The Italian neurological schools of the twentieth century

Lecture delivered by “Ottorino Rossi Award” 2010 winner, Vincenzo Bonavita, MD, Professor Emeritus of Neurology, University of Naples “Federico II”

Vincenzo Bonavita, MD

University of Naples “Federico II”, Italy

Correspondence to: Vincenzo Bonavita
Department of Neurological Sciences
Via S. Pansini, 5
80131 Naples, Italy
E-mail: bonavita@unina.it

Summary

This lecture is not a historical lecture, but rather a journey through the “story” of neurology in Italy from its “prehistoric” beginning in the 19th century. The birth of a neurological school is that magical moment in which a founder attracts disciples: the more capable this founder is of transmitting methodology and allowing his pupils intellectual freedom, the longer his memory will live on.

On the basis of this idea, the scientific biography of a few leading Italian neurologists of the 20th century is outlined, starting from Leonardo Bianchi, founder of the Italian Neurological Society in 1907.

KEY WORDS: history of neurology, Italian neurology, neurology in the 20th century

Premises

In his last brief work “Letter to D”, André Gorz, an Austrian Jew, recalls how as a young man, and thus at the start of a career that would see him regarded as one of France’s great intellectuals, he learned the tricks of objectivity: “I learned… in the face of facts, to make them say what I was thinking.” As an intellectual position, this is admissible from one who edited Les Temps Modernes (the journal founded by Jean-Paul Sartre) and subsequently went on to found the Nouvel Observateur with Jean Daniel, but it is not for the historian (if objectivity without tricks actually exists). This lecture is not intended to be a historical lecture, but rather a journey through the “story” of neurology in Italy: it is a story in which there stand out, among quite a number of individuals of considerable calibre, several who, in different ways, left their mark on their time or, in my view, influenced their ages of great intellectual and moral calibre.

The conclusion I thus reach, with or without Pietro Aretino, is that a school of neurology is nothing other than that magical moment in which a founder attracts disciples. And the more capable this founder is of transmitting methodology, and of allowing his pupils intellectual freedom, the longer his memory will live on in the history of his discipline.

An exceptional scientific imagination does not make a great master; what makes a master is the ability to impart a method of scientific research (not a procedure) and to grant critical freedom to the other party (the disciple who is no longer a follower), in a perennial circular relationship between the teacher (who also learns), the learner (who also teaches), and the problem that constitutes the focus of the three-sided debate in the scientific rhetoric. This second premise allows me to outline clearly the scope of my address, which asks the following questions: were there Italian schools of neurology in the 20th century? And, if there were, what were the substantial, not formal, differences between them that allow them to be considered distinct entities.

In the end, perhaps, it will be clear that the differences are not between schools, but between different personages of great intellectual and moral calibre.

The prehistory of neurology in Italy

It is worth beginning by examining briefly the prehistory of neurology in Italy, which was born in the 19th century in the South and the North of the country almost simultaneously.
The dawn of neurology (for many years called neuropathology – not because of an epistemological mistake, since this name actually reflects the roots of the discipline – even though Thomas Willis had already used the term neurology in 1664) can be traced back not to Naples, and the University founded there by Federico II in 1223, but instead to a hospital in Aversa, just outside Naples. It was June 2, 1861, when Biagio Gioacchino Miraglia, director since 1842 of the Reale Morotrofio in Aversa, founded the Società Frenopatica Italiana (Italian Phrenopathic Society), recalling how a number of years before, in 1849, “we had had the idea of a Società Medico Psicologica, a concept of our own devising that, here thwarted in a hostile political context, was subsequently introduced in France.”

It is interesting to read what Miraglia wrote on the indissoluble link between the clinical phenotype of mental disorders and nervous system pathology: “...the physicians belonging to the hospitals' medical committee will form a scientific academy... which will deal with psychology, physiology, especially physiology and pathology of the brain, comparative anatomy and pathology...” “...This disease known as madness is not a subjective affliction of the spirit, as many still believe, but rather of the organ through which the spirit works and manifests its faculties.”

There can be no doubt that Miraglia was a forerunner of neuropsychiatry, which was to survive with this name for many years. His cultural points of reference were actually Gall and Spurzheim, who to our eyes seem extremely primitive, but who perhaps deserve to be remembered for the research project to which their ideas gave rise. The purpose of the society was specified in its statute, approved at its first meeting on May 14, 1862: “...to cultivate and advance study of mental alienation and of related sciences,” and its studies were to focus on “...the anatomy, the physiology and pathology of the brain and nervous system, comparative anatomy...”

Several months later, Miraglia called for the establishment of a section of the Phrenopathic Society at the (unitary) Congress of Italian Scientists which was shortly to take place in Siena, so as to give interested physicians an opportunity to probe, in more depth, the problems of their specific professional area.

While acknowledging that Miraglia was a groundbreaker, whose forsightedness led to the birth of the Phrenopathic Society, it must also be recognised that in terms of efforts to codify neurology as an independent discipline, Italy lagged a long way behind other countries. Of course, Miraglia was not a maquil in the medical culture of the time. In 1864, Andrea Verga (director of the Senavra mental asylum, and later of the Ospedale Maggiore in Milan), together with Serafino Biffi and Cesare Castiglioni, transformed the Appendice Psichiatrica of the Gazzetta Medica Lombarda, an offshoot that had been created in 1852, into the Archivio italiano per le malattie nervose e più particolarmente per le alienazioni mentali (Italian Archive of Nervous Diseases, particularly of mental alienations). In actual fact, Verga, Biffi and Castiglioni in northern Italy and Miraglia in the South were running in parallel, since Miraglia, in addition to having the historical merit of founding the Italian Phrenopathic Society, was also founder of Annali Frenopatici Italiani, the official journal both of the Reale Morotrofio in Aversa and of the Italian Phrenopathic Society. This exciting venture was destined to be short-lived however. Publication of the journal ceased after Miraglia, in 1869, left his position as director of the hospital in Aversa. As Miraglia himself subsequently recalled in a piece published, in 1872, in the Giornale della Reale Accademia di Torino: “we were forced to inform the Ministry of Public Education that we had dissolved (the society) because of a lack of active members, even though we had Fossati as our honorary president and around 300 corresponding members from leading Italian and foreign scientific societies.”

The story of Biagio Gioacchino Miraglia is echoed in that of Andrea Verga and Serafino Biffi who, in September 1873, used the aforementioned Archivio italiano per le malattie nerveose to urge colleagues interested in mental alienation to attend the XI Congress of Italian Scientists, scheduled to be held in Rome from October 20 to 30, in order to form a psychiatric section. Thus, Miraglia’s original idea, which nine years earlier had failed to come to fruition in Siena, once more returned to the fore. The birth, on October 26, 1873, of the Società Freniatrica Italiana (Italian Phreniatric Society) was, in fact, the refounding of Miraglia’s Phrenopathic Society. And it is worth dwelling briefly on the debate over the name that the society was to be given. Verga suggested the name Medical-psychological Society, reflecting that of its French counterpart, so as to embrace philosophers too, but Clodomiro Bonfigli, Cesare Lombroso and Carlo Livi favoured the name Società Freniatrica Italiana. This is how Bonfigli rebutted Verga: “Diseases of the nervous system with mental alienation must be studied by physicians and […] a society engaged in the study of these diseases must be comprised essentially of physicians, not philosophers.”

But let us look at what Miraglia had been saying twelve years earlier (1861): “...The word phrenopathy should replace the more widely used term psychiatry, because the latter embraces the absurd and hateful concept of a subjective disease of the spirit; conversely, if madness is to be depicted purely as a material disease of the brain, then the most appropriate term is phrenopathy, which indicates a disorder of the brain’s functions, functions through which the soul and spirit manifest themselves...”

It is for this theoretical position that Miraglia must be acknowledged as a significant figure in the history of neurology in Italy, where the discipline is rooted in recognition of the link between mental disorders and their structural substrate: the neuropathological substrate. And this is the source of the apparent epistemological mistake mentioned earlier, i.e. the reason why the discipline was, for a long time, called neuropathology.

After Miraglia, the town of Aversa rose to prominence again in the 19th century, this time thanks to Gaspare Virgilio, director of its hospital, and to the fact that the town provided the venue for the II Congress of the Italian Phreniatric Society, which ran from September 24 to 29, 1877.

I mention Gaspare Virgilio and the Aversa congress for two reasons:

1. Virgilio, in an obituary by Leonardo Bianchi (published in the Rivista Sperimentale di Freniatria in 1908), received plaudits that are here worth citing as an illustration of the value of knowledge, an attribute that made a leader of this practitioner, who did not conduct re-
search but had a broad and solid cultural background: "...he was the exponent, par excellence, of the psychiatry of his era... long before the new school came into being in Naples, ...he was promoting modern psychiatry. Psychiatry finds its natural terrain in a range of areas: in anthropology, in anatomy, in physiology and in physiological psychology. Virgilio understood all this and organised his mental hospital accordingly, making it one of the most renowned in Italy, and the Italian Phreniatric Society chose to hold one of its first meetings in Aversa, as a tribute to the psychiatric modernism of Virgilio who, in his work and his thought, outstripped many of his contemporaries. Virgilio will thus remain as a significant figure in the history of psychiatry – the same psychiatry on which today neurology is founding its imposing building..."  

2. At the II Congress of the Italian Phreniatric Society, in Aversa, there was no shortage of specifically neurological topics; there was also a debate on the name of the brain's convolutions which culminated in an ante litteram theoretical-practical session, when the delegates asked the hospital authorities to provide them with a corpse, whose examination allowed them to reach their conclusions (they were actually led by Augusto Tamburini, Andrea Verga and Enrico Morselli, but this is incidental: after all, there is always someone who takes the role of conductor). Thus, in Italy, the birth of neurology was promoted by the psychiatrists of the period, who were also neuropathologists, one of whom, Leonardo Bianchi, in 1907, founded the Italian Neurological Society (Società Italiana di Neurologia, or SIN).

Leonardo Bianchi and the Italian Society of Neurology

In view of the first of my opening premises, I wish to point out that the founders of Italian neurology of the 20th century identified herein are my own, arbitrary selection; however the second premise will operate as a limit to the arbitration, as will the need to set the various figures in the cultural context of their time, and in particular in the European context. This context was dominated by timeless figures like Jean Martin Charcot (a neurologist ante litteram but also a psychiatrist whose Tuesday lectures at La Salpêtrière were legendary), but also by his pupils who were prominent on the European scene in the period spanning the end of the 19th and the start of the 20th century. The relationship between Charcot and Joseph Babinski provides a concrete illustration of the term "school". Charcot's approach was to advance by hypotheses and he possessed extraordinary imagination and insight; Babinski, in approaching problems, particularly that of hysteria, initially followed in the footsteps of his master, but then he drew away from him, as he believed that a medical diagnosis must always be based on demonstrable and verifiable facts. This position, if it is valid, obliges Babinski (intellectually) to be a semiologist, a seeker of signs able to identify demonstrable and verifiable events, as peculiarities of organic diseases of the central nervous system and not other pathological conditions.

Charcot thus instructed and his lesson was followed, but then his pupil, not prone to share all the ideas that had contributed to his master's great renown, turned partially away; this is also seen in Babinski's decision to remain silent in the great debate on aphasia, in which Jules Dejerine and Pierre Marie were leading figures. I have digressed, but deliberately, because the relationship between Jean Martin Charcot and Joseph Babinski provides an excellent illustration of what it means to teach and found a school: to teach is to be listened to and followed, but also to ensure that others are allowed to develop freely and independently. If I am asked to identify, in the Italian setting, 20th century personages of the same intellectual substance and enormous charisma as Charcot, then I am forced to admit that Italy has produced comparable figures, but no one that is quite his equal. Who, then, are the founders of neurology in Italy? We might use geography as a criterion, if we want to draw up an arbitrary list, which must, nevertheless, correspond to the truth. I will therefore start with Naples, before moving up the country, to Rome, Florence and beyond on a journey through Italy's oldest universities. Because universities are, ultimately, the places where ideas develop, even though the seeds of these ideas may have sprouted elsewhere. Giorgio Zanchin in his "Profilo storico della Società Italiana di Neurologia" ("History of the Italian Neurological Society") writes that the programme of the XII Congress of the Italian Phreniatric Society (Genoa, October 18-22, 1904) contained many specifically neurological contributions. It is precisely this prevalence of neurological contributions (particularly histological and neuropathological) that, for cultural and pragmatic reasons, re-ignited the dispute – a major cultural debate that swung like a pendulum – between the alienists and neuropathologists (but the alienists were also neuropathologists). Contrary to the views of Augusto Tamburini, who on relinquishing the presidency of the Italian Phreniatric Society in 1904 had urged his successors to ensure that the society remained "ever worthy of its glorious past and of the memory of the great masters who first brought together, in a single society, Italy's alienists and neurologists", Leonardo Bianchi, in April 1907, founded the Italian Neurological Society at a gathering of 36 founder members in Rome. Eight of these 36 founder members were from Naples, a substantial proportion that says a lot about the city's interest in the Italian Neurological Society, an interest that has never since flagged. Bianchi's inaugural address would be worth rereading in full, but here I extract just one affirmation that anticipated, by a century, what we know to be true today: "Psychiatry is a branch of neurology". Obviously, this does not mean psychiatry as a whole, but the whole of that part that Ehrardt called neuropsychiatry. At the first SIN congress (1908), Leonardo Bianchi, in a lecture entitled "Physiology and Pathology of the Frontal Lobes", returned to his theme and imparted, once again, his specific methodological lesson: his experiments were conducted on wild monkeys from Africa "because the loss of that which is the product of education may be a source of error". Bianchi's conclusion, still controver-
sial in 1908, albeit much less so than in 1895 (the year that saw the publication of his paper “The functions of the frontal lobes” in Brain), was that the frontal lobe is the organ of intellectual synthesis: in other words, that it “exercises a synthesising function in that it uses the products of sensory processes to form higher intellectual constructs, more complex judgements, and to mediate reactions that reflect the complexity of those judgements.” The second SIN congress, held the following year in Genoa, featured a presentation by Giuseppe D’Abundo, a pupil of Bianchi, that is worth recalling. It was a lecture on the “physiopathology of the optic thal- 
amus”, which may be seen as an anticipation of the thal- 
amic dementia observed by D’Abundo in cats operated on 24 hours after birth. This was Bianchi’s comment: “It is my belief that the optic thalamus really is an interme- diary link with the psyche.” At the third congress, held in Rome (October 25-27, 1911), Leonardo Bianchi was prominent again. This time he delivered a lecture enti- tled “Histological alterations of the cerebral cortex fol- lowing destructive foci and experimental lesions”, in which methodological rigour as the basis of any scientific con- clusion once again emerged as an absolute value. Bianchi described the histopathology of the destructive focus and of its walls; he also examined the surrounding structures, the structures on the same side as the lesion but not immediately adjacent to it, and finally the corre- 
sponding contralateral hemispheric structures. I wonder whether it is apparent, to readers of this piece, that the exploration of all phenomena.” The reason I include this quotation is that it reflects a view repeatedly and in- sistently expressed by Bianchi in his teaching. Reviewing, historically, the scientific observations of Leonardo Bianchi there can be no denying that, despite the rigour of his approach, only a few of his scientific ob- 
servations still survive today. Actually, in the history of science, this is inevitable, given that all truths are re- 
garded as such only in the here and now. In judging Leonardo Bianchi, therefore, we must consider two fac- 
tors: his methodological rigour and the constraints of the knowledge of the time. The function of the frontal lobes is Bianchi’s main scientific result, the one that has stood the test of time, but it is worth going back to the previ- 
ously cited article published (as a translation by A. de Watteville) in Brain in 1895 to quote two extracts that, on the one hand, show how the instrumental limitations of the era influenced this research, begun in 1888, and, on the other, bring out the self-critical humility of Leonardo Bianchi: “I have taken as my chief guide the electrical re- 
actions of the frontal region, exploring it repeatedly with an exciter connected with a Du Bois Raymond sledge apparatus. I used to test the strength of current on my tongue always keeping the same intensity of sensation, which corresponds to 9 or 10 mm of the scale” and then, at the end of the article: “But even should a more ac- 
ceptable hypothesis to explain the facts observed be hereafter framed, I feel at any rate certain of the accur- acy of the observations themselves.” In actual fact, at the time Leonardo Bianchi was tackling this problem, the debate on the function of the frontal lobes had been under way for some time. The suggestion that the frontal lobes were the elective site of mental activity can be traced back to Lancisi (1654-1720), who had recognised the frontal lobes as the “factory of thought”, even though the first experimental investigations, involving ablation and galvanic stimulation of the cerebrum in the dog, were not to appear until around two centuries later, with the work of Eduard Hitzig (1838-1907). And yet even as late as 1885, Luigi Luciani, luminary of Italian physiology, was denying the existence of any re- 
lationship between the frontal lobes and intellectual ac- 
tivity. This is the setting in which Leonardo Bianchi conducted his scientific work and developed his ideas on the frontal lobes, which it is worth recalling in his own words: “My concept is that the frontal lobe utilises, for intellect and behaviour, the products, sensory and motor, of processing that takes place in other areas of the cortex. It is the organ of conscious and historical synthesis of the mind’s two great resources: the somatic emotional and the cog- nitive. The frontal lobes are the field where abstract ideas are produced. Ideas are nothing other than the re- 
sult of the fusion of a number of sensory and motor com- 
ponents and their derivatives, processed in the sensory and motor areas and translated into symbolic form in the
language area.” And yet, he added: “No one can say whether such a fusion of concrete images or, if not fusion at least rapid succession or connection on the basis of their psychic affinities, is not a process that also takes place elsewhere in the brain.”

Leonardo Bianchi was not just a rigorous researcher: he was also an all-round university professor. With his many interests, he may be regarded as a Renaissance man whose seed has become lost. Bianchi was, indeed, also the author of a “Treatise on Psychiatry”, in 1905, the same year that Eugenio Tanzi, without Ernesto Lugaro, published the first edition of his “Treatise on Mental Diseases”.

The life of Leonardo Bianchi provides an illustration of the fact that great successes can come even to those who hail from obscure places, such as his small home town of San Bartolomeo in Galdo, a small municipality on the borders of the historical province of Capitanata, quite a distance from Benevento, where Bianchi received his secondary schooling, and which took him a carriage journey of seven or eight hours to reach. But to be a master, in any discipline, one must generate pupils who, in their turn, develop the discipline, and Bianchi generated pupils in many universities (Naples, Palermo, Siena, Cagliari).

Many years later, Fabio Visintini recounted a conversation with Giuseppe Moruzzi in which, implicitly, he had defined the role of the master: “…He asked me, at a certain point, how I had managed to gather around me so many worthy young people … I said …I hadn’t sought them… my task had been to allow them to grow without feeling envy or irritation.”

Giuseppe D’Abundo, then professor in Catania, wrote that Leonardo Bianchi was the founder of a school and that the University of Manchester had acknowledged this fact, awarding him an honorary degree. This was something extremely unusual for the time, which only goes to confirm that Leonardo Bianchi was, indeed, an exceptional figure.

But to reiterate, repeatedly, Leonardo da Vinci’s methodological warning means subscribing to it, in other words sharing the belief in the need for absolute methodological rigour in research and clinical practice as well as in academic and other activities: a rigour Leonardo Bianchi never failed to display.

I have mentioned Leonardo Bianchi, to highlight his attachment to and insistence on scientific rigour, but Naples was also home, in the 20th century, to another equally prominent figure who, however, had a less intransigent attitude to methodology: Vito Maria Buscaino, who came to Naples in 1946 as the successor of Onofrio Fragnito, mentor of Mario Gozzano.

Vito Maria Buscaino had his Clinic of Nervous and Mental Diseases renamed Clinic of Nervous System Diseases, thereby inscribing on the front of the building his unitary view of neurology and psychiatry, literally setting it in stone so as to exclude any further debate on the matter.

In 1927, Vito Maria Buscaino, then aged 40, moved from Florence to Catania, as professor and director of the University’s Institute of Neuropsychiatry, a position he held until 1946, when he left Catania for Naples. Anyone, like myself, who knew Buscaino in the last years of his academic career would surely endorse, without hesitation, the personal and scientific profile of him drawn by Eugenio Tanzi, on promoting his candidacy for a university chair: “A greatly cultured and austerely scholarly man … his intellectual brilliance and character are absolutely uncommon.”

Vito Maria Buscaino was an academic, who lived his life in a spirit of remarkable cultural engagement, actually going beyond the rigid formalism of his time and the official recognitions he received, like the Medal of Merit for Public Health Service (1963) and the Gold Medal and First Class Diploma for Education, Culture & Arts (1966). In truth, these awards, which were the highest the relative ministries could confer, are actually of little note if one considers, in the context of what were nationalistic and autarchic times, the recognitions he received in the international arena. Vito Maria Buscaino was, from 1929, a corresponding member of the Royal Medico-Psychological Association of Great Britain and Ireland. A note in support of his nomination to this association pointed out that he had: “earned the high respect and regard, not only of his Italian colleagues, but of workers in the field of neurology and psychiatry everywhere.”

Scientific research thrives both on imagination and on methodological rigour: hypotheses spring from imagination, and the livelier the imagination the more innovative the hypotheses; method, on the other hand, regulates the conflation of hypotheses and allows to stand, as truth, all that the technical means of the day are unable to disprove. In my view, Vito Maria Buscaino had great scientific imagination, but his methodological rigour did not match this imagination.

The titles of two monographic works, “The Biology of Emotive Life” (1921) and “The Neurobiology of Perceptions” (1946) summarise the main topics that Vito Maria Buscaino loved returning to with his students, interesting and stimulating them with his contagious enthusiasm.

And yet, specific hypotheses aside, there is one general hypothetical construct for which Vito Maria Buscaino deserves great recognition: I refer to his concept of biological psychiatry, whose importance stems from the fact that it revolutionised psychiatry, which at the time was merely a systematic and descriptive catalogue of psychopathological phenotypes. His hypothesis that schizophrenia was an “aminic toxicosis”, was another hugely important insight, but one that had to wait a long time for experimental observations.

There is no doubt that Vito Maria Buscaino was a neurologist. Alongside neuroses and schizophrenia, he was also interested in epilepsy, insisting that a role was played by an altered hydrosaline balance, a theory he set out in his monographic work “Aetiology of Epileptic Attacks” (1935), and dwelling at length on a particular aspect of basic neurology, namely, the neurobiology of perceptions. Generally speaking, his hypothesis was that central-peripheral pathways play an essential role in perception phenomena. However, as Buscaino further developed his ideas, the theme of basic neurology brought him again to the clinical field to interpret illusions, hallucinations, dysmnesias and lapsus.

The genesis of conscious phenomena was the last of the main areas on which Vito Maria Buscaino focused, returning to the central-peripheral pathways that had underpinned his work “The Neurobiology of Perceptions”. None of Vito Maria Buscaino’s university colleagues shared his scientific imagination. This imagination, together with his “uncommon character” made him an im-

---

**Italian neurological schools of the 20th century**

**Functional Neurology 2011; 26(2): 77-85**
posing figure on the academic scene. It also ensured that his pupils cultivated the research ideas that he, their mentor, suggested and thus imposed.

Vito Maria Buscaino was my first teacher of neuropsychiatry and, noting that he had little interest in methodological rigour, I was immediately critical of him, even though I also absorbed his message on the crucial role of neurochemistry in neurology and psychiatry. Even though this was the only lesson he taught me, I nevertheless affirm that he was a great and charismatic mentor. After all, even a negative message, if it is grasped and overturned, can constitute a valuable lesson.

From Naples to northern Italy

But let us now go back in time again and travel northwards, to Rome. In the early 1900s, neurology in Italy was taught in psychiatric clinics. The Psychiatric Clinic in Rome, which was next to the Santo Spirito Hospital, was the home of a neuropathology laboratory, founded at the beginning of the century by Giovanni Mingazzini, who was later to succeed Augusto Tamburini as director of the city’s mental hospital and several years after as professor of the Psychiatric Clinic, which in 1921 became the Clinic of Nervous and Mental Diseases. Giovanni Mingazzini was one of the 20th century founders of Italian neurology. His “Treatise on the Clinical Anatomy of the Nervous Centres” (1912/13) has particular importance beyond its intrinsic value as an excellent treatise, as it set out a methodology in clinical neurology that would be developed and refined over time, but never rejected or refuted. Mingazzini enjoyed great international renown, as is shown by the fact that he, author of “Description of a normal human brain”, received the brain of Lenin for examination following the Soviet leader’s death in 1924.

Augusto Tamburini’s successor in Rome and a pupil of Augusto Tamburini, was certainly a prominent figure in the university during the first half of the 20th century. Despite qualifying in 1906 as a free lecturer in neuropathology, and the fact that he held the Chair of Mental and Nervous Diseases, he was, primarily, a psychiatrist. Eugenio Tanzi was appointed director of the Psychiatric Clinic in Florence, later renamed the Clinic of Nervous and Mental Diseases, in 1895 and remained working in the city for 36 years. Although his interests were mainly in the field of psychiatry, his position on two important issues allow us to regard him as an ante litteram neurologist: he was one of the few Italian scientists of his time to support Ramon y Cajal’s neuron theory and reject Camillo Golgi’s diffuse neural network. He formulated the hypothesis that external stimuli bring about material changes in brain tissue: Tanzi argued that a long memory corresponds to a physical structure modification as a consequence of a recurrent stimulus. A number of significant personages moved from Florence to other universities, taking with them the mark of a master and mentor who may be remembered as one of the most robust promoters of the total fusion of psychiatry with neuropathology, but, despite this, Florence would have to wait for another historical era before witnessing the emergence of modern, multidisciplinary neurology.

In view of the close bond that united Eugenio Tanzi and Ernesto Lugaro, a bond that never weakened, it is appropriate that we should now turn our attention to Turin. In Turin, the prehistory of neurology is inextricably linked with Cesare Lombroso, who lectured in forensic medicine, psychiatry and anthropology, but also neurology. It was to be 1905 before Lombroso decided to attribute the lectureship in neuropathology to Camillo Negro, who five years later had his own chair, separate from the Chair of Psychiatry, which went to Ernesto Lugaro. Negro was Turin University’s first neurologist, but Ernesto Lugaro was to be its charismatic representative in the 20th century.

Trained in Florence under Eugenio Tanzi, Lugaro is known mainly for his “Treatise on Mental Diseases” which (as from 1913) he co-authored with his mentor, and for the rather fierce criticism of the nascent field of psychoanalysis that arose from the work of Sigmund Freud, about whom the pair remarked: “he is trapped in the maze of his own hermeneutics, and while believing he has established a scientific scheme, he has actually done nothing other than compose a symphony of sounding metaphors.” But perhaps Lugaro’s greatest merit is not so much the “Treatise” as the fact that he was one of the first to intuit the existence of neuronal plasticity, and also, from as early as 1899, a champion of the neuron theory as opposed to the syncytial theory supported by Camillo Golgi, whom he was never afraid to challenge. Lugaro was a complete neuropsychiatrist – a figure that everyone of the time wanted to emulate, although few succeeded: a neuropsychiatrist who also had philosophical interests, as is shown by the 1920 publication “Philosophical idealism and political realism”, which was his contribution to the great debate on this topic between Benedetto Croce and Giovanni Gentile.

Lugaro’s death, in 1940, together with the events of the Second World War brought things to a halt in Turin for a while; but then neurology flourished again and, from Turin, spread throughout Italy thanks to the endeavours of a number of individuals, all remarkable for their intellectual qualities and commitment to research and methodological rigour. Fabio Visentini, who worked in Parma, and Dino Bolsi, in Turin, were both pupils of Lugaro and both went on to generate pupils capable of exercising intellectual autonomy.

So this journey has taken us from Naples to Rome, and then on to Florence and Turin. But Pavia and its university also stand out in the 20th century as forerunners of an innovative organisational model. The creator of this model was Casimiro Mondino, a pupil of Camillo Golgi and an extraordinary figure in Italian neurology of the last century. On arriving in Pavia in 1898, he did not set out to pursue an autonomous research project, but the far more ambitious objective of founding an institute for the “treatment of nervous diseases”, of which his mentor, Golgi, was regarded as the scientific inspiring guide. This institution, his own creation, meant everything to him, and on his death he left his entire personal estate to the Foundation, which took his name. He was thus a founder of neurology who laid the foundations for the research of others, and his farsighted vision remains very much alive to this day.

The first to benefit from Mondino’s work was Ottorino
Rossi, whom Giuseppe Nappi, in a 2007 memoir, recalled thus: “In his approach to the management of a large hospital, Ottorino Rossi displayed the genuineness and the strength of his scientific vocation: that which for many is a goal (from which they may easily deviate) was, for Rossi, merely the starting point from which to strive towards new goals.” His diligence as rector of the Alma Tlicensis Universitas, a position he held just after returning to Pavia, bears witness to this. Rossi’s scientific output was varied and full of original findings, but what he should really be remembered for is his promotion of a unified research direction that would preserve the close links between clinical neurology and biological studies. Indeed, he observed his “primary asymmetries of positions” both in humans and in the cat.

On February 12, 1996, the Mondino Institute provided the venue for a historical seminar on Joseph Babinski, marking the centenary of his description of the sign that took his name.

This event, at which I was not present, ended with an astute lecture by Rosario Magri. It was a well reasoned and insightful defence of clinical semiology in neurology, which I largely endorse. The closing remark was: “in an uncertain profession like ours, we at least need to be aware that one day we will be judged by our intentions and not our results.” I have to disagree with the second part of this affirmation, however: our results, too, will count, indeed must count.

In Pavia, the discipline of neurology can be traced back to 1898; in Milan it emerged much later, but because the University of Milan was founded late, i.e. in the 1920s, Carlo Besta, formerly a professor in Messina, was the first to hold the Chair of Nervous and Mental Diseases, based in the clinic that would later, after his death at the age of 64, be named after him.

To tell the truth, the neurological institute that became the Carlo Besta Institute, had started out, in 1918, as a hospital, specialising in nervous and mental disorders, for soldiers returning from the Great War; this was seven years before the newly founded University of Milan appointed Besta to the relative chair. Carlo Besta’s great merit was that he appreciated, although of course he had the example of Pavia to draw on, the importance of a clinical centre entirely devoted to the neurosciences, even though their subsequent evolution would later make it clear that, from a research and clinical perspective, the neurosciences really need to co-exist, in both a spatial and a cultural sense, with all the other medical disciplines.

But there remain two other major universities that deserve to be mentioned: those of Genoa and Padua.

It is my view that neurology at the University of Genoa began not with Enrico Morselli or Carlo Ceni, but with Lionello De Lisi, who for 20 years, starting in 1935, lectured in nervous and mental diseases there. A pupil of Cesare Lombroso, Enrico Morselli was a psychiatrist who was not particularly drawn to neurology; meanwhile Carlo Ceni, who succeeded him for a short time, was an experimental biologist with interests in early neuroendocrinology. Compared with Naples, Rome or Pavia, then, the neurological school of Genoa was a late starter, but it flourished greatly. The calibre of De Lisi is reflected in his many scientific interests, but also in his remarkable organisational skills, which came to light when he founded an avant-garde clinic that Cornelio Fazio, in subsequent years, went on to develop further. De Lisi is still remembered for his descriptions of physiological hypnic myoclonias, his observations on hepato- lenticular degeneration (for which he was acknowledged, as early as 1940, by Kinnier Wilson in his treatise of the same year), and for a chapter, written in 1936, on the “diseases of the extrapyramidal system”, published in Angelo Gacconi’s “Medicina Interna”.

It is in this important work that Lionello De Lisi deals with the question of movement from an evolutionary perspective – from animals to man, from the infant to the adult – and also from the perspective of its functional-anatomical features and its clinical aspects, providing early insights into the individuality of the organisation of movement and the hereditary origin of Parkinson’s disease, the first demonstrations of which did not appear until as recently as the 1990s.

Lionello De Lisi and Cornelio Fazio, his most prominent pupil, are two personages who somehow run together. Fazio’s main research interest was cerebrovascular disease, of which he gives an innovative account in the proceedings of the XI Congress of the Italian Neurological Society, held in Naples in 1952. An international symposium on imipramine, organised by Fazio in Rapallo in 1960, bears witness to the variety of his cultural interests. Less ecletic than De Lisi, he too had a wide (although perhaps not as wide) range of interests outside neurology and psychiatry; he was passionate about politics and prepared to participate in civil struggles even at his own personal risk. A witness to his times, Fazio actively encouraged his pupils to participate in the international scientific research arena, helping them to become leading figures.

In Padua, for a long time, no one built on, in the neurosciences, the legacy left by a great personage, namely Vesalius. For many years, teaching on disorders of the brain continued to be an integral part of special medical pathology. That is until 1879, the year that saw the teaching of clinical psychiatry officially included in the statute of the Faculty of Medicine. At that time, clinical psychiatry embraced topics that are today considered essential components of the neurological sphere. But neither Augusto Tebaldi, first holder of the Chair of Clinical Psychiatry, nor his successor Ernesto Belmondo, were particularly interested in neurology. Belmondo, in 1907 changed the name of the discipline to nervous and mental diseases, but, being a pupil of Eugenio Tanzi, his main interest and area of expertise was psychiatry, an inclination that determined his involvement in the mental asylum act of February 14, 1904.

Giuseppe Carlo Riquier, in particular, and Carlo Berlucchi, both pupils of Ottorino Rossi, did not have a long enough academic life in Padua to be able to really influence the development of neurology in that city. It must be recalled, however, that Riquier had promoted the transfer of the Clinic of Nervous and Mental Diseases to the city’s hospital, where it became an independent structure outside the general medicine department, and would later go on to develop the same project in Milan. The true founder of the Padua school of neurology is Giambattista Belloni, of whom Nicola Rizzuto wrote: “Belloni’s training saw him following paths that linked in-depth studies of neuropsychiatry with neurological interests;... a master with a rare ability to foresee and sup-
port the evolution and future of the clinical neurosciences.” Historically, then, Padua had a late start (Belloni began lecturing there in the academic year 1941-42), but Belloni struggled against time, albeit in the wake of around five devastating years of war. The organic link with neurosurgery, and the birth of new areas – neuroradiology, clinical neurophysiology and applied neurochemistry –, all stemmed from the endeavours of Belloni who left a strong mark in Padua, as yet unequallled.

The fact is that Belloni, who never had a mentor and returned to the university after working for a brief time in a psychiatric hospital, possessed attitudes and qualities that placed him on a level above that of the average university lecturers of his day, and this is not because, after his histological studies of glial cells, he developed the cisternography method that is now known by his name. It is because he, blessed with the charisma of a great teacher, managed to form a group of scholars who engaged, daily, in debates (where else can the neurologist refine his intellect?) and developed projects that Belloni coordinated and promoted without ever placing constraints on anyone’s freedom. Prominent members of his group included Hrayr Terzian, renowned for his scientific achievements, and Franco Basaglia for achievements outside science (he was instrumental in the passing of the Italian psychiatry reform law of 1978). I have not mentioned the schools of neurology in the many other universities that, more often than not, young professors have tended to “pass through” on their way to more prestigious academic seats; also, I should have mentioned the achievements of Bologna, but these relate more to the present than to the past: such are the limits of the objectivity that I outlined earlier and have herein chosen to apply.

Concluding remarks

Louis Pasteur wrote that there is no such thing as basic, or applied research, but only research tout court. I have tried to apply this affirmation to the sphere of clinical neurology and have come to the conclusion that it may, or may not, be true. The examples I could cite are infinite and, in want of a criterion, I have chosen a personal one: if one tries, as I have done, to correlate the molecular changes taking place in an enzyme in growing and in degenerating nervous tissue, the research one is conducting is, at once, both basic and applied; if I am attempting to establish the usefulness of a drug, in a multicentre trial, I am conducting applied research; meanwhile, anyone who investigates the mechanism of action of that drug will be conducting basic research that has many potential clinical implications, thus blurring considerably the boundaries between clinical and applied research. But why do I say all this? The link between basic and applied research obliges me also to mention non-clinical researchers – the other side of the only coin I have presented here.

Camillo Golgi’s life spanned the 19th and 20th centuries, but there are also other important figures whose work in the 20th century contributed to prominence of the neurosciences in Italy: Giuseppe Levi, who is remembered for his in vitro studies on cultured nerve cells and for mentoring three Nobel prize winners (Salvatore Luria, Renato Dulbecco and Rita Levi Montalcini), to whom he imparted his “intolerance of superficiality and failure to apply the rules”; Giuseppe Moruzzi, who, with Magoun in 1949, described the brainstem reticular formation and EEG activation and later, with the “San Zeno School” in Pisa, the inhibitory control of the activating system, showing sleep to be an active process; Daniele Bovet, whose scientific work advanced for many years along lines that appear obvious to us now, but were not so at the time: the relationship between a drug’s chemical structure and effect; drugs as instruments for interpreting physiological processes as well as for contrasting pathological ones; drugs as the probes for exploring brain functioning. Bovet’s career concluded with his work on psychobiology and genetics of behaviour at a time when the behavioural theories were dominating psychology, in Italy and elsewhere.

Similarly, there are a few other figures who have shaped the course of the neurosciences such as Vittorio Erspamer, who, in 1935, identified “enteramine” (later named serotonin), a milestone that made him, several times, a candidate for the Nobel prize; the same can be said of Rita Levi Montalcini, who discovered and characterized the nerve growth factor.

All of these were great personages who profoundly influenced the growth of clinical neurology in Italy, particularly Giuseppe Moruzzi, who may be regarded as the natural father of all, or a large part, of clinical neurophysiologists in Italy.

A perhaps equally important role was played in the second half of the 20th century by Italians who left their own country’s neurological schools and, developing their careers overseas, have proved to be an inspiration to young researchers choosing to pursue their passion for neurology through residencies in other countries, which had been the pattern of things at the start of the century, prior to the cultural autarchy of the Fascist period. I refer to Salvatore Di Mauro, Gianluigi Gambetti, Amico Bignani, Bernardino F. Ghetti, Giovanni Di Chiro, Cosimo Ajmone Marsan, Michelangelo G. F. Fuortes, and Carlo A. Terzuolo.

These and others were the magnet that drew young Italian researchers, who dreamed about the nervous system (a crucial requirement of a neurologist, according to Percival Bailey), to other European countries and the United States. In this way, many young Italians have spent time in important centres abroad and acquired experience that could be brought back to promote our country’s further scientific growth.

But now, ten years into the 21st century, how influential is Italian neurology in the world?

Alfredo Berardelli and Giorgio Cruccu have conducted a survey on neurological research in Italy in the period 2003-2006. From the analysis of the overall data, which include data on publications in the 20 neurological journals with an impact factor greater than 2, it was found that Italy lies in fourth position, after the United States, the United Kingdom and Germany, a position that is confirmed when considering the 20 top journals (i.e. with the highest impact factor) in the JCR subject category of clinical neurology.

Basically, what this analysis shows is that the role of Italian neurology, founded by the great fathers I have men-
tioned and pursued by individuals of varying calibre, actually has a greater international stature than indicated by the fourth place attributed by Berardelli and Cruccu’s investigation, given that Italy has only the seventh largest GDP and is in twelfth position as regards the level of funding invested in scientific research. This latter observation is a crucial point, especially if we consider that a remark made by Camillo Golgi in 1909 could hardly be applied to scientific research today: “It is through the sum of small steps, coordinated and always proportionate to the strength of the most modest worker, that I was able to achieve the results that the world has deemed worthy of consideration.”

Finally, I close by quoting Jacques Le Goff, whose words justify the tricks of objectivity: “History does not come down merely to positive elements, but manifests itself also, and above all, through the creation of unreal elements that stem primarily from the dreams and desires that, more than current realities, drive the actions of men and women.”

Essential bibliography

2. Bonavita V. I Congressi della Società Italiana di Neurologia dal 1908 al 1971. Origgio (Varese); Novartis 2001
4. Federico A et al. eds Cento Anni della Società Italiana di Neurologia: le Origini e gli Sviluppi. Siena; Tipografia Senese s.n.c. 2011
8. Paradiso A. Omaggio a Leonardo Bianchi e alla sua terra. San Bartolomeo in Galdo (Benevento); Grafica Spalone 2004
12. Zanchin G. La Neurologia nella Storia. Milan; Media Edizioni Scientifiche 1999