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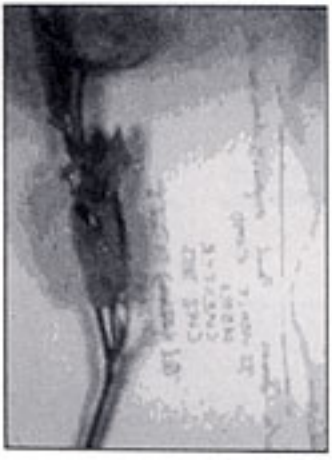

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Towards a Third Culture or Working in Between

Victoria Vesna

> Practice must always be founded on sound theory.
> -Leonardo Da Vinci (Kleine, 1977, pp157-158)

Artists working with computer and other technologies that are a product of the scientific world are also informed and inspired by the exciting innovations and discoveries taking place in science. We are keenly interested in what the cultural critics and commentators from the humanities have to say on the meaning and impact these discoveries and innovations have on culture and society. Scientists can relate and understand our work easier primarily because we use the same tools-computers. Because our work and tools are in constant flux, we are forced to articulate the reasoning and meaning informing the art produced, which has traditionally been the role of art critics and historians. This creates room for an active dialogue with both humanists and scientists. Thus we are placed in between these "Two Cultures," which creates a triangle and promises to an emergence of a Third Culture. This is a privileged and dangerous position, at least in this transitional stage. Therefore it is important to take a look at the background and current status of these Two Cultures.

The Ghost of CP Snow persists

Much of the discussion concerning the triangle of art, science, and technology can be traced back to CP Snow's famous annual Rede lecture at Cambridge on May 7th, 1959. The phrase 'Two Cultures' entered into a cultural controversy and debate that has endured remarkably long. The title of Lord Snow's lecture was "The Two Cultures and the Scientific Revolution." He identified the two cultures as the literary intellectuals and the natural sciences, and he pointed to the curricula of schools and universities as the source of the problem. In the Introduction to Snow's book, Stephan Collini gives a historical perspective to this divide by locating its beginning in the Romantic Period, at the end of the eighteenth and beginning of the nineteenth centuries. (Snow, 1964, pg. xii) He traces the British genealogy of 'Two Cultures' anxiety in the linguistic peculiarity by which the term 'science' came to be used in a narrowed sense to refer to just the 'physical' or 'natural' sciences.

The compilers of the Oxford English Dictionary recognised that this was a fairly recent development, with no example given before the 1860's: "We shall . . . use the word "science" in the sense which the Englishmen so commonly give it; as expressing physical and experimental science, to the exclusion of theological and metaphysical." (Snow, 1964 pg. xi) William Whewell, a philosopher and historian of science who used 'science' in his Philosophy of the Inductive Sciences of 1840, is credited with establishing this term. The first time it was recorded as an idea, however, was at the Association for the Advanced Science in the early 1830's when it was proposed as an analogy to the term 'artist.' Yet, the two cultures refer to the divide between the literary humanities and frequently exclude what was originally the analogy to science-art.

The idea of 'Two Cultures' was a great source of fame for Snow in the 1960's. He received twenty honorary degrees in the course of the decade and, following the Labour Party's election in October 1964, accepted Harold Wilson's invitation to become the second-in-command at the newly established Ministry of Technology, becoming the government spokesman on Technology in the House of the Lords. From 1966 until his death in 1980, much like Fuller, Snow travelled the world as a lecturer, adviser, and public sage.

In the second edition of The Two Cultures, in 1963, Snow added a new essay, "The Two Cultures: A Second Look." In that essay he suggested that a new "Third Culture" would emerge and close the gap between literary intellectuals and scientists. (Snow, 1963, pg. 53) It is significant to note that Snow originally named his lecture "The Rich and the Poor" and intended this to be the centre of his argument: "Before I wrote the lecture I thought of calling it 'The Rich and the Poor,' and I rather wish I hadn't changed my mind." (Snow, 1964, pg. 79) He remained dissatisfied with the Two Culture concept and had on several occasions tried to refine the claim. In his last public statement he makes clear that the larger global and economic issues remain central and urgent: "Peace. Food. No more people than the Earth can take. That is the cause." (Snow, 1968, pg. 220)

Art, Science and Technology : Building the Triangular Bridge

> Scientist-artists originally conceived and designed bridges. The power-structure-behind-the-king, seeing great exploitability of the bridge for their own advantaging, accredited workers and materials to build bridges. (Fuller, 1981, pg. 27)

But it seems that there is still much work to be done in building the bridge between the humanities and the sciences. John Brockman, editor of a book of essays entitled The Third Culture, negates Snow's optimistic prediction that a day will come when literary intellectuals will communicate effectively with scientists. Instead he makes the claim that the contemporary scientists are the third culture and alludes that there is no need for trying to establish communication between scientists and literary intellectuals, who he calls the "middlemen." (Brockman, 1995, pg. 18) Although the choice of people in his book is significant, [1] the mere fact that it is comprised almost completely of Western white men, with the exception of Lynn Margolis with her essay "Gaia is a tough Bitch" makes it impossible to take his proposition seriously. But it does point to the continuing gap between the humanities and sciences and clearly shows that the bridge being constructed is still very fragile.

The bridge is triangulated and made into a more stable structure with the work of artists who are utilising new technologies and are in active dialogue with both sides. Artists using technology are uniquely positioned in the middle of the scientific and literary/philosophical communities, and we are allowed "poetic license," which gives us the freedom to reinforce the delicate bridge and indeed contribute to the creation of a new mutant third culture. By utilising tools familiar to scientists and collaborating with the scientific community, we are getting closer to an atmosphere of collaboration and mutual respect.

This road, however, is not without dangers of which to be wary. It is a delicate mission to be in between disciplines that are themselves in a tenuous relationship. Perhaps the greatest danger is for artists to look to the literary, philosophical, and theoretical circles for interpretations of scientific data and then further reinterpret their versions without checking back with the scientists. Much postmodern writing borders on linguistic play with mathematics and scientific terminology that serves to alienate the scientific community, which has used precise methods to arrive at those theories. [2] This is not to say that one should blindly accept all products of the scientific community, but simply to suggest that any working relationship needs to be based on mutual respect and dialogue. The other danger that faces those 'in between' working on creating 'something else' is the general attitude of theory being above practice, prevalent in both humanities and sciences. At this stage, it is in the practice of art that the freedom lies to make assertions that are beyond the rational and beyond necessary methodology of proving a thesis. Practice informed by theory, utilising a methodology which makes it accessible to both worlds, is the key. Or, conversely, theory informed by practice.

Currently, much of this bridge-building work takes place in universities for more reason than one. First, at this point, with no market in place, it is impossible to make a living outside of academia and industry. Between the two, academia is generally friendlier to someone searching for a yet-to-be-defined path than industry, with its pressures to produce. Second, academia is a natural environment in which one can have access to good bandwidth and updated equipment. Third, and perhaps most important, academia allows artists contact with scholars from many disciplines. In order to function and communicate effectively in this context, one must learn the etiquette and language of various disciplines. The challenge, then, is to do this without losing the intuitive, 'wild' aspect, the practice, that taps into the silent, the unknown, the mysterious.

Our work depends largely on an active dialogue with scientists and humanists while performing an important function of being bridge builders. And as any engineer knows, we have to know the territory on both sides and be very precise in how we negotiate the space 'in between.' Negotiating the gap between the canon of rationality and the fluid poetic is ultimately the goal of artists who work with communication technologies.

Creative Process of Artists and Scientists -- Discovery of Strangeness

> Any definition of complexity is necessarily context-dependent, even subjective. (Gell-Mann, 1994, pg. 33)

One of the most important scientists who has commented on the similarities between artists' and scientists' creative process is physicist Werner Heisenberg (1958). He believed artists' creativity arose out of the interplay between the spirit of the time and the individual. For McLuhan, artistic inspiration is the process of subliminally sniffing out environmental change: "It's always been the artist who perceives that alterations in man caused by a new medium, who recognises that the future is the present, and uses his work to prepare ground for it." (Norden, 1969) In fact both artist and scientist are involved in the work of intuiting change of perception and materialising it for other to experience, see and ultimately change.

Science and Something Else

Gell-Mann is the founder of the Santa Fe Institute where Kauffamn, Bak, Penrose, and others have worked on the possibility that there might be a still-undiscovered law of nature that explains why the universe has generated so much order in spite of the supposedly universal drift towards disorder decreed by the second law of thermodynamics [3]. This something else as Gell-Mann refers to it (Horgan, 1996, pg. 214) would be located beyond the horizon of current science-something that can explain better the mystery of life and of human consciousness and of existence itself. To Gell-Mann this indicated a certain tendency towards obscurantism and mystification.

One of the most profound goals of chaoplexity pursued by Kauffman, Per Bak, John Holland, and others is the elucidation of a new law, or set of principles, or unified theory, or something that will make it possible to predict the behaviour of a variety of dissimilar complex systems. A closely related proposal is that the universe harbours a complexity-generating force that counteracts the second law of thermodynamics and creates galaxies, life, and even life intelligent enough to contemplate itself. How could one not then summon the ancient texts of the Vedas, Buddhism, and much of eastern mysticism? Although Gell-Mann was playing when he referred to the eightfold way and to Finnegan's Wake, he did touch on that something else many disciplines are struggling to define.

End of Art, End of Science?

I have discovered that the discussion of whether we are reaching the 'end of art' is not limited to the field of art. Apparently this is an ongoing and lively discussion in the world of science as well. John Horgan, who spent years profiling major names in the world of science for Scientific American, asks this question in The End of Science: Facing the Limits of Knowledge in the Twilight of the Scientific Age (1996). He lists a number of disciplines and questions major personalities in their fields about whether they are reaching their limits: philosophy, physics, cosmology, evolutionary biology, chaoplexity, limitology, scientific theology, and machine science. One could easily compile a list of disciplines in the humanities asking this same question, with the difference of having a bit more representation of women and minority opinion. Horgan's book does not list one woman or minority as a major authority, which could be a good sign if he is announcing the end of the world as we know it. Nevertheless, his premise is intriguing in the world of science and did not go unnoticed. It was publicly denounced by President Clinton's science advisor, the administrator of NASA, a dozen or so Nobel Laureates, and scores of critics. (Horgan, pg. 267) The simple point Horgan misses is that every end constitutes a new beginning, and by stating doubt that there will be anymore Einstein's or Bohr's in the future, he does not take into account the possible emergence of a group genius and endless mutations of disciplines that truly do result in something new. Reaching limits in science or any other discipline for that matter really means being on the threshold of the inevitable something else.

Reacting against "Something Else"

> Transgressing disciplinary boundaries... [is] a subversive undertaking since it is likely to violate the sanctuaries of accepted ways of perceiving. Among the most fortified boundaries have been those between the natural sciences and the humanities. (Greenberg, 1990)

Contemporary art practice, particularly utilising digital technology, is loaded with references to science, and this trend has taken root in cultural theory as well. In fact, an entire new field has been formed in the humanities: "Science Studies." One would think that this would allow for better communication between the sciences and humanities, but in general this does not appear to be the case at the present time. Some of the work coming out of science philosophy and theoreticians commenting on the scientific process has infuriated some scientists and actually deepened the gap of the "Two Cultures."

The most famous recent case, and in my opinion relevant to consider, is the Sokal Incident. In 1996 Alan Sokal published an article in the American cultural-studies journal Social Text, a parody article entitled "Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity." The article is crammed with 'non-sensical quotations about physics and mathematics' by prominent French and American intellectuals such as Lyotard, Derrida, Irigaray, and Lacan. The text is full of references to scientists such as Heisenberg, Kuhn, Bohr, Harding, Bell, and Godel and is indeed as difficult to read as any postmodern theory text can be. The references cited are all real, and all quotes are rigorously accurate; however, having been taken out of their cultural contexts and reframed, they do assume questionable meanings. According to Sokal it was meant as an experiment to test whether the bold assertion claiming that physical reality is at the bottom of social and linguistic construct (without evidence or argument) would raise eyebrows among the editors. It did not. The editors trusted that the information in the essay, written by established scientists, would be an honest contribution and did not read carefully the erroneous information in the text. The debates sparked by Sokal's hoax have come to encompass a wide range of tenuously related issues concerning not only the conceptual status of scientific knowledge or the merits of French postructuralism, but also the social role of science and technology, multiculturalism, and 'political correctness,' the academic left versus the academic right, and the cultural left versus the economic left.

The text was followed by an entire book, Intellectual Impostors, which Sokal co-wrote with Jean Bricmont. In the book they exhibit incredible zeal and thoroughness in their effort to de-mystify these very famous authors. Perhaps the most impressive aspect of this hoax article turned into event and book is how much rigour the thesis is delivered. One wonders if they actually had to put aside their own scientific research to write this book, which would indicate that this is much more than a hoax but something they felt was very important to deliver to the scientific community and the public at large. There is no question that the authors have done their homework and that their work has had a definite impact on The Two Cultures. Some of the fallout is positive in that it brought to surface and activated a dialogue that was simmering under the surface. The negative aspects

are that the dialogue was coloured by controversy and was mostly argumentative, thus endangering the very fragile bridge between the humanities and sciences. Why was Sokal not flattered that science has a such a strong influence on contemporary philosophers, as Einstein was when he read Fuller's interpretation of the Theory of Relativity?

The philosophers Sokal and Bricmont attack are those working in theory of psychoanalysis, semiotics, or sociology and whose work is subject to innumerable analysis, seminars, and doctoral theses. It is important to note that there are no authors mentioned who are principally literary or poetic. Sokal and Bricmont do make a valid point when saying that the scientific terminology and fact were rather abused and consequently serving as a way to spread false information to the readers. Sokal assembled a list of quotations that showed this kind of handling of the natural sciences and circulated it to his scientific colleagues whose reaction were "a mixture of hilarity and dismay. They could hardly believe that anyone-much less renowned intellectuals- could write such nonsense." When the texts were shown to non-scientists, they needed to explain in lay terms why the said passages were "meaningless." One can only imagine the reaction of scientists when they read a quote from Lacan, who refers to the structure of the neutronic subject as exactly the torus (it is no less a reality itself. pg. 19), or from a passage by Kristeva, who states that poetic language can be theorised in terms of the cardinality of the continuum (pg. 38); or Baudrillard, who writes that modern war takes place in non-Euclidean space (pg. 137). We do get a clue that there is more at stake in Final Theory by Steven Weinberg:

> These radical critics of science seem to be having little or no effect on scientists themselves. I do not know of any working scientist who takes them seriously. The danger they present to science comes from their possible influence on those who have not shared in the work of science but on whom we depend, especially those in charge of funding science and on new generation of scientists. (Weinberg, 1992)

Using the Poetic License as a Tool

> No doubt the first act of the calculus consists of 'depotetentialisation' of the equation (for example, instead of 2ax - x2 = y2 we have dy/dx = (a - x/yu). However, the analogue may be found in the two preceding figures where the disappearance of quantum and the quantitas was the condition for the appearance of the element of quantitability. . . . (Deleuze, 1994, pp. 174-5) (Sokal pg. 213)

What is important to note however, is that Sokal and Bricmont are much more tolerant with use of scientific terminology in context of art or science fiction:

> If a poet uses the words like 'black hole' or 'degree of freedom' out of context and without really understanding their scientific meaning, it doesn't bother us. Likewise, if a science fiction writer uses secret passageways in space-time in order to send her characters back to the era of the Crusades, it is purely a question of taste whether one likes or dislikes the technique. (Sokal, 1997, pg. 8)

Clearly this points to a semi-favourable position for artists in relation to the sciences, particularly those working with technology. What complicates matters, however, is that many artists are inspired and interpret the very philosophers that are under attack from the scientific community. [4] What Sokal and Bricmont fail to notice is that absolutely all authors that comprise their book have become staple philosophers for artists working with media, particularly Deleuze and Guattari, to whom they dedicate an entire chapter analysing their misuse of scientific and mathematical terms. On the one hand one could argue that Deleuze and Guattari utilise these scientific and mathematical terms in a distinctly metaphorical or philosophical senses, which would explain their vague or tenuous relationship to 'hard' scientific fact; this argument is lost, however, when one points to direct quotes and references out of a book on the theory of differential equations that uses terms such as 'singularity' and 'singular point' in a distinctly technical and mathematical sense. The terms are then used in their literal senses without any distinguishing between their use as such rather than in a metaphorical context, nor is there offered an explanation of how we might understand the relationship between literality and figuratation as such. (Sokal, 1997, pg. 216) (Deleuze,1990, pp. 50, 54, 339-40n) Although I very much sympathise with Deleuze and Guattari's approach and can relate to their writings in many ways, I feel that Sokal and Bricmont are flashing an important red light to artists who are inspired by scientific innovation and discovery and are interested in working closely with the scientific community.

The Methodology of "Anything Goes": Embracing Paradox, Contradiction and Rhetorical Excess

Much of epistemic relativism in philosophy is understood by the scientific community as violent attacks on science. Frequently quoted in discussions about relativism is Paul Feyerabend, who is also analysed by Sokal and Bricmont. Although acknowledging his complex personality, they write, "Nevertheless, Feyerabend's writings contain numerous ambiguous and confused statements, which sometimes end in violent attacks on science: attacks which are simultaneously philosophical, historical and political, and in which judgements of fact are mixed with judgement of value." (pg. 73). Indeed they find his views, in some extreme cases, to have similar problems that they point to with all the other philosophers they critique. His first and most famous book, Against Method (1975), translated into sixteen languages, argued that philosophy cannot provide a methodology and rationale for science since there is no rationale to explain. Particularly inflammatory was his famous "Anything Goes" statement: "All Methodologies have their limitations and the only 'rule' that survives is 'anything goes.' (Feyerabend, 1975, pg. 296). In a footnote, Feyerabend suggests that if we assume that science and art share a problem solving attitude, the only significant difference between them would disappear; therefore, we could speak of "styles and preferences for the former, and progress for the latter." (1975, pg.197)

What is intriguing about Fereyabend is his embrace of paradox, contradiction, and rhetorical excess. He is yet another complex persona who as a teenager studied opera and astronomy simultaneously and envisioned himself working in both fields. Later he kept going back and forth between majoring in physics and philosophy, eventually settling on the latter. Fereyabend studied under Popper at the London School of Economics where he met Lakatos, who urged him to write Against Method. He then moved to Berkeley, where he befriended Kuhn and strongly rejected science as being superior to other modes of knowledge and as a result was labelled by many as an anti-scientist.

Sharing the Language: Collaboration

Perhaps the source of the communication problem can be traced to the fact that most of the philosophers under attack in the scientific community do not work closely with scientists and that scientists are equally isolated from the movements of philosophical thought and contemporary artistic expression. As long as the work does not have a reason to be located in a few disciplines simultaneously, room for misunderstandings will be ample. The work of artists working with technology demands interaction with scholars from a wide variety of disciplines such as computer science, social studies, philosophy, cultural studies. Bridging and synthesising many worlds while composing 'something else' becomes the art.

Notes

1. Representatives of the Third Culture according to Brockman are William C. Williams; Stephen Jay Gould; Richard Dawkins; Brian Goodwin; Stev Jones; Niles Eldredge; Lynn Margulis; Marvin Minsky; Roger Schank; Daniel C. Dennet, Nicholas Humphrey; Francisco Varela; Steven Pinker; Roger Penrose; Martin Rees; Alan Guth; Lee Smolin; Paul Davies; Murray Gell-Mann; Stuart Kauffmann; Christopher G. Langton; J. Doyne Farmer; W. Daniel Hillis. He first published a brief essay on the idea of the emerging third culture in September, 1991 in his journal, the Edge. Now online, he continues to promote this idea: www.edge.org/3rd_culturees the art.

2. The term "postmodern" is being used as summarised by Barry Smart: Postmodernity remains a contentious term, signifying for some analysts simply a "symptom of the current mood of Western intelligentsia" (Callinicos,1989, pg. 9), whilst for others it describes important aspects of the social, cultural, and political conditions to which we increasingly find ourselves subject. (Harvey, 1989; Bauman, 1992) And of those analysts who regard the term as appropriate for describing contemporary conditions some at least clearly consider the constituency affected, the 'we,' not to be confined to either the 'first' world or the intelligentsia alone. (Rouse, 1991) The configuration of Western modernity has been placed in question and challenged in a second, somewhat different manner by increasing evidence that the economic and cultural momentum has swung away from both Europe and America towards the Pacific rim and the modernising societies of the East. (Smart, B. 1993, pp.150-151)

3. The second law of thermodynamics is the law of nature which says that things wear out. One expression of the second law of thermodynamics is that heat cannot flow from a cold object to a hotter object of its own volition. For instance, if you leave your house unattended for a long time, it will crumble away under the influence of wind and weather, whereas a pile of bricks will never spontaneously form itself into an arrow of time. (Gribbin, J. 1998, pg. 359.)

4. See list of conferences that have been organised around discussions of the work of Deleuze and Guattari; lists.village. http://virginia.edu:80/~spoons/d-g_html/d-g.html
For artists inspired by science: see Wellcome Trust's SCI~ART initiative, 1998 and Art and Science Collaborations, Inc. : www.asci.org

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References

ALBERT, M. 1996. "Not all stories are equal: Michael Albert answers the pomo advocates." Z Papers Special Issue on Postmodernism and Rationality.

ALBERT, M. 1996. "Science, postmodernism and the left." Z Magazine 9.7/8 (July/August).

BAUDRILLARD, Jean. 1995. The Gulf War Did Not take Place. Translated and with introduction by Paul Patton. Bloomington: Indiana University Press.

BATESON, G. 1972. Steps to an Ecology of Mind.

BRICMONT, J. 1995. "Science of chaos or chaos of science?" Physicalia Magazine 17.3-4. Available online as publication UCL-IPT-96-03 www.fyma.ucl.ac.be/reche/1996/1996.html

BRICMONT, J. and A. SOKAL. 1997. Intellectual Imposters; Postmodern Philosophers' Abuse of Science. London: Profile Books.

BROCKMAN, J. 1995. The Third Culture: Beyond the Scientific Revolution. New York: Simon and Schuster.

BOHM, D. 1968 On Creativity. Leonardo. Volume 1, number 2.

CHOMSKY, N. 1992-93. "Rationality/Science." Z Papers Special Issue on Postmodernism and Rationality. www.zmag.org/zmag/articles/chomopomoart.html

CRINGLEY, X. 1996. Accidental Empires: How the Boys in Silicon Valley Make Their Millions, Battle Foreign Competition, and Still Can't Get a Date. New York: Harper Business.

DELEUZE, Gilles. 1994. Difference and Repetition. Translated by Paul Patton. New York: Columbia University Press.

FEYERABEND, P. 1975. Against Method. London: Verso

FEYERABEND, P. 1996. Leonardo. Volume 29, number 1.

FORESTA, D. 1991. "The Many Worlds of Art, Science and the New Technologies." Leonardo. Volume 24, number 2.

GELL-MANN, M. 1994. The Quark and the Jaguar. New York: W.H. Freeman.

GREENBERG, Valerie D. 1990. Transgressive Readings: The texts of Franz Kafka and Max Planck. Ann Arbor: University of Michigan Press.

GRIBBIN, John. 1998. Q is for Quantum. An Encyclopedia of Particle Physics. New York: The Free Press.

HEISENBERG, W. 1958. Physics and Philosophy. London: Penguin.

HORGAN, John. 1996. The End of Science. Facing the Limits of Knowledge in the Twighlight of the Scientific Age.

JOHNSON, G. 1995. Fire in the MInd:Scientific Faith and Search for Order.

KAUFFMAN, S. 1995. At Home in the Universe: The Search for Laws of Self Organization and Complexity. New York: Oxford University Press.

KLUVER, W. 1995. Online interview with Hertz www.conceptlab.com/interviews/kluver.html,
April 19.

LOVEJOY, M. 1989. Postmodern Currents. Ann Arbor: Michigan UP.

SOKAL, A. 1996 Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity. Social Text 46/47 (spring/summer).

SMART, B. 1993. Postmodernity: Key Ideas. New York: Routledge.

SNOW, C.P. 1959. Two Cultures. Cambridge: Cambridge UP.

SUPPLE, C. 1996. "5 Americans Share Nobels for Science: New Structures Found in Chemisty, Physics." The Washington Post. Thursday, October 10, 1996.

THEOCHARIS, T. and M. PSIMOPOLOUS. 1987. "Where Science has Gone Wrong." Nature. 29 (October 15).

WEINBERG, S. 1992. Dreams of a Final Theory. New York: Pantheon.