He continued his studies and publications on philosophy with *Der energetische Imperativ (The Energetic Imperative)*, *Die Pyramide der Wissenschaften (The Pyramid of the Sciences)* and *Moderne Naturphilosophie (Modern Natural Philosophy)* (Ostwald, 1914).

For Ostwald progress meant working against the consequences of the second law of thermodynamics, and his general motto became: "Do not waste energy, ennoble it". Further, he considered both war and religion "unscientific wastes of energy", to the extent that he became a leading figure in both the world pacifist movement of the

middle-class and the Monist League, a science-based atheistic group also active in public life and educational reform. He believed that he could fight the Church's claim to power and spread a natural scientific ideology. He pursued those aims in *Monistische Sonntagspredigten* (Monistic Sunday Sermons) and *Arbeiten zum Monismus* (Works on Monism) (Nobel Foundation, 1966; Schummer, 2001).

His final passion was the theory of colors. He devoted himself to the laws of color in the hope of developing a scientific basis for their perceived harmonies. His seventeen *Letters to a painter on the theory and practice of painting* appeared during the winter of 1903 and spring of 1904 in the scientific supplement of *Münchener allgemeine Zeitung*. An English edition, containing many additions to the German original of 1904, carefully revised and corrected, was published three years later (Ostwald, 1907). Other works in this field are *Die Farbefibel* (The Color Primer, 1916), which introduced a color system devoted to the task of developing a scientific standardization and surviving for 15 editions, *Die Farbenlehre* (Color Theory), and *Die Harmonie der Farben* (The harmony of colors). He also published the periodical *Die Farbe* (Color).

Expressed in technical language, Ostwald attempted to construct a perceptual color system using non-empirical methods. In the world of art, Ostwald may indeed have created rather a doubtful reputation for himself with this claim. But his system nevertheless left its mark. Among the topics he covered, one finds 'The physico-chemical side of the technique of painting', 'Paper and fixatives', 'Why lead-pencil drawings are glossy and charcoal drawings are not', 'The drying of oil colors and the catalytic processes involved', 'Objective representation of subjective phenomena', 'Opinions about Academies'; 'Mistakes in seeing and mistakes in painting', 'Conscious creation'.

Ostwald died on 3 April 1932 in his country home near Leipzig.

5.2. Ostwald's introduction to the German edition of Biological Psychology

The following is an English rendering of *Zur Einführung* (as an *Introduction*) that Wilhelm Ostwald wrote for *Prinzipien der biologischen Psychologie*, the German edition of *Principios* (Ingenieros, 1922a). For more details on Ostwald's proposed system for the classification of the sciences the reader is referred to Ostwald (1914), Hapke (2003), and Zott (2003).

"According to its adopted methods Psychology is a science, which is predicated on the assumption of the Exact (*Ordnungswissenschaften*) and Energetic Sciences (*energetischen Wissenschaften*), as well as General Biology, which includes Psychology. Therefore, its precise scientific formation cannot occur unless the more general disciplines – which are the presupposed auxiliary sciences – have attained the necessary level of systematic development, such that the latter may be applied for the appropriate development of the more advanced and specific science. However, what depends on such a systematic association is not at all the developmental course of individual sciences, but only the extent achieved in each case. The initial emergence of a science does not depend on its position in the system, but rather, on the needs of everyday life. And thus, we see that a whole lot of sciences have tried to take shape, while the exact means were still totally insufficient. The methodically undeveloped – although partially very old – disciplines, grouped under the Humanities (*Geisteswissenschaften*), prove, upon closer examination, to be at an embryonal stage. They have also emerged from the need to gain insight into the difficult and manifold problems of human coexistence and its mental and cultural application; but they have not been able to attain their true definitive form as yet, because such methodical conditions have been lacking.

To the extent, however, that sufficient material is brought together in relationship to the more general sciences, it by no

means entails automatically an unimpaired and appropriate use of such material also for the formation of the advanced sciences. What is more, those who were the first to introduce this necessary procedure, must overcome big and powerful obstacles, practised by those who have been working in the field until now in a more primitive manner and have domineered it. The latter consider the intrusion of the new means of thought and work – with which they are not familiarized –, instinctively and most likely in good faith, a destruction of science as they know it, and accordingly renounce them.

There are two ways to go about such difficulties. One either begins a fundamental fight with the representatives of the older view over methodological problems and tries to prove the superiority of the new scientific approach over the old through logical and other arguments. Usually, such a procedure is followed first, leading however to a result only in the rarest of cases. And even if it finally succeeds in doing so, it proves an extremely time- and energy-consuming detour.

A much more direct and shorter way is to completely ignore the methodological reservations of the supporters of those older scientific forms and to effect the rational or exact reconstruction of the science to be through the means at hand, as far as they reach. The presence of such a rational basis makes it then possible for those who get involved in research with the wish and the goal of a direct and successful outcome, to not only find and implement such work, but at the same time to put it in the appropriate perspective within the total picture as well. Thus arises the strong, instructive character of such fundamental tasks, which we so frequently witness in studying the history of the simpler and more general sciences.

The book at hand is also to be regarded as a work of that latter kind. Meeting the methodical need, which it takes upon itself to satisfy, it primarily and most thoroughly treats the biological

background of rational Psychology and then gradually implements these views in Psychology all the way to the development of the individual personality. That through this methodical reconstruction a profound contrast manifests itself to most attempts heretofore of a foundation of Psychology, was to be expected on methodological grounds and applies most obviously to the work at hand as well. Regardless of the personal stance one may assume towards the contents and results of this work, one may not deny the author the concession of being exclusively concerned with the topic, and sparing with utmost care any personal appeal in assessing the thoughts he criticizes.

Finally, it shall be noticed, the author – through his course of studies and mother-tongue – is primarily familiar with the literature published on the subject in the Romanic languages, and therefore French in particular. Hence results a certain one-sidedness in the selection of the material used, which however has not been harmful in the roundup of the train of thoughts. Perhaps though, this situation offers a pretext for a similarly disposed German researcher to compile an analogous work with corresponding consideration of the German and English literatures. It will then in some details culminate differently from the one at hand. In its essential part – and that is certainly the inestimable result of a really methodically reconstructed science – its main content would not be substantially different from that of the present work. Regarding the transition of the entire scientific Psychology from the still oft prescribing metaphysical phase – in which it finds itself presently – into the positive and rational, the book of the South American researcher, having in the meantime appeared in the French language as well, will provide fundamental services.

Great Bothen, June 1922,

Wilhelm Ostwald.”

5.3. Appendix: Wilhelm Ostwald's original German text: 'Zur Einführung.'

“Gemäß ihrer methodischen Stellung ist die Psychologie eine Wissenschaft, welche zur Voraussetzung die Ordnungswissenschaften und energetischen Wissenschaften sowie die allgemeine Biologie mit Einschluß der Psychologie hat. Ihre exaktwissenschaftliche Gestaltung kann somit nicht eher stattfinden, als nachdem die als Hilfswissenschaften vorauszusetzenden allgemeineren Disziplinen den erforderlichen Grad systematischer Entwicklung erlangt haben, um für den Ausbau der höheren und spezielleren Wissenschaft sachgemäß verwertet werden zu können. Nun hängt aber die Zeit der Entwicklung der einzelnen Wissenschaften durchaus nicht von diesem systematischen Zusammenhange ab, sondern nur der jeweils erreichte Grad ihrer Vollkommenheit. Die ursprüngliche Entstehung der Wissenschaften beruht ja nicht auf ihrer Stellung im System, sondern auf den Notwendigkeiten des täglichen Lebens. Und so sehen wir, daß eine ganze Anzahl von Wissenschaften sich zu gestalten versucht haben, obwohl die exakten Hilfsmittel dazu noch gänzlich unzulänglich waren. Die Gruppe von methodisch unentwickelten, obwohl zum Teil sehr alten Disziplinen, welche man die *Geisteswissenschaften* nennt, erweisen sich, genauer untersucht, als derartige Wissenschaften im embryonalen Zustande. Sie sind aus dem Bedürfnis entstanden, auch über die schwierigen und mannigfaltigen Probleme des Zusammenlebens der Menschheit und ihrer geistigen und kulturellen Betätigung Auskunft zu gewinnen; sie haben aber ihre exakte Dauerform noch nicht annehmen können, weil jene methodischen Voraussetzungen fehlten.

In dem Maße aber, wie ein genügendes Material seitens der allgemeineren Wissenschaften zusammengebracht wird, tritt keineswegs alsbald auch eine ungestörte und sachgemäße Verwendung dieses Materials zum Aufbau der höheren Wissenschaften ein. Vielmehr haben diejenigen, welche diesen notwendigen Vorgang als die ersten einleiten, große und machtvolle

Widerstände zu überwinden, die von denen ausgeübt werden, welche das Gebiet bisher in der primitiveren Weise bearbeitet und beherrscht hatten. Diese betrachten das Eindringen neuer Denk- und Arbeitsmittel, die ihnen nicht geläufig sind, instinktiv und meist wohl auch im guten Glauben als eine Zerstörung der Wissenschaft, wie sie sie kennen, und verfolgen sie dementsprechend.

Solchen Schwierigkeiten gegenüber gibt es zwei Mittel. Entweder man beginnt mit den Vertretern der älteren Auffassung einen grundsätzlichen Kampf über die methodischen Probleme und versucht durch logische und andere Gründe die Überlegenheit des neuen Wissenschaftsweges über den alten nachzuweisen. Dieses Verfahren wird meist zunächst eingeschlagen, es führt aber nur in den allerseltensten Fällen zu einem Ergebnis. Und wenn es auch zuletzt Erfolg hat, so erweist es sich als ein ungemein zeit- und energieraubender Umweg.

Ein viel unmittelbarer und kürzerer Weg ist der, sich um die methodischen Bedenken der Vertreter jener älteren Wissenschaftsformen gar nicht zu kümmern und den rationellen oder exakten Aufbau der werdenden Wissenschaft mit den vorhandenen Mitteln, soweit sie reichen, durchzuführen. Das Vorhandensein einer derartigen rationellen Basis ermöglicht dann denjenigen, welche mit dem Wunsch und Ziel unmittelbarer erfolgbringender Arbeit an die Forschung herangehen, solche Arbeit nicht nur zu finden und auszuführen, sondern alsbald auch sachgemäß in das ganze einzuordnen. Dadurch entsteht der starke, schulebildende Charakter solcher grundlegender Arbeiten, welchen wir beim Studium der Geschichte der Wissenschaften so häufig in den Gebieten der einfacheren und allgemeineren Wissenschaften beobachten können.

Als ein Werk dieser zweiten Art wird man auch das vorliegende Buch anzusehen haben. Gemäß dem methodischen Bedürfnis, welches es zu befriedigen unternimmt, behandelt es in erster Linie und am ausführlichsten die biologischen Unterlagen der rationellen Psychologie und führt diese Betrachtungen dann stufenweise in die

Psychologie bis zur Entwicklung der Einzelpersönlichkeit durch. Daß bei diesem methodischen Aufbau sich ein tiefgreifender Gegensatz zu den meisten bisherigen Versuchen einer Begründung der Psychologie herausstellt, ist aus methodischen Gründen zu erwarten gewesen und kommt auch in dem vorliegenden Werke deutlichst zur Geltung. Wie man sich auch persönlich zu dem Inhalt und den Ergebnissen dieser Arbeit stellen mag, man wird dem Verfasser das Zugeständnis nicht versagen dürfen, daß es ihm ausschließlich um die Sache zu tun ist, und er jede persönliche Wendung in der Beurteilung der von ihm kritisierten Gedanken auf das sorgfältigste vermieden hat.

Endlich sei noch bemerkt, daß der Verfasser durch seinen Studiengang und seine Muttersprache in erster Linie mit der in den romanischen Sprachen veröffentlichten, also insbesondere mit der französischen Literatur des Gegenstandes vertraut ist. Hieraus ergibt sich eine gewisse Einseitigkeit in der Auswahl des verwerteten Materials, die indessen der Abrundung des Gedankenbaues nicht schädlich geworden ist. Vielleicht aber veranlaßt diese Beschaffenheit einen gleichgesinnten deutschen Forscher ein ähnliches Werk mit entsprechender Berücksichtigung der deutschen und englischen Literatur zu verfassen. Es wird dann in manchen Einzelheiten von dem vorliegenden verschieden ausfallen. In der Hauptsache würde, und das ist ja das unschätzbare Ergebnis einer wirklich methodisch aufgebauten Wissenschaft, sein Hauptinhalt von dem des vorliegenden Werkes nicht wesentlich verschieden sein. Zur Überführung der gesamten wissenschaftlichen Psychologie aus der noch vielfach maßgebenden metaphysischen Phase, in der sie sich gegenwärtig befindet, in die positive und rationelle, wird das Buch des südamerikanischen Forschers, das inzwischen auch in französischer Sprache erschienen ist, grundlegende Dienste leisten.

Groß-Bothen, Juni 1922.

Wilhelm Ostwald.



6. Discussion

A true pioneer, Ingenieros was the first psychologist in South America who succeeded in establishing a complete psychological system within the contemporary limits of verifiability. Previous local accounts, such as Richard Sudnik's, were not less important but more segmentary and less wide-ranging.

Deeply impressed by Darwin, Ingenieros often spoke like a modern evolutionary psychologist. *Principios* is an admirable work for the profundity of its concepts and its vast accumulation of scientific information, an important reduction of psychology to evolutionary biology and a profound essay on Psychology as a natural science.

Ardila (1971) makes the following comment about Ingenieros' system of psychology, which Díaz-Guerrero (1994) feels compelled to translate: "Psychology's method is the observation of behavior: 'psychological phylogenesis can only be reconstructed through the observation of the behavior of living organisms, i.e., by studying the form through which they express their psychological functioning' (Ingenieros 1937). I believe it is important to remember that this statement was published in 1911, two years before J. B. Watson presented his 'Behaviorist Manifesto' to *Psychological Review*." (Watson, 1913).

Interestingly yet, whereas both Ingenieros and Watson viewed psychology as a natural science, their perspectives remained fairly diverse from an epistemological standpoint. Behaviorism, heir of functional accounts, cast direct roots in Darwinism and akin sources. It investigates the organisms' behavior – human behavior among the behaviors of non-human animals – as adaptive response to environmental changes, purposing to predict and control it. Ingenieros rather built on a quite different epistemological basis and, as historian Kurt Danziger puts it, intellectual interests. Even though Ingenieros was influenced by Darwinism and its impact on mental health, this inspiration remained slighter than the Anglo-American average (one might think of mental hygiene, "social Darwinism", eugenics). Like other

physicians working in psychology in Buenos Aires at the time (e.g., the Society of Psychology's first President, Horacio G. Piñero), Ingenieros was still more strongly indebted to the French clinical-psychopathological model.

This model has to do with a far less general focus: not an organism, but the ailing human person or human mental patient as such, the insane or *aliéné*. Further, on a still narrower concern, it studied her or him only in view of the cure. This may help to understand why Buenos Aires today is the world capital of (particularly Lacanian) psychoanalysis, a therapy uninterested in the generalization of its model to non-humans or the validation of this model under generalizable scientific criteria. In France the concern was, returning the *aliéné* to his political condition of *citoyen*. It was similar in Argentina, not in view of Enlightenment's values but because of the positivist administrative organization of the fast-changing nation, already built as a State if not yet built as a nation – as Christian Gundermann (2006) puts it –; namely, in the attempts to forge a sense of nation within a significant portion of the population. Both the élite inspired by liberal ideas derived principally from Europe and responsible for a record of great economic and cultural development, and the conservative and nationalist leaders who celebrated the rural and native cultural norms, had been imagining the State and building the nation by sharing a great deal of authoritarian traits, implementing measures aimed at establishing and maintaining social control through force. Both therefore became concerned about immigration, madness, and political refugees (chiefly anarchists) as Argentina, by the beginning of the twentieth century, was undergoing a remarkable transformation, from an economically backward and unruly state to Latin America's most advanced and wealthiest country. This in Ingenieros resulted in a conception far less generalized than in Watson, although far more detailed or integral, of the object of study of this *psychology as a natural science* – which thus is not the same in Aristotle, in Watson, or in Ingenieros. Such a situation relativizes Ingenieros' Darwinism, too. In the beginning of the twentieth century the height of positiv-

ism in the industrialized countries is tied to biology as a dominating social paradigm. Thus many countries became impacted by Darwinism in some degree, but from diverse perspectives and to different extent in every case, depending on the social context.

A synthetic summary of the 'genetic method' of Ingenieros's system of psychology was published in Cuba by Dr. José González Vélez (1922), Chairman of Logic and Psychology in the Institute of Secondary Education of Camagüey, with Ingenieros' approval (Fig. 20). Intriguingly, not much can be found in the biomedical literature on José Ingenieros: only two papers appear in *Medline*, by Dalmases (1951) and Ardila (1970). A short book was written in English sometime ago (Van Der Karr and Basile, 1977), and an abstract was presented by Dr. Jesse N. Valdez of the University of Denver at APA's Centennial Meeting (Valdez, 1992). Moreover, Ardila (2000) has provided a short entry on Ingenieros for APA's Encyclopedia of Psychology.

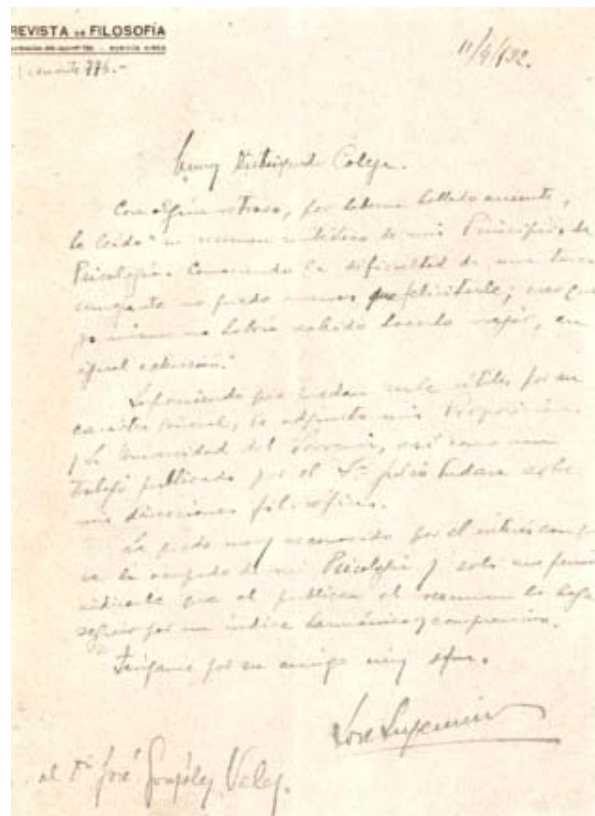


Fig. 20. Facsimile of Ingenieros' letter to Cuban author José González Vélez (1922).

Principios has been called an extraordinary book, originating in 1910 or slightly earlier, and extraordinary it is. A man of the same enthusiastic ancestry of Haeckel and Loeb, and strongly influenced by Ostwald's thermodynamic approach, Ingenieros settled down the bases for the potential development of a Biological Psychology, where mental functions arise as natural corollaries of the evolution of matter before changing physicochemical conditions. In this he shows himself the closest to the Anglo-American scientific atmosphere. Read today, the depth and the conceptual framework of his book can only impress. A biophysical concept of life, according to his observance of cell biological events, was as original as anyone's in an era that viewed mental phenomena as an enigma. Remarkable advances have since been made in our understanding of the dynamics of neuronal networks. The ideas presented by Ingenieros, an immediate sequel of ideas presented by Loeb, after many decades during which they had been suspended, begin to move again and to be uncontrollable (Mizraji, 1988).

A certain distance, between Ingenieros and Jakob's Argentine-German neurobiological tradition, was taken after the latter's mentioned criticism (pp. 135-6 above) of the empiricalness grounding the neurobiological postulates in "*Le Langage Musical et ses Troubles Hystériques: Études de Psychologie Clinique*" (Ingenieros, 1907). It started a growing disconnection as regards the slow developments concerning fundamental matters. While Jakob published in 1911 and 1913 some general treatments, of the relationships between contents of experience and brain states, in the *Archivos de Psiquiatría y Criminología* which Ingenieros directed, it was only in 1935, ten years after Ingenieros' death, that Jakob published in the same journal – whose title had by then changed – his essay "On the organic bases of memory" (Jakob, 1994). Internal to the Jakob-led tradition, this essay contributed to make pressing some conflicts concerning time, the recoveries from amnesias, and the back-effects upon the course of biological evolution arisen from its selection of psyches for accomplishing regulatory organic functions. After Jakob's death (1956) such conflicts

prompted for those developments, whose notice could thus not have reached Ingenieros. He nevertheless knew of Jakob's models of brain upper function upon the interference of neuronal circuit-supported stationary waves of neuroactivity (taught in Jakob's courses and published since 1906), but Ingenieros disregarded the neurobiological need, issuing thereby, of a further control level above the neuronal one. Also by chronological reasons, Ingenieros could not have energetically considered the mentioned back-effects altering the evolutionary course, so as to question for the sort of energy involved therein. Further, he assumed the correctness of describing minds as purely reactive ("energy transformers") and all causal observation as lacking in empirical impression, as Hume did; Ingenieros also viewed minds as consisting only of mental contents and these as not differing from other natural realities, quitting from Jakob's notion of "subjective intonation". On this notional platform, Ingenieros' trajectory in neurobiology and psychophysiology remained far closer to what currently is the general Anglo-American perspective.

The neuronal basis of behavior instigated by Ingenieros is thus in line with the modern foundations of Behavioral Neuroscience (Altman, 1966; Cotman and McGaugh, 1980; Carew, 2000; Zupanc, 2004). The component on 'Phylogenetic Psychology' in Ingenieros's system harbingers today's dimensions of Evolutionary Psychology. Having initially struck root in Darwin's *Expression of the emotions* (Darwin, 1872), the formal field of 'Evolutionary Psychology' was promulgated and formulized by Barkow, Cosmides and Tooby (1992). In the meantime, the field had been adumbrated from the texts of Hamilton (1964), Williams (1966), Masterton *et al.* (1976a; 1976b) and Wilson (1978) and foreshown by the school of the charismatic science popularizer Carl Sagan (Sagan, 1977; Sagan and Druyan, 1992; Skoyles and Sagan, 2002). Various expositions of these ideas can be found in modern works by Deacon (1997), Pinker (1997), Scheibel and Schopf (1997) and de Duve (2002); today, there are many textbooks on this growing and fascinating field in the interface of Evolutionary Biology and Behavioral Neuroscience, including Plotkin (1998), Buss (1999),

Cartwright (2000), Alcock (2001), Clamp (2001), Gaulin and McBurney (2001), Barrett *et al.* (2002), Palmer and Palmer (2002), and Workman and Reader (2004).

In view of the spectacular progress made in modern genetics, molecular neurobiology, and evolutionary neuroscience, the Standard Social Science Model (SSSM), which overtly favored the role of the environment in the context of the eternal nature-nurture debate in mental development, is no longer tenable from a scientific perspective, and heads inevitably toward replacement by an evolutionary model (Cory, 2003).

Lastly, the component on 'Sociogenetic Psychology' in Ingenieros's system heralds the recently established branch of 'Social Cognitive Neuroscience'. The influential modern assessment of the behavior of organisms in groups from a Darwinian perspective is E. O. Wilson's *Sociobiology* (1975). Social Cognitive Neuroscience, an interdisciplinary field of research formalized in 2001 (Ochsner and Lieberman, 2001; Ochsner, 2004), seeks to understand phenomena in terms of interactions between three levels of analysis: the *social level*, concerned with the motivational and social factors that influence behavior and experience; the *cognitive level*, concerned with the information-processing mechanisms that give rise to social-level phenomena; and the *neural level*, concerned with brain mechanisms that instantiate cognitive-level processes. Social Cognitive Neuroscience entails studies and theories at all three levels and contrasts with traditional social psychological and cognitive neuroscientific research that primarily made reference to two of these levels.



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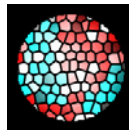
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