Containing Multitudes: Herbert Spencer, Organisms Social, and Orders of Individuality

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James Elwick
York University

It is well known that Herbert Spencer likened societies to organisms, claiming that the different parts of a community were structured, functioned and developed in ways that resembled an organism. What is less appreciated is that Spencer trafficked in the other direction. Just as there was a "social organism", so too was there what I will call an "organism social." Organisms were like societies, with body parts retaining degrees of autonomy. Since "an ordinary living organism may be regarded as a nation of units that live individually, and have many of them considerable degrees of independence, we shall perceive how truly a nation of human beings may be regarded as an organism" (Spencer, 1877: 473). The implication of the organism social was that just as biologists could reveal facts about society, in turn "SOCIOLOGISTS CAN HELP BIOLOGISTS", shouted the Scottish anatomist Sir Arthur Keith in a retrospective on Spencer's social organism (1924: 5).[1]

With its vision of quasi-independent parts, the organism social made problematic any easy definition of a biological individual. Spencer sought to answer this point by defining an individual as any organized unit that persistently distinguished itself from its surrounding environment. Such a definition made it possible for an individual to be a part of a larger organization-individual, while at the same time being constituted itself of smaller part-individuals. What was their relationship to one another? Spencer envisioned a hierarchy of first-order, second-order, and third-order individuals: orders of individuality. This vision was shared by contemporaries and by Spencer's followers, and orders of individuality led to conceptions such as the "superorganism" and a brief flurry of what came to be called "organicism" in late nineteenth century sociology.

Spencer's meditations on orders of individuality tend to be overlooked because he is famous as an "individualist", a champion of the self-reliant individual. Yet orders of individuality challenged a person's autonomy both from without and from within. From the outside, a person could be seen as a member of a larger individual: a part of a social organism, a

1 I am grateful to Howard Hill for providing me with this rare publication.

constituent element of a superorganism. Yet that person could also be seen as a microcosm of smaller individual-parts, her conduct as an individual the aggregate of all of the parts' relationships and interactions. In Spencerian thought, a person could be sociologized from the inside.

In setting out the Spencerian organism social, this paper will emphasize that Spencer was not simply a philosopher of *evolution* as he is best known today*;* he was also a philosopher of *organization.* This paper then becomes a chronological account of how his perspective emerged. On the one hand he was familiar with religious and political organizations arranged by local groups forming still larger groups which in turn made up still larger ones: aggregates of first, second, and third orders. An advantage of this organizational model was to allow both unity of purpose and sub-level autonomy. On the other hand Spencer became familiar with the research method of analysis, which worked by disintegrating large and complicated entities into their simplest possible elements. His early writings to 1857 combined both analysis and nested orders.

The paper then moves to 1857, on the eve of Spencer's *System of Synthetic Philosophy.* At this point, it discusses how Spencer made the definition of an "individual" - be it a cell, a ganglion, a psychological "net-work", a person - far more abstract. An individual was any unit capable of maintaining a "dynamic equilibrium" between its internal and external environment. His definition also became more relativistic: what counted as an individual depended upon the observer's perspective. Spencer began to set out individuals in different orders, with individuals constituting larger individuals in what to us might best be described as a formation of Russian dolls. Such a vision of nested orders in turn went on to influence not only sociologists, but also biologists and sociologists. This paper finishes by considering Spencer's legacy - if the subsequent repudiation of many overt Spencerian details, while retaining his underlying organizational model of individuals within individuals can really be considered a legacy.

SPENCER'S ORGANISM SOCIAL

Perhaps Spencer's most vivid image was the "social organism", which likened a society to a biological entity; the term first appeared in his 1843 *Proper Sphere of Government* (17).[2] It is helpful to quickly recount some of the reasons why this image of a social organism was so useful to him. First, it allowed him to depict the division of labour in both societies and organisms. More complex social organisms displayed greater amounts of internal economic and social differentiation: just as plants and animals showed greater levels of internal physiological specialization (that is, dedicating a specific organ or system to a physiological function, such as

[2] Spencer later claimed that he did not know of Comte at this time ('he was to me but a name' - 1904: i255-56), let alone Comte's prior use of the term 'social organism'. This is quite likely, given Spencer's haphazard reading habits. Indeed any claim of priority to the term "social organism" are problematic, given the long history of drawing analogies between societies and organisms in Western political thought, at least since Plato and Livy (see the next footnote on this). Another possible inspiration for Spencer was the 'religious organic' language appearing in *The Nonconformist* immediately before Spencer's own use of the phrase; this is discussed in the next section.

lungs to respiration), so too would there emerge individual citizens or industries that specialized in a particular social or economic function. And just as a highly specialized organ was kept alive by the work of other specialized organs - the work of the lungs supported the heart and vice versa - each specialized citizen did not have to fulfil every one of his needs for survival, since he could depend upon contributions made by citizens working in other realms. Second, the social organism enabled him to depict 'evolution' in both the individual and the collective, in biological systems and social systems: evolution was the progressive specialization of the division of labour. Embryo, new society, species, and so on developed in the same way: starting out simple and unspecialized, but becoming a bundle of complex and specialized - yet integrated - systems. Evolution both biological and social was a process of internal specialization, a transition from the "homogeneous" to the "heterogeneous", as shown by the embryologist Karl Ernst von Baer. von Baer had proposed this in 1828, but only to explain the development of biological organisms (von Baer, 1828; *idem,* 1853). But Spencer made no distinction between living organisms and societies.

Indeed, if the notion of a "social organism" first appeared in Spencer's work in 1843, and if Spencer only came across von Baer in 1851 (Spencer, 1904: i384), then it is reasonable to infer that Spencer had non-evolutionary reasons for initially invoking the "social organism". One reason for this is because in 1843 he was writing for the Dissenting audience of the *Nonconformist,* who were quite familiar with such organicizing images: more on this below. Spencer would then later transform this into a common idiom in which to express the relationship between a person and her society. In Western history, society has been likened to an organism since at least Plato; in England, Thomas Hobbes's polity of the Leviathan was depicted as an artificial man. Spencer would later explicitly distinguish himself from such predecessors[3] by likening society not to a human but to a simple marine invertebrate ([Spencer], 1860: 94-5). This was partly to undermine the authoritarian implication of using humans as models: since higher vertebrates tended to be more unitary and obvious individuals under a central control, such an image could be used to support *dirigiste* and authoritarian governments, an assumption held by T.H. Huxley which which led to a later disagreement between the two friends (Elwick, 2003). Hence the life sciences and its images gave Spencer some organizational models with which to explain how society worked.

As Sir Arthur Keith noted, however, Spencer believed that sociology could also help biology. He spoke of modes of social development being "paralleled" in an individual organism and its constituent units; social structures gave us "hints" at understanding the makeup of "individual organisms" (Spencer, 1864-1867: i376, i373, i162-4). In other words, Spencer believed that the different parts of an organism tended to work as a kind of *community,* with each part retaining some autonomy. Thus while marine invertebrates and other simple organisms better illustrated this disunity, it was still the case that "every organism of appreciable size is a society" (Spencer, 1877: 480). The parts of an individual organism had "special" and not always

[3] His original anonymous review article "The Social Organism" set out to review new editions of Plato and Hobbes.

harmonized "interests". Organs "competed" with one another for blood. A cell in a simpler animal was free to "follow its own interests" and pursue its "individual" life without direction from a central nervous centre. Everything from the internal organs to the cells of higher vertebrates were relatively autonomous. White blood cell activity resembled free-moving amoebae; and anyone believing in top-down control of the body would be quickly disabused of this notion by consciously 'ordering' their heart to stop pumping (Spencer, 1871: 631, 640-2; 1877: 472).

The notion of organisms with quasi-autonomous body parts may seem odd to us now, but this was not Spencer being idiosyncratic or projecting his mistaken political and social views onto the more objective and empirical life sciences. In the century before Spencer, physiology was often called the study of the "animal oeconomy" (Canguilhem, 1988: 87-8; Cross, 1981: 64-5, 74-5). For eminent researchers such as John Hunter, body parts such as the heart and the lungs "sympathize[d]" with one another (Hunter, 1786: 116-17; 1861: 371); the term "sympathy" would carry on into the nineteenth century to describe different body parts agreeing with one another (Winter, 1998, 308). During Spencer's life the notion of a community of body parts was bandied about by elite European biologists as well (Nyhart and Lidgard, 2011, 378-81). After 1859 Darwinism may have shifted the perception of how these parts interacted - away from sympathy and towards competition - but body parts were still seen as acting autonomously. We shall see how Ernst Haeckel would contact Spencer in 1868 because he saw commonalities between Spencer's notion of aggregates of first, second and third orders of individuals, and his own "tectology," which also proposed levels of individuality. which One of Haeckel's students, the Prussian zoologist Wilhelm Roux, began his career by extending Darwinian natural selection to the inside of the body, a view of "struggle" succinctly captured by the title of his first book: *Der Kampf der Teile im Organismus* (1881). This work inspired August Weismann to write about "germinal selection": an internal Darwinian process occurring "in every kind of units [sic] within the organism, -not only in cells and tissues, but also in the smallest conceivable living particles, which I have called 'biophors.'" (A. Weismann, 1894: 12-13; C. Weismann, 2011: 60-61). Weismann is an especially interesting figure to link with Spencer, since modern histories of biology usually only discuss their debate over the existence of a Lamarckian mechanism of selection. Seen through the lenses of evolution and heredity, Weismann and Spencer are depicted as natural opponents. Yet when seen as bio-philosophers of organization, both Spencer and Weismann share a common perspective - each taking for granted the relative autonomy, the independent 'interests', of even the simplest body parts.

Spencer was also perceived to be as expounding upon the organism social. In the 1880s one physiologist read Spencer as stating that "the great physiological problem of the living body is really one of Sociology": any body was a community of cells, each one a living individual serving its own interests first, yet dependent upon the activity of its neighbour-cells (Sewall, 1886: 2). And we have seen how in 1924 Keith noted Spencer's vision that the the "living body, be it of man or of beast, is in reality an assemblage of microscopic units knit together so as to form a society or commonwealth." (Keith, 1924: 3). Both commentators saw Spencer as

depicting organisms as societies composed of smaller, relatively-autonomous entities. The interesting story is how we came to forget this.

SPENCER'S ORGANISM SOCIAL TO 1858

From a relatively young age, Spencer was habituated to two views that led to the organism social. First, he became familiar with an organizational model in which units compounded together in a way that preserved some autonomy of each unit. Second, he learned about a disintegrating technique called *analysis*, a method used in many sciences either orthodox or heterodox. Spencer would apply both compounding and analysis to orders of individuality and superorganisms.

Nested Orders

Over his long writing career, Spencer was never terminologically consistent when denoting an organizational model in which simpler entities at a lower order combine to make more complex entities at the next higher order, which in turn combine to make entities at the next higher order. Sometimes he referred to "corporate bodies" (1851: 17); to "composite states" or "compound states" (1855: 589, 590); to an "aggregation of units into organized groups" (1860: 280), or to compositions of "the first, second, third, or fourth order" (1864-67: 5). Despite these different identifiers, I believe this organizational model to be of central importance in Spencerian philosophy, so to reconcile the reader's need for consistency while also trying to stay true to Spencer, I will use the phrase "nested orders."

Interestingly, Spencer seems to have first learned about nested orders not from science, but religion: specifically, the way in which certain religious groups were organized. Such Dissenting religious groups were inhabited by various members of Spencer's family. The system originating in the late eighteenth century saw Wesleyan Methodists worshipping together in local class-meetings, with twenty members in each. When it was time to send a delegate to a more general district meeting, each class-meeting would select a single delegate out of the twenty members. At this local district meeting, one delegate would again be elected and sent to go up to a still more general district meeting. This process continued all the way to the selection of delegates to attend the national Wesleyan Conference (Watts, 1995: 30-31; Spencer, 1904: i20-21, i41, i82-3).

This Wesleyan form of organization was a new innovation that was subsequently imitated by English political reform movements (Perkin, 1969: 358-9). One reason for the success of nested orders was that it ensured that the entire national group of Wesleyans followed common principles while at the same time allowing some autonomy for each local class-meeting. When a class-meeting felt overly restricted by the larger Conference, it might secede and set up its own Dissenting religious splinter group. John Spencer, one of Spencer's lesser-known uncles, did just this in 1831 by leading the secession of his own local class-meeting, a secession which led to a

fairly short-lived group known formally as the Arminian Methodists and informally as the Derby Faith Folk (Elwick, 2003: 42-3; Brigden, 1899: 124; Spencer, 1904: i24-5). Spencer was eleven years old at the time of the secession. By age twenty, he would participate in a democratic reform movement organized in exactly the same way as the Wesleyan Methodists. This Complete Suffrage Union was led by Spencer's energetic uncle Thomas, who got Spencer to serve as the group's Derby Secretary. Indeed it was Spencer's participation in the Union which prompted his first publications: in letters to editors he defended that group and began to advance a "voluntarist" approach to politics (that the State should not interfere in social, religious, and economic matters) (Duncan, 1908: 35; Spencer, 1904: i251).

Spencer sent these letters to Edward Miall's *The Nonconformist* in 1842, as common interests were shared by Spencer's political Radicals and Miall's religious Dissenters. Fascinatingly, anonymous writers in that journal - possibly Miall himself - used organic imagery in various polemics. Thus the journal's statement of principles, appearing on the very first page of the inaugural 1841 *Nonconformist,* spoke of Acts of Parliament being detrimental to freedom because they "pinioned" "every limb of the nation" and prevented "spontaneous growth". An 1842 editorial argued for the rights of religious minorities, because majorities could turn into mobs, and everyone knew that a mob acted as a "single body -- a distinct individuality -- a unit; and when possessed of supreme power is as very a despot as any one man who has ever held in his hands the reins of dominion". Still another *Nonconformist* article noted how religious groups (seceding religious groups, perhaps) reproduced themselves like plant seeds: "germs of future societies" spread in all directions and ripened, or stunted by, external circumstances ('Address', 1841: 1; 'Reproduction', 1842: 762; 'Self-Adjustment,' 1842: 448). While Spencer did not write these articles, each image can be found in his later works - the 'exogeneous' mechanical and artificial device unjustly restricting 'endogeneous' organic development; the imaginative jumping of orders of individuality from group of people to individual body; the emphasis on the "fissiparous reproduction" (that is, budding) of simple social groups. It is telling that while the phrase "social organism" cannot be found in Spencer's 1842 letters to the *Nonconformist,* it does appear in his first book, *The Proper Sphere of Government,* which reprinted twelve of those letters (1843: 17).

Analysis and compounding

As a young man Spencer also learned about the research technique of *analysis.* This method worked by dividing up complex entities into simpler parts, and those simpler parts into still simpler ones, until one could divide no further. What remained were "elements." The exemplary use of this technique was in chemistry. Until the eighteenth century air had been deemed indivisible, making it one of the four Aristotelian "elements"; then it was shown to be divisible into simpler gases, and then into still-simpler chemical elements such as oxygen. What this meant was that many complex and apparently simple chemicals were actually compounds of simpler elements. Spencer practiced chemical analysis with his father William George at the

Derby Literary and Philosophical Society, for instance pouring acid upon iron filings in order to produce hydrogen and sulphate of iron (Spencer, 1904, i86; Elliott, 2003, 15).

Meanwhile the young Spencer used analysis to communicate. His father William George's system of "lucid shorthand" worked to "analyze words, and, as it were, to decompose them into their primitive elements". Just as oxygen and hydrogen combined to form water, language-elements such as simple vowels or suffixes could be combined with each other, forming double and triple vowel-combinations or "affixes of the second order": these "compound sounds" could be represented by shorthand signs "being formed by the union of the signs of the simple ones." Between age thirteen and twenty Spencer used "lucid shorthand" to record his uncle Thomas's sermons and to correspond with uncle and father. By 1843, at age twenty three, he was still writing correspondence and taking dictation with this system (Spencer, 1894: 9, 14-15, 20-21, 24-25, 30), indicating how familiar he must have become with this idiosyncratic reading and writing system.

Spencer also used analysis in geometry. Most dreaded the common study of Euclid, but William George Spencer was a Derby teacher who actually instilled a love of geometry in his students. His unusual pedagogical methods were compiled and published as *Inventional Geometry* (1860). It is clear that his son also loved geometry: after getting a job as a railway engineer, moving to London, he resisted that city's temptations by solving problems in *Chamber's Euclid* (1837) after work (Duncan, 1911, 25-6; Spencer, 1904, i134, i149). If we look at this book, we see it explaining geometry as partly working through analysis: where "synthetic" geometry combined simple axioms into new truths; the reverse process of "analytical" geometry clarified complex specimens of geometrical reasoning by dissolving them into their simple constituent axioms. (Bell, 1837, ii-v). Spencer would carry this idiom of geometry into his later work,[4] as well as the method of analysis, where we see the words 'compound' and 'element' and 'synthesis' as well.

Spencer's combination of analysis and orders of organization

Writings that followed Spencer's *Proper Sphere of Government* combined analysis with nested orders. He came to see organizations both biological and social as compounded of elements within elements, all possessing various degrees of autonomy. Spencer's phrenologizing of the early 1840s followed the principle that the mind was a "plurality of faculties" (Spurzheim, 1834: 10), and he argued that phrenologists used analysis in the style of chemists. Just as chemists disintegrated air into simpler elements, so too should the phrenologist analyse apparently-simple mental faculties into simpler ones (Spencer, 1844-1845: 316).[5]

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[4] Compare, for instance, the phrase appearing in *Social Statics*, 'Things which are equal to the same thing are equal to one another' (1851, 31): an definition matching almost word-for-word with *Chambers's Euclid (*Bell, 1837: 5-6).

[5]It is important to note here that despite likening the method of phrenology to chemistry, Spencer was not trying to "reduce" mental functions to non-living chemical operations. Analysis took two forms: one was reduction, the other

Between 1842 and 1858, Spencer learned about analysis and nested orders in more orthodox sciences. One was physiology, where the economists' notion of the division of labour had been profitably applied by the Anglo-Belgian zoologist Henri Milne Edwards. In 1827 he claimed that an individual organism could be seen as made of individual "elements" (*élémens*), each of which acted as a workshop (*atelier*) contributing to the "animal economy" (*l'économie animale*). The more specialized each workshop, the more 'life' that would be produced by the organism in total; more complex animals were 'higher' because they possessed more specialized workshops to produce this additional life (Milne Edwards, 1827: 340-41). What became known as the "physiological division of labour" was discussed by Milne Edwards in English publications (1836a: 172–3; 1836b: 753, 762-3) as well as *Bridgewater Treatises* (Roget, 1834: ii.105; Limoges, 1994: 318). William Benjamin Carpenter, a physiologist using this concept in his well-regarded textbooks (Carpenter, 1839: 391-3) became one of Spencer's key biological informants. Yet Spencer was already well-prepared to use this conception, having first heard about the division of labour at age 15, after reading Harriet Martineau's *Illustrations of Political Economy* (1834; Spencer, 1904, i159-60).[6] It was thus quite easy for Spencer to extend the principle and describe development, or 'evolution,' in terms of the progressive specialization of an organism's internal division of labour.

Interestingly, Milne Edwards's own conception of the physiological division of labour emerged out of the belief that the individual organism was itself compounded out of part-elements. Milne Edwards had taken a principle used to explain the economic operations of a society, occupied by numerous individual people, and then scaled it down into a microcosm. Something used to explain a community could also be used to explain the inner workings of an individual animal. It was this imaginative shifting up and down of orders that I think Spencer found attractive, because he was already doing this in phrenology. Spencer's earliest writings are just as much phrenological treatises as they are political tracts: one part of *The Proper Sphere of Government* depicts each person as a bundle of "moral and intellectual faculties", with happiness requiring each faculty to be exercised and freed from restraint. Another part claims that a just society had all of its "elements in equilibrium" (Spencer, 1843: 34-5, 5-6). In the first sentence, one could substitute "person" for "faculty" and retain the sense of the passage; in the second, one could read "element" as denoting either a mental faculty or a person.

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was localization. Reduction took living things or processes and expressed them in terms of the nonliving and physical - ultimately making sociology into physics and matter in motion. But localization preserved the agency of the elements. Indeed critics held localization to be unscientific because it *did not* reduce - phrenology didn't explain the brain but simply redescribed it, "breaking up the brain into twenty-seven small brains", complained neuroscientist Pierre Flourens (1842: 105).

[6] Interestingly, there are some proto-evolutionary notions in one of Martineau's stories. Her first tale,“Life in the wilds”, features a group of British emigrants to Africa who after an attack are reduced “from a state of advanced civilization to a primitive condition of society”. The settlers rebuild the colony by using the division of labour (Martineau, 1834: i 22, i 28).

With 1851's *Social Statics*, Spencer's phrenological language was leavened by more orthodox physiological principles. Each person was a "congeries of faculties" and a "commonwealth of monads" (that is, cells); to understand humanity one had to "analyze that humanity in its elementary form - for the explanation of the compound, to refer back to the simple." Primitive social organisms, meanwhile, were compounded out of repetitive element-individuals akin to simple polyps, which lacked any specialized physiological systems (Spencer, 1851: 451-3, 280, 16). The shifting back and forth between the social and the organic here is obvious (La Vergata, 1995: 209); what also merits attention is Spencer's continuous jumping up and down nested orders, as he had already done with phrenology. A society is a bundle of simpler element-people, with each element-person being himself a bundle of simpler element-faculties. Milne Edwards had already shown that such order-jumping might lead to interesting new speculations, and we also see this tactic used even in the *Origin of Species* when Charles Darwin compared the diversification of plants and animals in a single geographic area to Milne Edwards's notion of specialized and diversified organs in a single body (Darwin, 1964: 115–16). Darwin was struggling to articulate what would later become known as ecological 'niches'.

By September 1852, Spencer had contacted T.H. Huxley regarding "the production of composite animals by the union of simpler ones" (Spencer, 1852b). Appearing in that month was Spencer's paper "A Theory of Population", which discussed how some marine invertebrates merged "many incipient minor individualities into one large individuality" (Spencer, 1852a: 483, 485). This paper also discussed the relatively new "cell theory" of botanist Matthias Schleiden and Belgian zoologist Theodor Schwann, which inspired Spencer's remark about bodies being a "commonwealth of monads". The cell theory analysed the organism into elements called "cells" that worked harmoniously as part of a larger organism. It also considered those cells to be distinct, elementary individuals (Schwann, 1839: 2). Cells combined into nested orders, making tissues; tissues made organs; organs combined into physiological systems. Spencer's "Theory of Population" merged cell theory with the division of labour: unspecialized cells in the simplest organisms had the power to secede and live independently; specialized cells in more complex organisms would soon die upon gaining independence (Spencer, 1852: 486), perhaps akin to a certain uncle's Derby Faith Folk.

By 1855 Spencer was writing about analysis in the neurosciences. The previous twenty five years had seen neuroanatomists disintegrating the nervous system into its two simplest elements: the grey ganglia which generated nervous force (energy), and the white nerve fibre which transmitted that force. Taken together, a single ganglion-fibre set acted autonomously in the simplest animals. Comparative anatomists had showed that nervous systems from the human to the lowest invertebrate were simply compounds of these two elements - all that distinguished the human nervous system from others was that humans possessed more ganglia-fibre compounds, laid out in a more concentrated way. Meanwhile, neurophysiologists had shown that complex nervous activities, such as instincts, were compounded out of simple reflexes ([Carpenter], 1846: 519; Jacyna, 1984: 78; Elwick, 2007, 47). Spencer's 1855 *Principles of Psychology* related the autonomy of these ganglia (492-94) and also embraced the analytical

method in psychology: one started with the most complex phenomenon (human consciousness), then with "successive decompositions" one would "descend step by step to the simpler": consciousness was composed out of cognitions, cognition out of instincts, instinct out of reflex-elements. Even the ego was not unitary but was instead a "composite state of consciousness": the "entire group of psychical states" that we mistakenly supposed constituted our "psychical self" (Spencer, 1855: 71, 479, 539, 617-18). Thus human consciousness was composed of potentially autonomous reflex-elements, making consciousness itself a kind of organism social.

SPENCER'S ORGANISM SOCIAL AFTER 1858: RELATIVISTIC INDIVIDUALS IN A "MAGNIFICENT HIERARCHY"

Thus by the late 1850s Spencer was faced with various kinds of independently-acting element-entities: the reflex, the ganglion, the cell, the phrenological faculty, the physiological *atelier*, even the individual person. All elements could compound into larger units which could themselves compound into still larger ones. What, then, could be considered an individual? Spencer came to define as an individual as dependent upon the observer's perspective. He quoted the botanist who had himself wondered if the cell was an individual or member of something larger:

> ...[Matthias] Schleiden says - 'Now the individual is no conception, but the mere subjective comprehension of an actual object, presented to us under some given specific conception, and on this latter it alone depends whether the object is or is not an individual. Under the specific conception of the solar system, ours is an individual: in relation to the specific conception of a planetary body, it is an aggregate of many individuals.' (Spencer, 1864-1867: i202)

Spencer, then, defined an individual in relative terms: whether as small as a cell, or as large as a solar system, both could be individuals against a particular backdrop.[7]

Spencer also generalized his definition of an individual: any organized unit capable of continuously maintaining a dynamic equilibrium between its inside and outside "environment". Snait Gissis has rightly called this equilibrium between an organism and its environment the "basic methodological unit" of Spencer's system (Gissis, 2011: 91-2), and we can build on her point by saying that any individual was the analytic *localization* of this equilibrium: the equilibrium-element, so to speak. If all of this equilibrium-language is becoming a little too cosmic for the reader, Joseph Needham offers help. Pointing out that Spencer had argued in 1857 that the higher an organism was, the more it showed "greater unlikeness to its environment" (Spencer, 1857: 339-42), Needham suggested that this dynamic equilibrium was akin to - and may have predated - the homeostasis of Claude Bernard, in which organisms maintain a *milieu interieur* unlike their exterior surroundings (Needham, 1937: 23-4), such as a constant internal

[7] This point complements Christopher Herbert's argument that relativity was central to Spencer's philosophy (Herbert, 2001: 51).

body temperature. In other words, it may be useful to reconceive "dynamic equilibrium" as "homeostasis".[8] Seen in this way, the more individuals an organization had integrated within itself, the more unlike its environment it became. A cell by itself was only one 'individual' and thus didn't have much power to differentiate itself from its surrounding medium. But a human, as a compound of integrated cells, did. This equilibrium-homeostasis could be psychological, social, physical and so on.

After 1857, a ganglion-element, a person-element, and a cell-element was depicted by Spencer as an individual which could maintain a dynamic equilibrium on its own or in a compound. His *Principles of Biology* (1864-1867) defined a biological individual accordingly, and included polyps and plant buds (i207). The second edition of Spencer's *Principles of Psychology* (1870), rewritten in accordance with his new vision, defined a psychological individual as a "net-work" of gray nervous cells and white transmitting fibres, in which each net-work acted as an "independent agent". Humans were composed, therefore, of multiple kinds of individuals: our spinal cords, for instance, were made up of multiple psychological net-works each possessing a "certain degree of individuality", yet at the same time they combined their activities so that we acted as a larger whole (25-7, 38).

Spencer also situated individuals in a hierarchy, making them first-, second-, or third-order individuals. The discussion is clearest in *Principles of Biology*. Morphologically, an organism could be seen as compounded out of elementary structural elements, added separately as first order individuals; added in groups as second order individuals; or added in groups of groups as third order individuals. Thus any annelid (worm), with its multiple repeating segments, was a third order individual: morphologically it was divisible into these segments. In turn these segments were second-order individuals, themselves further divisible into cells. Accordingly, these cells were first order individuals (Spencer, 1864-1867: ii4-5, ii102). Physiologically, all organisms could be seen as aggregates of "highly plastic" physiological elements, each of which independently formed a dynamic equilibrium between inside and environment (Spencer, 1864-1867: i287-8). A cell was a first-order physiological individual, or perhaps a second-order one made out of hypothetical "physiological units". And genealogically, evolution denoted a process where lower-order individuals merged into colonies which then integrated and specialized, becoming higher-order individuals. Over enough time "it would be impossible to say where the lower individualities ceased, and the higher individualities commenced." Spencer thus speculated that many second and third order individuals were composed of originally-independent units: for instance, the segments of the worms noted above might have been "independent individualities" themselves (Spencer, 1864-1867: ii204, ii102).

In November 1868 Herbert Spencer received a letter, in German, from the Prussian morphologist Ernst Haeckel. Alerted by T.H. Huxley, Haeckel had read both Spencer's *First Principles* (1862) and *Principles of Biology* with great interest. Haeckel offered to send Spencer a copy of his own near-contemporaneous *Generelle Morphologie* (1866), and suggested he

[8] Historically this is cheating, as the word appeared in English only in 1926.

would especially find interesting chapters five, nine, and ten of its first volume (Haeckel, 1868), which discussed "tectology", Haeckel's new science of biological individuality. Thus chapter five of *Generelle Morphologie* discussed individuality in organic and inorganic forms, while chapters nine and ten respectively examined morphological and physiological individuality. Haeckel's tectology proposed six different orders of individuality. They ranged from the simplest 'first order' individual (cells, for instance) - to the most complex 'sixth order' individual - a 'stock' or 'corm', the colonial organism (such as a strawberry plant or Portuguese Man o' War). Higher order individuals were themselves composed of individuals of simpler orders (Haeckel, 1866: 269-331, 332-363; Richards, 2008: 128-35): nested orders, in other words.

It is not known if if Spencer ever took up Haeckel's offer. Indeed, given Spencer's desultory reading habits - not to mention his lack of German - even if he had requested a copy it is unlikely that he would have read the densely argued *Generelle Morphologie*. But it seems likely that Haeckel was prompted to send his letter to Spencer after reading Spencer's discussion of orders of individuality. Haeckel's own musings on individuality followed the work of physiologist Johannes Müller as well as Schleiden. Haeckel also probably appreciated Spencer's quotation from Schleiden that what counted as a biological individual depended upon the observer's perspective: in higher-order individuals, lower-order individuals became organs. Moreover for Haeckel, Lynn Nyhart succinctly notes that "'Individual' and 'organ' were not absolute concepts but relative ones." (Nyhart, 1995: 136).

Although Spencer proposed only three orders of individuals against Haeckel's six, the underlying principle was the same: lower order individuals compounded into higher order ones. Yet there was one important distinction between Spencer's vision of biological individuality and Haeckel's. Haeckel was interested in the degree to which the constituent units were *subordinated* to a larger entity, acting in the 'interest' of the larger individual. Spencer was interested in the degree to which the constituent units retained *autonomy* within that larger entity, following their own "interests." This emphasis on lower-order units' autonomy made it easy for him to switch back and forth between the life sciences and the social sciences while still retaining a liberal outlook. To repeat, Spencer had as his organism-model the lower invertebrates, yet most people assumed his organism-model to be higher and intuitively individual vertebrates. As a result they would find in his view contradictory "implications".

SPENCER'S OBLIQUE LEGACY

In 1911 the American entomologist William Morton Wheeler would group together Spencer, Haeckel, Weismann and others such as Gustav Fechner as envisoning a universe of nested orders of individuals. All had constructed an "elaborate hierarchy of organisms" from the most simple (the physiological unit or biophor), which aggregated into cells, which formed more complex aggregates from Haeckelian "persons" or "metameres", to "colonies" or "coenobioses". Fechner had the cosmically grandest view of nested orders, thinking that not only was the earth itself "a great organism, but that all planetary systems were in turn colonies of earths and suns,"

making the universe itself a single organism. "Thus, starting with the biophore [sic] as the smallest and ending with the universe as the most comprehensive, we have a sufficiently magnificent hierarchy of organisms to satisfy even the most zealous panpsychist" (Wheeler, 1911, 308-9).

In Spencer's case, individuality of the second order became "symbiosis", appearing in biology; individuality of the third order became the "superorganism", used mainly in ecology and sociology.[9]

Individuality of the second order: symbiosis

Spencer's "compound animal" became a symbiont; compounding became known as "symbiosis." *Principles of Biology*'s suggestion about how annelids may have emerged (1864-1867: ii204, ii102) fascinated Alfred Russel Wallace, the co-discoverer of evolution by natural selection; in an 1872 speech to the Entomological Society, Wallace suggested that insects, like worms, might *also* be third order individuals built out of second-order segments (Wallace, 1872). The Russian anarchist geographer Petr Kropotkin would later mention the "grand idea of Herbert Spencer, so brilliantly developed in Perrier's *Colonies Animales"* that colonies were "at the very origin of evolution in the animal kingdom" (Kropotkin, 1902: 53). "Perrier" referred to Edmond Perrier, the French zoologist who in 1881 discussed how colonies of separate individuals of lower orders integrated over time to form individuals of higher orders, showing the division of labour. Despite Kropotkin's linking of Perrier to Spencer, Spencer goes entirely unmentioned in *Les Colonies Animales.* It is unclear why; Perrier repeatedly mentioned Milne Edwards and Haeckel, and cited numerous sources in French, English and German. Following Wallace, he even suggested that insects, which had numerous "individual" segments, formed out of the fusion of those segments (Perrier, 1881: 532-5, 723). In a later book, Perrier discussed Haeckel's tectology (1888: 146-8) yet only briefly mentioned Spencer, and only because Spencer had discussed evolution seven years before Darwin's *Origin* appeared. It is almost as if Perrier deliberately avoided any mention of Spencer.

In Britain, the biologist Patrick Geddes used Spencerian views to formulate the notion of the "reciprocal accommodation" of two independent parts within an individual. He focused on unusual cases to illustrate "symbiosis" (mutualism, to be specific): a planarian flatworm with chlorophyll-bearing algae living inside of it was a clear case of evolution through mutual adjustment and mutual benefit. The flatworm received nutrients while the algae lived in a stable environment - each organism contributed to the compound unit through specialization, a clear case of the division of labour. Similarly, lichen was the mutualistic association of fungus and algae (Sapp, 1994: 11-12; Renwick, 2009: 43-5, 47). In an 1899 edition of *Principles of Biology*, Spencer retained the old language of analysis to discuss such mutualistic symbioses: the green

[9] Individuality of the first order, with cells being compounded out of subunits, came to be known as "endosymbiosis." That topic is not discussed here, but good places to start are Sapp 1994 or Gilbert 2012.

flatworm showed the "cooperation between vegetal elements and animal elements forming parts of the same organism", while lichens were "compound growths" (Spencer, 1900 [1899]: 399-400). This new edition also saw Spencer extending his views to a near- Fechnerian scale. A new chapter called "The Integration of the Organic World," argued that all living things on earth showed increasing integration and mutual dependence (Sapp, 1994: 25-6; Spencer, 1900 [1899]: ii397; Tansley to Spencer, 1896). In writing this chapter Spencer was aided by the botanist Arthur Tansley, who will be discussed below.

By 1924 Sir Arthur Keith pointed out new findings that in his mind showed Spencer to be right. A discovery made soon after Spencer's death established the existence of a second, more primitive, form of bodily control in addition to the nervous system: the "government of hormones." Where the nervous system was like a telegraph system, the hormones were analogous to a postal system, with a hormone representing a compulsory summons that a cell had no choice but to obey. In other words, there was a slower yet alternative internal communication system that evolutionarily preceded nerves; evolution was the accumulation of different forms of biological communication. Keith noted that the person continuing Spencer's analogy was the short story writer and amateur biologist Morley Roberts (Keith, 1924: 5-9). Roberts had proposed a new theory of evolution: the "hostile symbiotic view" in which all life and growth is the forcing of symbiosis between two bodies and their opposed energies, which stimulated the "conjoint individual". For instance he proposed that multicellular organisms had pathological origins - a kind of Siamese twin that occurred by incomplete fission; cancer, meanwhile, was also pathological, which made it a source of evolutionary novelty (Roberts, 1920: 141, 272, 84-5; Hayward, 2001: 264).

Individuality of the third order: superorganisms

The states and entities variously named the social organism, the aggregate of the third order, and the third order individual became known as a "superorganism."

In sociology, the Spencerian superorganism was especially appreciated in France. Sociologist Alfred Espinas thought that organisms were collections of smaller individuals, and waded through examples of marine invertebrates and the cell theory in support. He then quoted Spencer and his considerations on individuality (Espinas, 1878: 218-26). When Emile Durkheim's *De la division du travail social* mentioned primitive "segmented" societies, then, it was explicitly following Perrier, likening such societies to coalescing annelid segments. Durkheim was wrestling with the premises of the Spencerian social organism, citing Spencer more than any other author in this work (Durkheim, 1893: 208-10, 216; Perrin, 1995: 798). Réné Worms's *Organisme et société* also extensively considered Spencer and defended the notion of the social organism, although noting that Auguste Comte talked about the social organism before Spencer (1895: 9, 405-6). When Worms founded the Institut International de Sociologie in 1894, he invited Spencer to become its first president, which Spencer turned down due to ill health (Barberis, 2003: 55). The various efforts linking societies to organisms came to be known as

organicism, whose French heyday was in the 1880s and 1890s. Daniela Barberis has argued that organicism helped establish sociology as a field by establishing the reality of an entity called "society", as real as the internal coherence of an organism (Barberis, 2003: 52). The Spencerian "superorganism", then, was seen not as an analogy by its followers, but as real.

In the English-speaking world, superorganisms were discussed in zoology and ecology. At Harvard, the entomologist William Morton Wheeler sometimes considered himself to be a sociologist of ants, while at the same time seeing an ant colony as a superorganism in which each ant became a constituent part. He argued that it was possible to learn about societies and individual bodies by experimenting on social insect colonies - substituting parts, dividing them, and so on - to a far greater extent than one would on individual bodies. Since a social insect colony was far less integrated than a single individual body, it could survive far more radical changes as a result (Wheeler, 1926: 435). Meanwhile Wheeler mused about whether an ant colony - with only a single queen being responsible for its reproduction - could thereby be considered an individual organism. Wheeler saw entities such as ant colonies as "wholes comparable with but of a higher order than the individual organism, which is known to be a colony of cells." He looked back at the history of biology to others who had wondered about superorganisms and individuality, and he situated himself in a long line of people including Espinas, Haeckel, Worms, as well as Paul von Lilienfeld, Jacques Novicow, Emile Waxweiler, and Paul Barth. At the beginning of this line, Wheeler put Herbert Spencer (Wheeler, 1928: 304).

One of Wheeler's graduate students went on to become a professor himself, and one of his students was the entomologist E.O. Wilson, making Wilson (according to philosopher of biology Michael Ruse) Wheeler's "direct intellectual grandson". In the 1970s Wilson made his name by discovering that ants communicated through pheromones, prompting from him similar questions as those asked by Wheeler, Haeckel, and Spencer. "At what point does a society become so well integrated that it is no longer a society? On what basis do we distinguish the extremely modified zooid of an invertebrate colony from the organs of a metazoan [multicellular] animal?" (Wilson, 1980: 54). Wilson sanctified such questions with a framed picture of Herbert Spencer hung on the wall of his laboratory, next to a picture of Darwin. Ruse seems to have been surprised by this decoration when he first saw it on a visit in the 1970s: "My God, Professor Wilson," I gasped, "Herbert Spencer! Herbert Spencer!" "Great man, Mike." He replied. "Great man." (Ruse, 2011). Does this lineage make Spencer into Wheeler's great-grandfather? Wilson has certainly honoured his ancestors by returning to thoughts about superorganisms (Hölldobler and Wilson, 2008), which is credited to Wilson's love of Spencer (Gibson, 2012, 5-8).

Meanwhile, in England, Arthur Tansley, who helped Spencer to revise the 1899 edition of *Principles of Biology*, moved into the then-new field of ecology. He flirted with the view that certain stable vegetational groups such as forests were actually superorganisms. It was obvious that some such groups possessed an "individuality of their own," and Tansley followed Milne Edwards, Darwin and Spencer by using the division of labour to jump up and down between nested orders. Thus the the specialization of functions in a plant grouping was analogous to the

various specialized systems in an individual organism - competition between plants led to the division of labour, differentiating species from one another, yet integrating the unit as a whole (Tansley, 1920: 123). Plant groupings were not "superorganisms", but a long-term and relatively unchanging plant-group Tansley described as a "*mature quasi-organism*... the highest expression of *organisation* to be found among plant communities...they are the most unmistakable vegetational *units* we find in nature". Tansley did not explicitly call certain forests "individual", for it was only an analogy, with many differences: a forest's development in no way resembled the ontogeny of a "true organism", for example (Tansley, 1920: 120-23, 146, 131).

Yet the analogy was taken by others to be real: certain forests *were* individuals. Others disagreed. By 1935 the dispute over the reality of ecological "superorganisms" came to a head. Responding to a set of three papers on why plant-animal groupings were really individual superorganisms, Tansley wrote a famous treatise arguing that superorganicists had gone too far. While one could consider mature plant communities, human societies and ant colonies "quasi-organisms", they were not single individuals or superorganisms, for these terms led to confusion. Tansley thus suggested a new term to describe plant-animal groupings: the "ecosystem", laden with far less ontological baggage (Tansley, 1935: 289-91, 297-9).

CONCLUSION

Although this is a contribution to a collection determining Spencer's legacy and influence, it is difficult to establish his influence in such fields as ecology or biology. This is partly because others articulated similar concepts before or around the same time as him, whether remembered in our own day (Comte), barely remembered (Milne Edwards) or utterly forgotten (religious Dissenters). Meanwhile, other Spencerian principles worked so well they quickly became self-evident, as Barberis shows with the influence of organicism on French sociology. Meanwhile, any slight difference with Spencer's views often led to an explicit repudiation of him.

Thus although Durkheim took up the division of labour, he considered himself to have surpassed Spencer by proposing phenomena such as organic and mechanical solidarity, also using other sources such as Edmond Perrier (Durkheim, 1893: ix, 208-210, 195; Perrin, 1995, 801; Taylor, 2007: 96-8). To repeat, Perrier never acknowledged anything to Spencer. Nor would Morley Roberts, noting that Spencer's biological knowledge was deficient even for its own time. Besides, Roberts, said, much of his 1920 *Warfare in the Human Body* had been written before he encountered Spencer's social biology, and nowhere therein could he find any mention of how sociology might help biology (Roberts, 1920: 5-6). The latter claim is false. The former claim is - to put it mildly - improbable. Roberts's own friend Arthur Keith mentioned that Roberts was continuing Spencer's work (Keith, 1924: 5-6), and there are hints that Roberts himself

plagiarized from the French organicist sociologist Jean Izoulet.[10] In turn Izoulet's own *Cité Moderne* extensively discusses the Spencerian *hyper-organisme* (Izoulet, 1895: vii, 105-7, 111, 557, 603, 620,622, 624), but mainly to quarrel with its problematic 'implications' rather than acknowledge any debt.

Indeed, a major reason why so many sought to reject the Spencerian social organism was because of its apparent political contradictions. Despite Spencer's insistence that the social organism complemented a liberal vision of autonomous cell-citizens, Izoulet drew the opposite view: biology showed sociology that hierarchy was natural. The division of labour meant that some citizens were analogous to nerve cells, and thus had the power to order about the rest of the citizen-cells (Izoulet, 1895: xxiv-xxv). Roberts agreed with this view. Sir Arthur Keith in turn thought that hormones' ability to compel cells to act meant that the "society represented by the animal body is in reality a slave state" (Keith, 1924: 12). Meanwhile, as noted above, T.H. Huxley thought that the analogy legitimated authoritarian rule (Huxley, 1871: 535), while Durkheim retreated from an early embrace of organicism partly due to similar critiques by sociologists such as Gabriel Tarde (Barberis, 2003: 63, 52; Gissis, 2011: 93). Across the Atlantic, the American palaeobotanist-turned-sociologist Lester Frank Ward excerpted five and a half pages from Spencer's "Social Organism", calling it "masterly " but then attacking it for ignoring the statist and *dirigiste* implications of biology (Ward, 1898: 50-58). One reason why Spencer's insistence upon lower-order unit autonomy came to be interpreted as a contradiction was because critics returned to their intutive understandings of individuality conferred by their greater familiarity with vertebrates (Elwick, 2003). Does such explicit rejection of surface details while following underlying organic Spencerian principles and language constitute a 'legacy', and if so, what kind?

More subtly, Spencer came to be ignored or repudiated because of his transdisciplinarity. He and his superorganism stood Canute-like against a rapidly specializing world of scientific research. Then as now, everyone spoke in favour of broad learning, complaining that research was following a remorseless von Baerian logic by splitting up into various disciplines and subdisciplines. Yet in practice, matters were different. For instance, Espinas - a would-be sociologist with a dissertation whose sources referred mainly to the works of naturalists - faced a dilemma about the particular Faculty in which he should defend his thesis: Science or Letters? As John I. Brooks mordantly notes, "If Espinas was interested purely in academic advancement, he could hardly have chosen a worse topic or a worse approach than Animal Societies" (cited in D'Hombres and Mehdaoui, 2012: 33-4). When Tansley argued that since the phenomena were the same, on "logical" grounds it was more appropriate to call the study of vegetation "plant-sociology" rather than "plant-ecology" (Tansley, 1920: 118), it is easy to guess the fate of this proposal. Nor did ants come to be studied by Wheelerian "ant-sociologists" either. Something

[10] Roberts was the model for Dyce Lashmar, who in George Gissing's novel *Our Friend the Charlatan* creates the field of "biosociology". At the end of the story, however, Lashmar is revealed to have plagiarized biosociology from Izoulet (Gissing, 1901: i; Hayward, 2001: 257).

similar happened to the study of symbiosis: rather than being investigated as a phenomenon in its own right, over the next century it would be restricted to specialized fields - zoologists ignoring chloroplasts and bacteria, for instance (Sapp, 1994: 208). As specialization continued - as the walls of the disciplinary silos became stronger in first half of the 20th century - it became more and more difficult for life researchers in different fields to range widely across disciplines, much less embrace a synthetic philosopher.

Another reason why Spencer's insights about nested orders came to be forgotten is because historians of biology have generally been uninterested in biological individuality. Although this topic fascinated many of the most important European life scientists between 1850 and 1915 (Nyhart and Lidgard, 2011: 374-5; Elwick, 2007), evolution tends to interest far more historians of biology, for its obvious cultural appeal. As a result, their agenda has been shaped by the modern "neo-Darwinian" evolutionary synthesis of 1942, whose focus was the population of sexually breeding animals. That is, it studies groups of intuitively clear individual organisms: the gene pools of fruit flies, or the evolutionary adaptations of finches, rather than the quasi-individuality of slime moulds or the division of labour in *Volvox* algae cells. The result is to make nineteenth century questions about individuality seem alien or idiosyncratic, allowing them to be passed over or dismissed. Thus the leading biography of Haeckel gives a very nice summary of tectology and its influences, but ultimately concludes that the several hundred (!) pages of *Generelle Morphologie* devoted to orders of individuality were ultimately not very productive. Psychological motives are instead given. Tectology revealed Haeckel's "mania for puzzle-solving", and it is implied that individuality was a technically forbidding yet sterile subject into which he could escape to stave off personal heartache (Richards, 2008: 128-34).

Then again, biological individuality *was* a technically forbidding topic. Was it also sterile? Between 1850 and 1915 a number of highly regarded zoologists, including Haeckel, may have thought so - they started their careers working on biological individuality, but then went on to drop it.[11] It is an interesting historical question as to why. I wonder if this repeated failure to

[11] I can immediately think of six, although all dealing with multicellular animals, which betrays my own regrettable metazoan bias. First, Roux, already mentioned for *Kampf der Teile im Organismus,* moved into experimental embryology. Second, Haeckel , disappointed by the reception of *Generelle Morphologie* (Gould, 1977) moved to become a Darwinian controversialist. Third, although T.H. Huxley's first big London public event was entitled "On Animal Individuality" (Huxley, [1852]), he ultimately thought such questions meaningless. Fourth, T.H. Huxley's grandson Julian's first book was *The Individual in the Animal Kingdom* (1912), but he does not seem to have continued such work afterwards. Fifth, Huxley's protégé E. Ray Lankester wrote on individuality in lower annelids (1870) but then criticized Wallace's proposal of Spencerian evolutionary integration of insects (Lankester, 1872). Sixth, Lankester's fellow "merist" (Jeffs and Keyes, 1990: 84) William Bateson - known now for rediscovering Mendel's law in the early twentieth century and his contributions to genetics - before g time considered the recurring yet ultimately "barren" idea that metamerism (repeating segments) arose from a "series of individuals which have not detatched themselves from each other", and that perhaps all Metazoa were "colonies" of protozoa (1894: 34). In many cases the loss of interest in biology may have been caused by shift of research focus away from invertebrates to vertebrates. A separate yet related cause may be a pragmatic focus on career options - in 1854 T.H. Huxley

fit biological individuality into research programmes contributed to the decline of Spencer's reputation, leading to the rejection of his insistence that we see individuals as microcosms. If that is the case, then current research on individuality in immunology, genetics, evolution, development, anatomy and physiology - all indicating that "we have never been individuals" (Gilbert et al, 2012) - may mean that Spencer's star will rise again. It is easy to laugh at Grant Allen's claim that the "twenty-fifth century will do him full justice" (Allen, 1904: 629), but perhaps by then the life sciences will have confirmed one of Spencer's legacies - that we do indeed contain multitudes.

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moved from invertebrate work into vertebrate paleontology partly because this was the only job he could get at that time (at the School of Mines).

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