

# Maria Montessori between Medicine and Pedagogy

## Roots, actuality and educational perspectives

**Andrea Bobbio**

University of Valle d'Aosta

### Abstract

This paper examines the thinking of Maria Montessori in relation to the contribution of other branches of educational science to the epistemological status of pedagogy. Specifically, it situates the interconnections between Montessori's approach and medicine (primarily auxology and child neuropsychiatry) understood as a *Naturwissenschaften*, as well as the practical implications of this interrelatedness, within a heuristic framework that extends beyond the field of special education. Analysis of Montessori's scientific output around the turn of the twentieth century is followed by a proposed outline of its present-day relevance, in terms of promising avenues of inquiry informed by Montessori's initial ideas and educational work and recent neuropsychological research.

Questo contributo mira a comprendere il pensiero montessoriano in relazione allo studio dello status epistemologico della pedagogia alla luce degli apporti delle altre scienze della formazione. Più precisamente, esso mira a inquadrarne le specifiche interconnessioni con la medicina (in primis l'auxologia, e la neuropsichiatria infantile) in quanto *Naturwissenschaften*, e le sue ricadute in un orizzonte euristico di carattere educativo non riconducibile esclusivamente alla pedagogia speciale. Tale analisi, che prende l'avvio dalla produzione montessoriana di fine Ottocento-inizio Novecento, si proietta poi fino ai nostri giorni evidenziando in sintesi i percorsi di ricerca più promettenti basati sulle iniziali intuizioni ed esperienze di Maria Montessori e sui recenti studi neuro-psicologici.

**Keywords:** Maria Montessori; developmental pedagogy; epistemology of education; pedagogical observation; educational positivism

**Parole chiave:** Maria Montessori; pedagogia dello sviluppo; epistemologia pedagogica; osservazione; positivism pedagogico

## 1. Cultural perspectives, horizons, hermeneutics

Maria Montessori's thinking and work had a truly revolutionary impact on modern pedagogical understandings of education and representations of childhood, inspiring a more congruent image of children and their educability in the contemporary world<sup>i</sup>. In the late nineteenth century, her ideas contributed to an increasing focus on «the importance of the child and childhood, which, in turn, was connected to Darwinian notions of heredity and development that held out the possibility of social reform» (Brehony, 2009, p. 592; Babini & Lama, 2000). A key stage in the development of this new “consciousness” and the recovery of a notion of childhood that had previously been “suppressed” and “altered” (Trabalzini, 2018) played out in the years between the “century of education” and “that of the child”, hence around the turn of the twentieth century. Montessori played a crucial role in this process and her influence is felt to the present day<sup>ii</sup>.

A crucial juncture along Montessori's path came after she had completed her training in medicine and psychiatry, when she took up the study of anthropology followed by pedagogy, also attending the Faculty of Philosophy at Rome's Sapienza University and addressing a national education Conference [Convegno pedagogico nazionale] in Turin on 08-15 September 1898. As chronicled by Babini:

«In the early 1900s, Maria Montessori moved away from psychiatry to engage in educational anthropology. It should be recalled that it was as part of her unpaid work at the Orthophrenic School in Rome, where she taught anthropology and was directly involved in supervising interns, that she devised her first educational experiments with “mentally deficient” children» (Babini, Lama, 2000, p. 119).

The combination of these factors, which were personal to Montessori<sup>iii</sup> but also reflected the broader emergence of a new perspective on the study of human phenomena, led the “Lady Doctor” – as she was known – to develop an educational model that radically departed from the traditional paradigm. At the time, pedagogy was paralyzed by the stalemate between positivism and idealism<sup>iv</sup>, whereby the historic failures of the former had prompted abstract, irrational, and antiscientific responses from the latter (Di Pol, 2007, p. 89). Maria Montessori's original revisiting of the epistemological map ultimately gave rise to the contemporary encyclopaedia of education, or – to be more precise – it threw fresh light on the constitutive relationships among the different branches of knowledge that comprise the educational sciences<sup>v</sup>, while acknowledging that «the explanation of an educational event is never simple; it is often incomplete and, therefore, partly inaccurate. Pluridisciplinary explanation is essential in this field given the complexity of the phenomena to be analysed» (Mialaret, 1978, p. 73).

The broader conversation on the nature of educational knowledge, which in the twentieth century would come to concern all the human sciences, was primarily epistemological – but also social, cultural, and even political – and as such was perfectly embodied by Maria Montessori. The crux of the debate lay in what Schopenhauer defined as a true *Kulturknoten* in contemporary culture: namely the relationship, within the humanization process, between *bios* and *logos* or, in Dilthey's terms, between *Naturwissenschaften* and *Geisteswissenschaften*. Montessori herself was more specifically concerned with evaluating the scope for transferring maturational and

developmental models from the fields of auxology and neuropsychiatry into the pedagogical domain; she set out to identify – among her observations of children in special education and mental health settings – universal constants that would also apply in purely educational settings, including some that had only just been established, such as kindergartens or, even, educational work with new-born children (De Serio, 2017). This debate gradually brought into focus further questions of no lesser hermeneutic importance, including: What was the relationship between medicine and education? How exactly, in the domain of educational research on child development, might quantitative methodologies (using, for example, the instrumentation of physical anthropology, such as weighing scales, anthropometers, pedometers, etc.) intersect with other kinds of measurement – from biographical charts<sup>vi</sup> and intelligence and personality tests (Montessori, 1902) to assessments of interests and learning styles devised to inform the personalization of educational processes? And what of the interplay between individual children's innate characteristics – then the remit of phrenology and characterology (see for example the work of Lombroso which directly contributed to shaping Montessori's thinking) – and the environmental factors to which they were exposed, in settings that varied in terms of their favourability to moral and civic development?

Embracing these radical questions inevitably influenced both the incipient status of pedagogy as an independent science with epistemic standing of its own and the thematization of meanings within disciplines then undergoing a revival or rising to prominence, including fields explicitly evoked by Montessori, such as *educational anthropology, hygiene, or paedology*<sup>vii</sup>. Crucially, this same set of issues later provided a key focus for the twentieth-century educational debate: for example, questions about the relationship between developmental stages and teaching methods would be taken up by Vygotskij (whose interests – like Montessori's – straddled special education, or defectology, and teaching methods) and Piaget (a biologist)<sup>viii</sup>, who was interested in the 'shifting' of Montessori's methodologies from the domain of disease to that of normal functioning and development<sup>ix</sup>.

## 2. Maria Montessori's encyclopaedia of education

As outlined in the last section, Maria Montessori's encounter with education came about historically via a series of intermediate steps, which began with the bio-medical sciences, and included her engagement with both educational anthropology and ethnology. On the one hand, the last-mentioned disciplines were academic niches where Montessori could establish a foothold in a university environment that had previously been almost inaccessible to women<sup>x</sup>. And indeed, her academic career might be seen as following a sort of "inverse emancipation" trajectory: her initially pre-eminently technical interests (she enrolled at the Faculty of Medicine directly after completing her technical secondary school studies, first at the Regia Scuola Tecnica "Michelangelo Buonarroti" and subsequently at the Regio Istituto Tecnico "Leonardo da Vinci") gradually became more humanistic and she ultimately settled down to work in an area that had traditionally already been the preserve of women, that of educating and caring for children. On the other hand, however, these novel subject areas marked out the boundaries of an epistemological dialogue whose contours would become increasingly clear and well-defined as Montessori continued to pursue her studies.

While on the one hand, Montessori viewed educational anthropology as fundamental and as crucially intersecting with experimental psychology (Catarsi, 2020, p. 16), on the other, in part based on her ethnological studies, she also saw as critical the social factors that can make the human biological substrate more or less predisposed to receiving cultural inputs and transforming them into intellectual and ethical-moral attitudes. In her own words:

«Educational anthropology, like all branches of anthropology, studies man from a naturalistic perspective: differently to general anthropology, however, it does not dwell on the related philosophical issues, such as the origins of humankind, theories about monism or polygenism, migrations, or classifications based on race: issues, as we know, that are not easily resolved and on which biological anthropology is centred» (Montessori, 1910, pp. 27-29).

This stance, while situating educational anthropology within the natural sciences, nevertheless signalled a progressive and decisive departure from Lombroso's radically nativist positions<sup>xi</sup> and underscored the interactive nature of the nature-environment dynamic.

In two essays published in 1904, *Influenza delle condizioni di famiglia sul livello intellettuale degli scolari* and *Sui caratteri antropometrici in relazione alle gerarchie intellettuali dei fanciulli nelle scuole*, Montessori departed even more emphatically from purely physical anthropology and purely biologicistic causal explanations (Cives, 1995). Specifically, she claimed that:

«The anthropology that provides a rationale for social inequalities based on caste and sex is already in decline, along with all dogmas that ratify such inequalities. Rather today, it has begun to peacefully and freely enter schools and take its place alongside pedagogy. [...] Thus, along with physiological and ethnological [criteria], a new concept is being added to the criteria for comparing cranial volume; the pedagogical [criterion] of the methodical and progressive exercise of the intellect» (Montessori, 1904, p. 245).

Furthermore, by 1907, Montessori had begun to develop a more congruent and increasing focus on the key role of environmental factors (whether cultural, familial, social, or ethnological) in human development. This is borne out by an essay she dedicated to Professor Enrico Morselli on the twenty-fifth anniversary of his university teaching career, *L'importanza della etnologia regionale nell'antropologia pedagogica*, in which she affirmed that «while pedagogy must adopt a scientific basis for the study of the individual school child – that is to say, it will tend to draw its foundations from anthropology – it cannot overlook ethnological data» (Montessori, 1907, p. 1).

Despite this heightened awareness of psychological, sociological, and ethnological variables, Montessori's pedagogical analyses continued to be based on individual observational data, obtained using a range of instruments, with the aim of learning about children's anthroposcopic and medical histories (including their familial, nutritional, and health backgrounds)<sup>xii</sup>. At this stage<sup>xiii</sup> in the development of her thinking, the Lady Doctor was still inclined to borrow her measurement (and intervention) tools from the naturalistic method, with the explicit goal of “studying subjects, describing them individually, and grouping them on the basis of shared

characteristics” (Montessori, 1910, p. 14). She herself was perfectly aware of this fact, as well as of the resulting aporias, writing that:

«Although we know how to collect anthropological data with technical precision and we possess theoretical knowledge and comparison tables, this does not suffice to make us interpreters of nature. The latter is the most sublime part of the work, which brings us into contact with the most inaccessible part of the individual...almost giving substance to the unknowable» (Montessori, 1910, p. 21).

And on the same theme, Montessori elsewhere stated that: «To measure the head, stature, etc. does not mean, it is true, to educate; but it means following the route that leads there, because you cannot educate anyone unless you have direct knowledge of them» (2019, pp. 2-3). Thus, her key concern had become observing children to identify, in the minutiae of their behaviour, the trajectories followed by their spontaneous self-expression.

### 3. The role of observation

In Montessori's view, after empirical measurement, the next step in constructing a “true child psychology” that could operate outside the constraints of a purely naturalistic framework, was to scientifically proceed towards developing an “objectified subjectivity”, or a form of awareness –simultaneously both human and scientific – that would allow observers to set aside their own personalities and preconceptions in order to objectively capture reality (Montessori, 1910, p. 19). According to Roberto Mazzetti (1971), it was at this key juncture that Montessori laid the scientific bases for *participant observation*, the component that most markedly distanced the application of the scientific method within education from the scientific approach to medicine. In educational settings, “inhabiting the phenomenon”, allows the teacher to *liberate, dilate, and transform* the child's vital space, so as to fully connect with the freedom that the pupil is newly acquiring (Trabalzini, 2017, p. 25). This requires, on the one hand, a rigorous approach to the hard objectivity of scientific data, but on the other, a mindfulness – which educators must develop within themselves – of their own childhood castration anxieties and/or regressive projections on children, and thus of how they might potentially be imposing constraints on children's spontaneous development or impeding the identification of a horizon of experience truly designed to emancipate the child. This twofold objective – of liberating children (both by emancipating them from adults and by enabling them to fully express their human potential as unique subjects)<sup>xiv</sup> as well as of liberating educators from various forms of conditioning (an operation that Montessori described in almost ascetic and mystical terms<sup>xv</sup>) – was the ultimate purpose of scientifically-grounded pedagogy based on observation of the “natural” child (or the child who is progressing towards “normalization”). Paradoxically, only a setting that has been intentionally laid out for children will allow them to express themselves *freely* and spontaneously<sup>xvi</sup>, under the teacher's observant gaze. To put this in Montessori's own words:

We need to reflect upon the fact that children, when left to themselves, often make an effort to comprehend adult language and the things surrounding them, whereas teaching, when it arrives at an appropriate

time and is delivered following a rational method, *makes this effort unnecessary*, and thus *does not tire* children but *allows them to rest*, while fulfilling a desire that they have (2019, p. 184).

Herein lay the key shift in Montessori's thinking, which was operational but consequently also epistemological: «The school must *allow freedom for the development of the activity of the child*, if scientific education is to come into being; this is the essential reform» (2019, p. 10).

Thus, careful observation that was objective, but not materialistic, was the key that would enable teachers to develop a new pedagogical consciousness, and thus to more effectively identify, support, foster, and protect children's individual and unique developmental processes. Nevertheless, adopting a perspective that is reminiscent of Rousseau, Montessori also claimed that: «The idea that life and all pertaining to it go on by themselves, and that in order to study life, *enquire* into its secrets, and direct it, one must observe it and get to know it without interfering with it, is really very difficult to *assimilate* or *put into practice*» (2019, p. 57).

This position, as the critical literature has already brought to light<sup>xvii</sup>, invites numerous objections: how is it possible to deduce purposes, values, and educational objectives (pertaining to the realm of *Sollen*) from mere observation, albeit skilfully introspective and not limited to purely morpho-physiological dimensions? How may we get from the educational observation of individual learners to the educational model of the prototypical Children's House, without objectifying the educational materials and methods that Montessori herself was developing, in part based on her experience with mentally deficient children?

These discrepancies in Montessori's line of reasoning, which she herself never addressed systematically in her writings, are all rooted in an exaggerated, in part even naive, confidence in *observation* (and therefore the dimension of empirical evaluation) at the expense of *hypothetical reasoning* (and therefore the dimension of theory). Indeed, as Redi Sante Di Pol expressed it:

«Underestimating the role and significance of hypothesis is undoubtedly one of Montessori's limitations. Even in her [more mature] writings, she completely ignored this fundamental logical and instrumental category, which in the same years, Dewey was situating at the centre of scientific and educational inquiry» (Di Pol, 2007, p. 95).

These limits led to a budding educational science that was: skewed towards the operational and experimental rather than the hermeneutic side; characterised by a certain constituent theoretical weakness; incapable of independently identifying its own aims; and continuously torn between biology (from which it derived the general principles of development) and politics, which dictated the goals and ideals of education (Matellicani, 2007, p. 271)<sup>xviii</sup>. Nevertheless, it was also an educational science – and here the dimension of epistemological progress and advancement comes into play – that was already conceptualized as a “dual-register” body of knowledge (Metelli di Lallo, 1966), in that it was simultaneously theoretical and practical, and closely anchored to practice yet conscious of its own epistemic complexity.



#### 4. Final considerations

To sum up the main conceptual themes outlined thus far, which facilitate a coherent rereading of Montessori's thinking up to 1910, let us again cite Sante Bucci who, in light of the Lady Doctor's own reflections in *Corso di pedagogia scientifica* (1909), offered the following synopsis of the key developments prior to that date, along with their theoretical and epistemological implications:

1. Educational science, the need for which had been preached for around twenty years and still had not come into existence, was to be established by «following in the wake of the experimental sciences, which had been extremely fruitful in terms of yielding progress» (Bucci, 1990, p. 118).
2. Anthropology and experimental psychology had been brought into schools by applying their methods to education. «However – Montessori argued – educational science cannot consist in the application of other sciences» (*Ibidem*).
3. The proponents of the new education who were responsible for the setting up of educational anthropology committees throughout Italy, failed in their purpose «because they accepted the findings, but then did not know how to relate them to education. They were more partial to philosophical ideas» (*Ibidem*).
4. If this dispute, which Montessori saw as a real problem needing to be solved, was to be overcome, the teacher needed to «himself become a naturalist. It is not enough therefore to know how to measure nature – rather it must be contemplated and observed without preconceived ideas, combining the spirit of the naturalist with a special interest in all that nature has to offer...the natural phenomenon is the child» (*Ibidem*).
5. It follows that respect for the child is the cornerstone of education, «great respect for freedom, but not the freedom of anarchy; rather that which helps to express all that is best in the human soul» (*Ibidem*).
6. Educating typically developing children had much in common with educating children whose development was abnormal, «because the latter are not formed while the former are yet to be formed, and therefore both are at the same stage; and for both, I was guided by the criterion of *providing rational assistance to the development of human individuality*» (*Ibidem*).
7. The new schoolteacher «will thus be educated in positive principles as reliable guides, but above all [will be educated/guided] by experience» (*Ibidem*).

The sixth point, which we have not as yet developed in this paper, was to become a pivotal element in Montessori's rationale for classifying educational science as transformative and poietic: «I understood, as others did not, that scientific education cannot be based on studying and measuring the individual to be educated, but on permanent treatment that is capable of modifying them» (Montessori, 2019, p. 34).

#### 5. Medicine and education

As long ago observed by Mirella Chiaranda Zanchetta (1977, p. 504), Montessori saw anthropology, psychometrics, and experimental psychology – «which allow exact and rational observations of men – as an inadequate solution to the problem of education, because they only lead to a statement on the make-up of the mind, they

do not modify it and leave the educational methods unchanged» (Montessori, 2019, p. 26). In contrast, she drew inspiration from medicine in devising the innovative methods underpinning her educational approach. As Montessori herself wrote in *Corso di pedagogia scientifica* in 1909:

«Purely by chance, I, a doctor, got involved in education, ten or eleven years ago when I was an assistant at the psychiatry clinic of the University of Rome, where I had the opportunity to attend the insane asylum with a view to studying the sick being chosen for clinical teaching purposes, and this got me interested in the idiot children housed in the asylum. It was while working with the idiots that I got the intuition that the question of the mentally *defective* was mainly a pedagogical rather than a medical problem, and I threw myself with passion into the study of this remedial education, and after being in London and Paris to study the education of the [mentally] defective from a practical perspective, I myself began to teach the children like a school mistress. [...] If it is possible to educate an idiot, a rational normal method has been devised, and if the [abnormal subject] is studied using an individual method, *this must give rise to normal education*» (Montessori, 1909, pp. 22-23).

This passage clearly throws up epistemological issues: did Montessori merely transpose psychosensory stimulation techniques from a rehabilitation setting to an (albeit “special”) educational one, as Piaget simplistically maintained, or did the path she chose lead in a completely new direction? How was it possible to make mere neuro-psycho-physiological stimulation into a cultural activity, and thereby to intellectualize the forms and organizational structures that are characteristic of children’s minds and hence of human culture?

In another passage that is in keeping with the one just cited, this time drawn from *The Discovery of the Child*, Montessori continued to formulate these same questions, without throwing any definitive light on the matter, but at least situating the issue within a broader framework:

«From the time when, in 1898-1900, I dedicated myself to the education of defective children, I had the intuition that the methods of Seguin were not merely an attempt at helping inferior beings, the mentally defective children, but that they were based on principles far more rational than those in use in ordinary education: to the extent that even an inferior mind could become capable of development. This intuition became my position after I had left the school at the insane asylum; and little by little, I became convinced that applying similar methods to normal children would lead to a surprising development in their personalities» (Montessori, 2019, p. 25).

This suggests, first and foremost, that medicine provided Montessori with an operational paradigm that was more rational and planning-oriented (as well as more socially authoritative) than the improvised and a-systematic strategies of contemporary education (Sergi spoke of this medically informed approach as “the methodical study of the pupil”). Furthermore, it tells us that the graduated and developmentally appropriate structured materials that Montessori borrowed from remedial education enabled true self-education to occur in carefully and deliberately managed educational settings. Places where it was possible, for example, to select more carefully and analytically the variables to be studied, set up more targeted and systematic observation of the class, and



better match individual factors (timeframes and forms of development) with the educational devices to be deployed.

It appeared to Montessori that the progress attained in the field of special education was made to seem greater than it was by failures in education for normal children, which acted to blunt their intelligence while dulling their senses.

«But, in my opinion, the children from the institution equalled the normal children in the public examinations only because they had followed a different path. They had been assisted in their mental development, whilst the normal children had been stifled and repressed. I thought that if one day the specialized education which had so marvellously improved the idiots could be applied to the development of normal children, the miracle would disappear from the world, and the abyss between the inferior mentality of idiots and normals would never be lessened» (Montessori, 2019, p. 30).

Hence, based on the study of abnormality and infirmity (Bocci, 2016), the task at hand was to develop, with even greater reason, an environment suited to the development of normal children that also took into account the status of borderline subjects, that is to say, the

«Intellectual imbeciles, who are often taken to be lazy and are therefore left in ordinary schools where they are oppressed by punishment that makes true martyrs of them: moral degenerates, whose pernicious influence affects the normal children» (Montessori, 1899).

For these children, Montessori proposed a differential treatment, to be offered by medical educational institutions, whose purpose was, on the one hand to save them from inappropriate medical and psychiatric intervention, and on the other, to offer them a form of social redemption. These children were essentially a collection of unfortunates, whom Lombroso and his current had labelled *congenital delinquents*: the offspring of alcoholics and other outcasts from society. Socially stigmatized and heavily conditioned by their socioeconomic backgrounds, this was a new group of subjects, who from Montessori's educational perspective were ultimately *educable* and eligible for social redemption in light of the most recent scientific discoveries:

«Intellectual idiots and therefore moral imbeciles may be educated, and they possess instincts that may be directed towards good. It is important to distinguish between different degrees of idiocy, all of which may be, at least, improved; in less serious cases, elementary education may be provided (arithmetic, history, geography, etc...) and even the exercise of an occupation» (Montessori, 1995, p. 4).

The call for special classes for mentally deficient children<sup>xix</sup> immediately gives away the fact that Montessori saw dividing lines between normality and disease in children. It also tells us that she understood the extension and adaptation of her methods for use with normal children to imply a radical methodological shift: from a *stimulus-based education*, “which consists of awakening in the mind of the child the man who is asleep there” (Montessori, 2019, p. 29) to a *response-based education* designed for a subject whose “connections with the outside world are innumerable and unbroken. His need is to bring order into the chaos which is created in his mind by the

multitude of sensations which the world has given him” (Montessori 2019, p. 118). A child, in other words, who needs objects that allow him to engage in activity, but that feature inherent constraints (Regni, 2018, p. 53; Regni, 2015). Here, according to Scurati, Montessori had

«The merit of openly stating and demonstrating with facts that treating the deficient was not a solely medical problem, but was inevitably a medical-pedagogical problem, that is to say [a problem] of education, which was based on reactivating the use of sensory resources. When she went on to also consider the education of normal children and youths, she did nothing other than extend this conviction to them. Thus, the idea of the material was born: objects suited to development needed to be offered because it is through these that the child organizes itself» (Scurati, 1991, pp. 24-25).

The concept of material, as is well known, was not new: although particularly central to the methods of Fröbel and the Agazzi sisters, it had long represented a key aspect of children's education, at least from Comenius onwards (Bobbio, 2020). Nevertheless, the scientific underpinnings of Montessori's "things" represented a radical departure from the ideas of past and contemporary educationalists. Her materials were unencumbered by metaphysical assumptions and did not depend on the chaotic, fluctuating, or momentary interest of the child<sup>xx</sup>. Rather she saw them as *means of development* to be experimentally devised as a function of children's mental unfolding, whose purpose was not to supply knowledge, but rather to offer resources for the spontaneous expression of the child's internal energies. This implies that Montessori's approach was based on the perfect synchronicity between the dynamics of development, as identified by scholars of growth and corroborated by individual observation, and the mental work triggered by scientifically-calibrated materials, settings, and educational styles. As observed by Fornaca:

«There is no contradiction between the structuring of the setting in the Children's Houses (child-sized furnishings, tables, cupboards, and chairs), the availability of structured materials for analytical sensory education, and the principles of freedom, self-education, and discreet and competent help from the teachers. Close observation of children, with a continuous eye to their potential, resources, explosions of knowledge and practical skills, are combined in Montessori with a most distinctive developmental psychology, with a view to considering different factors and components (physiological, biological, and psychological presence, setting, culture, freedom, activity, method) that lead out of the "nebule", from the "absorbent mind" towards the development of knowledge-related, linguistic, affective, and cultural clarity, according to a perspective on children that sees them as a new force that is destined, more so than other forces such as social classes, to change society based on universal human values» (Fornaca, 1998, p. 64).

On these grounds, it seems clear that Montessori's dispositive may be deemed to "hold good" today to the extent that it will be possible to validate (in terms of epistemic agreement rather than the identification of precise neurophysiological correlates, given that Montessori [proposed] metaphors for development more so than actual developmental realities) concepts such as *sensitive periods* in children's development; the special nature of the child's mind, which makes it an *absorbent mind*; and the distinctive *spiritual embryo* status that characterizes the very young child" (Baldacci, 2015, p. 65).

These concepts, which Balducci saw as key to understanding Montessori's educational model, were more fully and clearly developed by the Lady Doctor in her later writings, up to and including *The Secret of Childhood*, whose final Italian-language edition came out in 1938, and *The Absorbent Mind*, a book based on the talks delivered by Montessori during the first training course she held after her internment in India, which lasted until the end of World War II. In these writings, in strong continuity with her previous works, she outlined the bases for child psychology as it was then emerging and remains today, organizing them around the following key concepts:

- *Sensitive periods*, defined as “special sensitivities to be found in developing beings, that is, in childhood strata, which are transitory and limited to the acquisition of a particular characteristic: once this trait has been developed, the sensitivity ends; and so, each trait is established with the assistance of an impulse given by a transient sensitivity” (Montessori, 1999, p. 52).
- *Absorbent mind*: defined as the, largely unconscious, property “that enables the ‘absorption’ of culture to a truly remarkable extent”. The powers of the absorbent mind fade out gradually, as the organization of the conscious mind becomes more advanced (2019, p. 358). Within the absorbent mind, “*nebule*” are activated, which guide and organize the activities leading to cultural absorption. These may be compared to the *gene* in a germ cell, which has the power to direct tissues to form and to create specific and complex organs (2008).
- *Spiritual embryo*, distinguished by a psychic energy of its own which precedes movement and sensorimotor phenomena more generally: the most important aspect of human development concerns mental life which is closely connected with movement.

The paradigmatic concepts just outlined form the basis for forthcoming dialogue, of great contemporary relevance and value, between the Montessori universe and current neuro-psychological theories: an exchange that, in the next section, is briefly, and not necessarily exhaustively, summed up with reference to the existing literature.

## 6. Montessori: future prospects

The line of comparative and interdisciplinary inquiry just evoked has been pursued by Regni and Fogassi (2019) in a recent joint study that identified multiple elements of continuity between the two fields in question: education and neuroscience. While bearing in mind the precautions advised by Cambi (2011, p. 135), let us take a brief look at how this path might be developed going forward, by listing leading contemporary research themes that are salient to the work of Montessori.

- *Sensitive periods, critical periods, development of cognitive and sensory skills* in newborns, very young, and young children (Gerhardt, 2006; Sale, 2016). A particularly pertinent line of inquiry is that concerning the neurobiological bases of attachment and its importance in the early years (Bridges, 2010; Feldman, 2016).

- *Nebule, brain plasticity, and learning*, as foundational themes for educational science and its inquiry into the importance of sensorimotor, kinaesthetic, and perceptual experience in the early years (Battro, Dehaene & Singer, 2011).
- The *absorbent mind*, with a direct emphasis on advancing our understanding of the role of experience and action in the structuring of children's minds (Nugent, Petrauskas, & Brazelton, 2008). A key aspect of interest here is the role of sensory experience and action in the development of focused and diffuse attention (Gopnik, 2010).

These lines of inquiry appear to hold promise for a dialogue – in languages that are new, or at least “alternative” to that of educational science – among the various disciplines that investigate the human and that can fruitfully engage with Maria Montessori's thinking. Clearly, such engagement will necessarily always be problematic and dialectical in nature. Furthermore, these particular avenues of inquiry exclude the social (and scientific in the strict sense) implications of Montessori's message: a strong concern for the most disadvantaged, who also possess the inalienable right to education and require care that addresses all areas of their lives (from health to moral and intellectual wellbeing), as well as the need to build bridges and forge connections between paediatrics and education. This last aspect is of great interest within contemporary *social education for children* (and has previously been explored, amongst others, by many of “education's medical doctors”: from Dolto to Winnicott, Bernardi, Bollea, and Romanini). Nonetheless, it is a pathway that has remained largely untrodden, located at is at the intersection of academic inquiry and folk pedagogy; if appropriately developed, it cannot but contribute to medicine, by humanizing medical care, as well as contributing to education, by – finally – endowing it with a more complete anthropological perspective that seeks to equally grasp the meanings of *logos* and the fortunes of the *bios*.

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## Notes

<sup>i</sup> As Baldacci has observed: «Montessori's theory was not organic in the usual sense of the term, but rather a series of concepts and images that, together, supplied a rationale for her method» (Baldacci, 2015, p. 65).

<sup>ii</sup> Along with Olga Rossi Cassottana, «we also believe it crucial to note that the great scholar, doctor, and teacher, with her in-depth reading of psychological factors and her inexhaustible desire to fathom childhood's every 'secret' - to paraphrase the title of one of her best-known works - as well as its specific character with respect to the other life stages, entered the mind of the child with such humility and judiciousness that she was able to grasp its key features and hence to rewrite the guidelines for education. For her, the two terms 'pedagogical' and 'didactic' and the concepts underlying them, were to be viewed as inextricable, given that one cannot exist without the other» (Rossi Cassottana, 2008, p. 34).

<sup>iii</sup> The personal circumstances that came into play included Montessori's romantic liaison with Montesano (1895-1900), out of which her son Mario was born in 1898. The pregnancy, which was kept secret, must have been a considerable source of distress to the Lady Doctor, now torn between the roles of mother and scholar.

<sup>iv</sup> Montessori herself offered an eloquent historical example of the disjointed state of the discipline in her work *The Discovery of the Child*: «Whilst Pestalozzi, in Switzerland, became 'the father of a new affective education', in Germany half a century later Fechner and Wundt founded experimental psychology. The two currents grew and developed separately in the schools. Academic pedagogy continued to evolve on the old foundations, whilst side by side mental tests were given to the students which, however, did not affect education in the least» (Montessori, 2019, p. 26).

<sup>v</sup> The implications of this pluralistic vision of education were long lasting and indeed persist today, as observed by Broccolini: «The Lady Doctor was the first to speak of the need to draw on anthropology, biology, sociology, psychology, psychotherapy, and psychoanalysis in educational processes, thus setting in motion the pluralization of the question of education which culminated in the establishment of the contemporary educational sciences, and laid the scientific bases for pedagogy itself as a trans-disciplinary field of knowledge» (Broccolini, 1993, p. 147).

<sup>vi</sup> Montessori conceptualized the “Biographical Chart”, a tool borrowed from Sergi who first proposed it in 1886, as focused on two key educational tasks: on the one hand, building up and continuously updating knowledge about the individual child, and on the other, fostering an increasingly deep relationship between the school and the child’s family. Montessori further wrote that «the Biographical Chart will be a document that guides each individual in their ongoing self-education» (Montessori, 1910, p. 391). Broader recognition of the biographical chart led to its official adoption in the 1914 curriculum for nursery schools.

<sup>vii</sup> In relation to the latter discipline, Paola Trabalzini commented as follows on the meaning and importance of Montessori’s 1903 lecture on *Educational Anthropology*: «With a view to drawing together and coordinating lines of scientific inquiry about the child ‘that can lay the ground for and contribute to modern pedagogy’ as then being called for by Eugenio Blum, [Montessori] reevoked the concept of the emergent discipline of *paedology* first introduced by the German scholar O. Chrismann in 1897, to propose an organic science of the child encompassing both normal and abnormal development in the physical, psychological, and social domains. [...] Paedology was to be further divided into *general* paedology studying the student’s overall psychophysical make-up; *laboratory* or experimental paedology whose complex studies would lay the ground for defining applied fields such as physical, physiological, and sensory education, as well as health guidelines; and finally *introspective* paedology, which would draw on the earlier discipline of psychology but introduce an emphasis on the direct observation of individual children» (Trabalzini, 1997, p. 10).

<sup>viii</sup> Like Piaget, Montessori had studied biology in depth before entering the field of child psychiatry. Specifically, as documented by Trabalzini, she “had followed a degree program in Natural Sciences for two years, from 1890 to 1892, taking courses in botany, zoology, experimental physics, histology, general physiology, comparative anatomy, and general and organic chemistry. Furthermore, her writings contain numerous references to the work of the naturalist, which requires skill in observation, description, data collection and classification, in addition to qualities such as patience and the ability to wait” (Trabalzini, 2017, p. 61).

<sup>ix</sup> On this topic, Piaget himself wrote in 1935 for the *Encyclopédie Française*: «Maria Montessori in Italy, who was entrusted the task of educating retarded children, devoted herself to analysing the abnormal. Discovering that these cases were more psychological than medical brought her face to face with fundamental questions about the intellectual development and education of children. By means of a most clever generalization [Piaget continued], Montessori immediately applied to normal [subjects] what she had been taught by the mentally weak: in the early stages of development, the child learns more by doing than by thinking; suitable material, which serves to stimulate action, leads to learning much more rapidly than do excellent books or even language itself» (cit. in Scocchera, 1990, p.7).

<sup>x</sup> As claimed by Matellicani: «Montessori almost certainly decided to enrol at the Philosophy Faculty not only to enrich her knowledge base, but also with a view to advancing her academic career. This is borne out by her 1903 work entitled *Educational Anthropology* and dedicated to the Honourable Luigi Credaro, then-professor of education at the University of Rome, who had commissioned her to deliver a lecture to the philosophy students on the theme of educational anthropology. On that occasion, she showed off her scientific training by presenting her student audience with the most recent developments in biological and educational research, emphasizing the importance of scientific competence as the required basis for a truly modern paedology, understood as the global study of the individual psychophysical make-up [of the child]» (Matellicani, 2007, p. 93).

<sup>xi</sup> As articulated by Rossi: «[in the work of Maria Montessori] the nature of humankind, accessed using the instruments of psychological anthropology, is not ossified and petrified, instinctive and unchanging matter, as it had been described, for example, by Lombroso and Morselli, [who saw it as] modifiable solely via biological heredity and [as] ontogenetically fixed. [The



human person's] constitution is not definitive at birth, but rather, even natural traits may be modified during ontogenetic development, if addressed using suitable tactics» (Rossi, 1988, p. 200).

<sup>xii</sup> Rossini has commented on this in the following terms: «This [anthropological] method was based in the first place on observation (anthroposcopy), measurement (anthropometry), and the interpretation of such data based on statistical procedures. Nevertheless, the data analysis was preparatory to the summary assessment, which was a matter for educational anthropology. The latter discipline, which studied human ontogenetic development and aetiological variations, defined itself as an “open science” ready to continuously incorporate new contents, and was mainly physiological in its focus but without overlooking psychological factors. Hence, educational science was born from the intertwining of general anthropology, whose purpose was to study individuals and individual characteristics, and educational anthropology, whose purpose was to educate humankind with a view to preventing rather than curing. Its defining characteristic was the introduction of observational methods into the field of education, as Sergi had previously done in the field of anthropology, while emphasizing the key contribution of studying the individual to the schoolchild's educational trajectory» (Rossini, 2020, p. 46).

<sup>xiii</sup> Franco Cambi has offered the following reading of this first phase in Montessori's thinking: «Her positivistic phase was shaped by the models of her teachers, [among whom] Cives and Fornaca rightly recall Lombroso, Sergi, and De Sanctis. From these, Montessori drew an idea of science in which measurement and determinism were indeed central, but alongside evolutionism and physiology and psychiatry, as well as hygienic medicine with its progressive social function» (Cambi, 2015, p. 127).

<sup>xiv</sup> Montessori herself had this to say: «There exists only one true biological revelation: the *living individual*; and it is towards these single individuals, observed one by one, that education ought to be directed, that is to say, the *help* required for the normal expansion of life. The child is a body that is growing and a mind that is unfolding; this dual physiological and psychological form springs from one eternal fount – life. Their mysterious potentialities ought not to be either dissected or crushed out by us; we must *wait* for the succession of events in which they show themselves» (2019, p. 69).

<sup>xv</sup> For example, Montessori wrote in *L'Autoeducazione nelle scuole elementari*: «Man's spiritual life can only be fused with the virtues of the scientist when the object of study and the scholar can be fused together. Then can science become a source of wisdom and join true positive science with the true science of the saints» (1916, p. 101).

<sup>xvi</sup> Montessori «refused to identify freedom with a disorderly explosion of spontaneity in a primitive environment: liberty means liberation and suppression of the circumstances hindering positive personal development, on both the physical and mental fronts. It follows that children, being unconscious of their own internal needs, cannot liberate themselves, while adults, who generally lack the scientific training required to recognize and interpret the needs of children, end up creating, rather than eliminating, new and more serious obstacles» (Geymonat & Tisato, 1981, p. 416).

<sup>xvii</sup> As pointed out by Geymonat and Tisato, Montessori was alternately «accused of excessive child-centredness, biological naturalism, artificiality, inflexibility, and individualism» (Geymonat & Tisato, 1981, p. 419). A particularly harsh critique of Montessori was advanced by De Bartolomeis, in relation to the “experimental science criterion” underpinning the methodological and cultural formulation of her work (De Bartolomeis, 1953, p. 155). For a broader examination of the influence of Montessori's thinking on contemporary educational science in Italy, see at least the following monographs by Bertin (1975); Cives (2001); Finazzi Sartor (1973); Leonarduzzi (1967); Regni (1997); Schwegman (1999); and Socchera (1990). For a meta-analysis of the international literature, see Tornar (2001).

<sup>xviii</sup> This passage from *Antropologia pedagogica* does – in reality – display some ambiguity. Having quoted Perez, Montessori added that: «Educational science demands combining [...] the *natural* perspective, which stakes out the biological make-up of the human being, and the *moral* perspective, which [...] interprets and forms the social human being. [...] Give to biologists that which belongs to biologists and to philosophers that which belongs to philosophers: but do this in such a way as to have them harmoniously unite their respective work» (Montessori, 1903, in Matellicani, 2007, p. 271).

<sup>xix</sup> This notion was already present in Montessori's 1904 work, in which, with a view to avoiding injustice and exclusion, she hypothesized streaming (albeit only temporarily) school children, including those who were socioculturally disadvantaged, into



groups of similar ability, «separating the physiological aristocrats from the proletarians, so as to avoid causing the latter the humiliation of being eternally last, demotivated and mortified, and destined we might well add to academic death» (Cives, 1995, p. 9).

<sup>xx</sup> Dina Bertoni Jovine claimed that: «[Montessori's] is a rational material that mirrors the gradual formation of images, ideas, and logical chains of association. It prompts children not only to engage in independent activity, but also to self-correct, gain mastery over their own resources, exercise a spirit of observation, and develop emancipatory skills» (Bertoni Jovine, 1976, p. 551).

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**Andrea Bobbio** teaches general and social pedagogy at the University of the Aosta Valley. A member of the board of Siped (Italian Society of Pedagogy), he is coordinator, with Anna Bondioli, of the section “Pedagogy of childhood between present and past”. He is the author of over 170 scientific publications in national and international books and journals.

**Contact:** a.bobbio@univda.it

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