

# Who Knows?

—Humanities Research in ‘Computerized Societies’

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Is it certain that to the word *communication* corresponds a concept that is unique, univocal, rigorously controllable, and transmittable: in a word, communicable? (Derrida, *Limited Inc*, 1)

Despite the apparent focus on the status of ‘knowledge in computerized societies’ in his most well-known book (*The Postmodern Condition*, 3-9), Jean-François Lyotard’s ideas have generally been taken up less as contributions to media, communication and information studies than as works of philosophy or cultural theory. This is unsurprising perhaps, given that even those of his works that appear to have an explicit focus on communication and information technologies revolve more around ethics (*Differend*), art and aesthetics (*Inhuman*), truth and legitimation (*Postmodern*), than around what we today call (rightly or wrongly) ‘new media’.

It’s interesting to note nevertheless the near prescience of the first few, scene-setting sections to Lyotard’s famous ‘report on knowledge’, in which he forecasts the impact that technological transformations can be expected to have on knowledge. Outside the effects that ‘the proliferation of information-processing machines’ will have ‘on the circulation of learning’ (*Postmodern*, 4), Lyotard highlights the ‘exteriorization of knowledge with respect to the “knower”’ which exacerbates a process whereby knowledge is commodified for sale, consumption, and subsequent valorization ‘in a new production’ (ibid.).

Read today, in a world where a ‘culture of search’ defines knowledge acquisition and information exchange, if not many other aspects of life (see Hillis et al., *Google*), and where academic journal publishing is seriously big business (see Miller, ‘Humanities’), Lyotard’s predictions look to have paid out. Further, his hypothesis that nation-states—and even ‘multinational corporations’—will ‘one day fight for control of information, just as they battled in the past for control over territory, ... raw materials and cheap labor’ (*Postmodern*, 5), seems credible in the wake of WikiLeaks and the Snowden release of US National Security Agency documents, not to mention the reciprocal allegations of cyberwarfare made by the Chinese and US governments. It feels safe to say, then, that Lyotard’s analysis makes plain how the age of computerisation raises to the next order of magnitude the question of media power in capitalist culture (see Gane, ‘Computerized’).

By the same token, the critical (and not entirely unexpected) point concerning the political-economy of knowledge production and ownership, couched in terms of control and access, is ghosted in Lyotard’s report by a quasi-Romantic disquietude over the reduction of hard-earned knowledge to consumable information. For at the base of these political-economic intensifications lies a more fundamental transformation of the nature of knowledge—its translation into ‘quantities of information’ so as to enable it to fit into new information-processing channels and new operational imperatives:

We can predict that anything in the constituted body of knowledge that is not translatable in this way will be abandoned and that the direction of new research will be dictated by the possibility of its eventual results being translatable into computer language. The 'producers' and users of knowledge ... will have to ... possess the means of translating into these languages whatever they want to invent or learn (*Postmodern*, 4).

Understood in terms of its pragmatics, knowledge, for Lyotard, is reducible neither to science in general—in the sense of humanity's 'stockpile' of knowledge (*savoir*)—nor to the specific learning that characterises a particular discipline (*connaissance*).<sup>1</sup> Knowledge in this analysis is much more than 'only a set of denotative statements' (18). It includes, additionally, notions of 'know-how', in the sense of 'knowing how to live', knowing 'how to listen'—it is a question not just of truth but also of competence (18). So what Lyotard calls the 'ideology of communicational "transparency"' (5) not only accelerates the capitalist commodification of knowledge but also severs 'truth' or 'information' from the specific competences that make 'someone capable of forming "good" denotative utterances, but also "good" prescriptive and "good" evaluative utterances' (*ibid.*). Accordingly, where it was once implicitly understood that 'the acquisition of knowledge is indissociable from the training (*Bildung*) of minds', in the scenario of computerisation one ultimately finds that this 'old principle ... is becoming obsolete and will become ever more so' (4).

What is perhaps most striking about this analysis, though, is the way that it appears at key times to succumb to the very ideology of communicational transparency it seeks to isolate. Producing something akin to a self-fulfilling prophecy, that is, Lyotard *follows* the reduction of knowledge to information in his analysis of such, insofar as he appears to stop short of considering knowledge in terms of the question of communication in all its complexity. Notwithstanding the use of a critical vocabulary that suggests otherwise, in fact, the production and dissemination of knowledge is routinely depicted in Lyotard's account in terms which suggest that the properties deriving from the *medium* of the communication are incidental or secondary to the *content*, such that knowledge, once 'legitimated' as such, can take the abstract form of pure, self-present information. Or, perhaps it's fairer to say that this image threatens to reassert itself at crucial moments in the narrative of knowledge's delegitimation, for the complexity and density of Lyotard's discussion defies any simple critique. Given the pace of technological development over the last 30 or so years, it is perhaps worth revisiting his analysis in any case, so as to assess the extent to which it may hold up today, and thus to identify how the conditions of knowledge may have changed since Lyotard first named 'the postmodern condition'.

The apparent incongruity between Lyotard's vocabulary and objective is plainest to see at the moment when the nature of knowledge is depicted in terms precisely of a communication process. In his 'summary' characterisation of 'the classical conception' of how scientific knowledge achieves its validity, Lyotard deploys the methodological vocabulary of 'language games' to analyse first research and then teaching in terms of the relations between the 'pragmatic posts' of 'sender', 'addressee' and 'referent' (23). The game of research is played and a statement is admitted as 'scientific', in this analysis, only when certain prescriptions regulate the transmission or exchange of knowledge. First, the sender must not only 'speak the truth about the referent' but also be capable of 'provid[ing] proof' in support of that statement, while being 'able to refute any opposing or contradictory statements concerning the same referent' (*ibid.*). Second, 'it should be possible for the addressee', on the basis of the same double requirement of proof and/or refutation, 'to give (or refuse) his assent to the statement he hears' (*ibid.*). These processes of proof and refutation are themselves grounded in the rules of verification and falsification that shore up a third prescription—the rule of adequation—which validates the truth of the statement: in short, 'it is permissible to think that reality is the way that I say it is', 'as long as I can produce proof' (24). Collectively, these rules

allow a horizon of consensus to be brought to the debate between partners (the sender and addressee). Not every consensus is a sign of truth; but it is presumed that the truth of a statement necessarily draws a consensus. (*ibid.*)

Brought together in a relation of equality and reciprocity—or intersubjectivity—by a shared competence in the rules of the game, therefore, two scientific minds establish the truth of a situation by way of a communicative exchange that attains or aspires to a form of mutual understanding and agreement.

‘That covers research’, Lyotard declares (ibid.). From here, the game of teaching can be deduced as but the ‘necessary complement’ of research: ‘the scientists need an addressee who can in turn become the sender’. Didactics is the means by which such addressees are produced, and it proceeds by way of the transmission of denotative statements, both of fact and of proof, which are presented ‘in the guise of indisputable truths’ (25).

Now: Lyotard is unambiguous in depicting this image of knowledge transmission as a characterisation of ‘the *classical* conception of the pragmatics of scientific knowledge’. And, as is well known, his subsequent argument concerning ‘performativity’ in research and education is based on a radical turn away from this classical conception towards highlighting the game of science’s legitimation not in the unconditional validity of denotative truth or scientific consensus but in an inevitable recourse initially to narrative, and subsequently to power. Accordingly, when he draws out certain ‘properties’ pertaining to knowledge on the basis of these classical scenarios, these illustrations serve to demonstrate the extent to which this conception of science arises as a function or effect of the pragmatics of science’s own transmission:

The game of science ... *implies* a diachronic temporality, that is, a memory and a project. The current sender of the scientific statement is supposed to be acquainted with previous statements concerning its reference (bibliography) and only proposes a new statement on the subject if it differs from the previous one.... This diachrony, which assumes memory and a search for the new, represents in principle a cumulative process. (26; emphasis added)

Today, ‘research’ continues to be identified with this proposition of ‘a new statement’ that differs from ‘previous statements concerning its reference’.<sup>2</sup> *Inside* the game, the production of research thus presupposes a scientific community whose members are well acquainted with existing knowledge on a topic—what in the language of research proposals is called ‘background’—and are capable of recognising the novelty of the research statement, understood as ‘original contribution’ to the discipline.

What I want to suggest at this point is (1) that this pragmatics of knowledge, hence concept of research, conforms to or derives from a very specific scenario of communication, whose apparent typicality cannot be taken as assured, and might even be characterised as mythological; and (2) that nothing in Lyotard’s justification of the method of ‘language games’, and nothing in the conclusions he goes on to draw concerning the incommensurability between language games and the potential for a form of legitimation to be ‘based solely on paralogy’ (60)—nothing in Lyotard’s development of these ideas ever quite calls into question the basic structure of this communicative scenario as the condition of a new statement. And it is in this sense that Lyotard might be thought to cut the question of communication short in his report on the status of knowledge in computerized societies, even where his predictions can be said to find empirical validation today.

To begin with, there is the question of *media*. In illustrating the classical conception of science’s validation of its statements, Lyotard explicitly appeals to a dialogic model of communication, in which ideas are transmitted via the seemingly transparent medium of speech. He even cites Plato’s *Dialogues* as the ‘very beginning’ of science, as the work in which ‘the pragmatics of science is set in motion’: ‘the game of dialogue’, he writes, ‘with its specific requirements, *encapsulates* that pragmatics’ (28; emphasis added). Yet, this appeal to the game of dialogue and the medium of speech can be understood as already anachronistic, insofar as the conception of science as a cumulative process—as implying a memory and a project, hence an ideal of progress—is not a notion that would easily present itself in classical Greek thought. And if we take seriously the question of media, then we might also note that it is by now almost a truism that the history of science is intimately tied to the possibility and development of *writing*.

That Lyotard is able to source the pragmatic scene of science—as distinct, in a sense, from dialectics—to Plato’s dialogues despite such potential anachronisms already hints at the mythological nature of the scenario he describes. In truth, there is a more recent, but no less historically situated, instantiation of the ideal communicative scenario from which Lyotard derives the paradigmatic pragmatics of research. It goes by the name of the Royal Society of London for Improving Natural Knowledge, which was founded in 1660 with an original membership consisting of around 50 virtuosi, natural philosophers and physicians, some of whom went on to earn reputations as significant figures in the history of science (most notably, the Honourable Robert Boyle).<sup>3</sup>

That this society or ‘club’ functions as the more likely referent of Lyotard’s sketch of the classical conception of science is indicated by two attributes of the society that are not immediately associated with the Greek scenario. First, the Royal Society literally takes the shape of a formal scientific *community*, in contrast to the predominantly dyadic and relatively spontaneous nature of Platonic dialogue. Secondly, almost from the beginning the Royal Society recorded and *published* its work in a scientific journal going by the rather delightful title of *Philosophical Transactions, Giving some Account of the present Undertakings, Studies, and Labours of the Ingenious in many considerable parts of the World*. This fact of publication is, of course, what enables membership of ‘the scientific community’ to extend beyond those who meet dialogue’s necessary condition of co-presence, expanding it to include ‘the Ingenious in many considerable parts of the World’. Indeed, it’s arguably this sense of a scientific or academic community underpinned by a national, if not global network of academic publishers, universities, libraries and so on, that allows the modern narratives of legitimation, grounded in a notion of universal humanity as self-legitimizing its knowledge or self-grounding its freedom, to make pragmatic sense.

When considered as an activity tied to a publishing and distribution system, in other words, the pragmatics of research exceeds what can be accounted for by an analysis of language games. From this we can see that the question of communication arises in Lyotard’s report as the displacement or delimitation of the classical *transmission* model of communication not via a reflection on the technics of media but via adoption of what communication theorist James Carey might call a *ritual* view of communication. In Carey’s words, ‘a ritual view of communication is directed not toward the extension of messages in space but toward the maintenance of society in time; not the act of imparting information but the representation of shared beliefs’ (Carey, *Communication*, 18). Understood as a ritual, in other words, communication serves to maintain a social bond through the reproduction of a shared form of experience and a set of tacit rules governing the situation. Or, in Lyotard’s words, ‘the observable social bond is composed of language “moves”’ (*Postmodern*, 11), which are subject to rules that ‘are the object of a contract, explicit or not, between players’ (10).

As ‘we’ know, Lyotard follows this alternative model of communication to the conclusion that the grand narratives once serving to legitimate knowledge have now broken up (or broken down). But returning to the question of media allows us to assess the status of knowledge in terms rather of its location in a system or network defined by the reach and stability of different *communications technologies*. In this view, different technologies possess different affordances or potentials with regard to where and when knowledge may be communicated, over what distance and for what duration, and so on. When these capabilities are factored into the equation, knowledge must be taken as inseparable from its moment of communication or reception, such that a given statement of knowledge—even in the form of ‘information’—has the nature of an *event*,<sup>4</sup> while knowledge as *savoir*, as ‘stockpile’, must be thought through the logic of *archive*. But further, the question of media draws attention to the effects on knowledge brought about by the computerisation not just of storage and access, but also of publication and distribution.

If print publishing and library systems helped to expand the limits of the scholarly community that functions as the subject of knowledge, in other words, what happens to that subject, hence to the knowledge it ‘knows’, as online publishing and other forms of digital communication become widespread? With this question we return to where *The Postmodern Condition* begins. But for all its prescience Lyotard’s report on knowledge could not have hoped to anticipate in full the rapid development over the last 20 years not only of online peer-reviewed journals and open-access book publishing, but also digital repositories, online

bibliographic databases, research aggregators, professional networking platforms, academic blogging, self- and unauthorised publication, post-print distribution, and more. Accordingly, while Lyotard reports on the computerization of knowledge in terms of the theme of ownership and control over access—a theme highlighted by Fredric Jameson in his ‘Foreword’ to Lyotard’s book—developments since that book’s publication suggest that the problem also takes the guise of display and discoverability, hence of audience and attention.

Indeed, the intensification of accessibility plays a part in the manifestation of this second component to the problem. Put simply, at a time when academic publishing is growing at an almost exponential rate and more and more research is being distributed and accessed via channels outside conventional scholarly publishing and academic library systems, the notion of an academic community as the subject of knowledge becomes increasingly untenable. Even as a phantasm informing the development and communication of a specific research statement, the disciplinary attributes of one’s (imagined, ideal) ‘addressee’ are nebulous at best.

The sheer mass of knowledge publication simultaneously calls into the question the *modality* of knowledge’s existence to the extent that the problem of access transforms into the problem of discovery: how do ‘we’ *find* a specific research statement (formation of an idea, solution to a problem, etc.)? Perhaps more to the point, how do ‘we’ determine the *non*-existence of such an idea, solution, conclusion, etc.? Who ‘knows’ these things?

At the same time, the modality of knowledge as ‘*savoir*’, as stockpile, transforms, making the issue of knowledge ‘storage’ a little more complicated than conventional readings of Lyotard would imagine. As knowledge is ‘digitised’, published on the web (both officially and unofficially), collected in online repositories, aggregated and indexed using variable algorithms, issued and distributed via social media, etc., *savoir* tends toward the logic of what John Hartley has called ‘the probability archive’ (Hartley, *Digital*, 155-75). The relative fragility of online publication, the uncertainty of continuance, the ephemeral nature of its dissemination via links and networks, mean that knowledge’s existence or non-existence becomes a matter of probability rather than certainty, a function of the ‘life’ of its referring links and of the success or otherwise of the search for it.

Of course, the expansion-cum-fragmentation of knowledge and its knower has conventionally been conceded and thence rendered innocuous via the principle of specialisation. Expansion of knowledge in the form of a proliferation of sciences, so the story goes, has seen specialisation in ever narrower fields of enquiry. While no one could ever hope to know ‘everything’, specialisation promises to ensure the existence of more closely knit communities of researchers that can work on commonly identified problems and validate new knowledge.

If the digital transformation of knowledge’s modality does not completely defeat the logic of specialisation, however, the economic imperatives deriving from the apparent limits to attention—its fundamental scarcity—may finish the job. This notion of an economy of attention (see Goldhaber, ‘Attention’) has its logical basis, if not its bibliographic origin, in yet another concept of communication, one which Denis McQuail has dubbed the ‘publicity model’ (*Mass*, 51-53). This third view highlights the important point that *spectatorship*—or reception in the sense of simply attending to the communication—is essential to the communicative event. In the context of media rich environments, in this view, communication takes the form of a competitive display, vying for an inherently scarce resource: people’s attention. Of course, for broadcast media and entertainment industries, this ‘publicity’ view is less a model of communication than a fundamental commercial reality, the overriding imperative being to attract sufficient quantities of viewers so as to leverage that net attention for financial gain.

Acknowledging the imperatives of this model, then, we could supplement Lyotard’s political-economic analysis of capital’s effects on research production with an analysis of economies of attention. The phenomenon of ‘reputation’ and the development of citation metrics would undoubtedly feature prominently in such an analysis, pointing to the opportunities for increased performativity that a research profile brings. By the same token, it is in such consequences that the conventional logic of specialisation comes undone. In a research environment answerable to the principles of attention economics, that is, specialists function

as nodes and attractors of research activity rather than as masters of their field. Their work serves to generate exponentially more research that, in turn, according to the logic of specialisation, requires reciprocal mastery for the specialist to satisfy the criteria of specialism. The logic of specialisation thus founders on a scaled-down but otherwise comparable version of the more general problem conditioned by the communicative properties of display and attention: amidst the mass of competing claims for our scholarly attention, how do 'we' become aware of a new statement?

Having thus proposed a principle by way of that question, moreover, it becomes possible to see the variable of attention at work even in the 'original' Greek situation of scientific knowledge 'transmission'. Ultimately, any argumentative success that Plato may have had in the course of his dialogues had to have been contingent upon the happenstance of his interlocutors (or addressees) attending to his discourse, a fact which points to the fundamental arbitrariness or serendipity that underpins even the dyadic scene of dialectics.

The deceptively simple point here is that the instability or uncertainty characterising the first-person reference in a statement of the form 'we know...' takes more than one form. Lyotard's report is well known for affirming the value and necessity of *dissension*, lack of agreement, in the pursuit of legitimation by way of paralogy. Paralogy—the invention or introduction of new rules in the game; the disruption of stable systems—is the differential activity that drives science in the postmodern condition. As 'a power that destabilizes the capacity for explanation, manifested in the promulgation of new norms for understanding', paralogy is 'a factor that generates blind spots and defers consensus' (Lyotard, *Postmodern*, 61). Dissension defeats claims of the form 'we know...', because, put simply, some of 'us' know *differently*.

The question for us today, however, concerns the extent to which paralogy adequately accounts for this knowing differently as a difference in the community of knowers. In characterising the 'major shift in the notion of reason' that accompanies the postmodern plurality of language games, Lyotard writes:

The principle of a universal metalanguage is replaced by the principle of a plurality of formal and axiomatic systems capable of arguing the truth of denotative statements; these systems are described by a metalanguage that is universal but not consistent. What used to pass as paradox, and even paralogism, in the knowledge of classical and modern science can, in certain of these systems, acquire a new force of conviction and win the acceptance of *the community of experts*. The language game method I have followed here can claim a modest place in this current of thought. (43-4; emphasis added)

It's at this moment that the image of community and of communicational transparency characterising the 'classical conception of science' returns. Understood in terms of the basic structure of research *communication*, in other words, is there any difference between scientific validation of new statements and scientific acceptance of paralogism? Lyotard's emphasis on dissension notwithstanding, novelty—as the difference of the new—continues to appear as such explicitly within the limits of a stable community ('the community of experts') that remains imaginable, if not necessarily identifiable.<sup>5</sup>

Difference in knowledge (new statement), difference in community (dissension)—to what extent do these differences coincide? And to what extent does dissension capture the forms of difference *within* 'the' community 'who knows'?

While Lyotard's report on knowledge shows surprising prescience in relation to many of the developments in computerised societies, those same developments have also drawn attention to certain properties of communication that ultimately frustrate the language game method informing that analysis. This is no clearer than in the report's quasi-utopian conclusion, where Lyotard returns to the question of 'how the computerization of society affects this problematic' (67). While computerisation 'could become the "dream" instrument for controlling and regulating the market system, extended to include knowledge itself', Lyotard,

writing more than 30 years ago, dares to imagine an alternative: 'give the public free access to the memory and data banks. Language games would then be games of perfect information at any given moment' (ibid.).<sup>6</sup> Today, we can see that even at current levels of access, which fall well short of Lyotard's ideal, the intensification of accessibility, the affordances of the probability archive, and the economics of attention all expose the ideal of perfect information as a fantasy. In assuming that games of perfect information are possible, the theory of language games admits the ideology of communicational transparency even as it takes that ideology as the target of its critique.

But further, '*imperfect information*' can now be seen to name not so much a lack of information or a gap in knowledge, but a break in the limit by which a community would 'ideally' be circumscribed: the doorway through which 'addressees' continually enter and exit, as they will. Imperfect information is not a contingent lack of information but a structural effect of the fact of communication. With respect to the question of knowledge communication in computerised societies, we can put it thus: research does not consist in the production of new knowledge so much as appear by way of a communicative *event* that is subject to the *contingencies* of being noticed, hence to the workings of the attention economy. From the absence of a collective subject who 'knows', however, and who can thereby validate the novelty of a given research statement, two consequences seem to derive. The first is that research, even 'innovative' and 'quality' research, is structured not (simply) by a body of background knowledge (a bibliography) that constitutes science's 'memory' and whose gaps or absences charges science with a 'project'. Rather, or additionally, research takes shape through the maintenance of an enabling ignorance, a necessary and constitutive neglect of what we nevertheless like to call 'the existing body of research'. Even specialists write in fundamental ignorance of whether or not their new moves might in fact be repetitions.

The second consequence, which presents more as a possible strategy, is that research might be understood now to consist less in the production of new statements than in the production of new *connections*. This production can be understood as entailing a kind of interdisciplinarity, a connection between different sites of knowledge, to be sure. But it might also entail the production of new 'communities', new 'addressees', which is to say, new *audiences*—especially in the guise of what we might call 'non-traditional' research audiences. As a 'project', such a thought takes as given the lack of a referent to the first-person plural pronoun. Moreover, it produces that difference, that lack of reference, in the very act of communicating. It happily opens disciplinary knowledge to addressees who, by definition, lack the 'know-how' required to judge the 'good' statement, or to act on it, perhaps even to understand it, but addressees who remain free to use that 'knowledge' as they will. In this way, radical '*misunderstanding*' and '*misappropriation*' may be affirmed as mechanisms by which both innovation and paralogy are produced, by which consensus is deferred, and by which, in Lyotard's terms at least, 'terror' is frustrated. Research's 'contribution to knowledge', accordingly, would be a function of the novelty of its connections.

The challenge that this possibility presents to the institution in which research is conventionally understood to take place (the university) is that it runs counter to the imperatives of research viewed from the perspective of attention economics. The games of research measurement and performance management undoubtedly favour a 'mass media' strategy of maximising scholarly attention by publishing in widely-read, high-impact journals. By the same token, there's no reason to believe that these two research strategies are necessarily at odds, in the sense that one might not flip over into the other at some point. Nor is it certain that the attention-maximisation game is simply imposed on researchers by an oppressive institution, given that most of 'us' willingly court and follow reputation. What the very possibility of this alternative conception and strategy of research may *practically* demonstrate, though, is that research and researchers can never be made entirely subject to the rules of a given game, nor ever completely circumscribed by any community. Whether that conclusion, which bears all the hallmarks of particular kind of philosophical ritual, may nevertheless count as new knowledge is a question to which I can only respond: who knows?

## Notes

1. It's worth recalling here that the strong distinction present in English academic discourse between 'science' (or 'the sciences') and 'the humanities' has no simple correspondence in French intellectual

discourse, nor in Europe generally. The closest French approximation to what the English-speaking academic world calls 'the humanities' is '*les sciences humaines*' (the human sciences). Accordingly, wherever Lyotard speaks of 'science' or 'scientific knowledge', he does not exclude reference to humanities disciplines—notwithstanding the fact that his entire discussion in *The Postmodern Condition* revolves around a distinction between what he calls 'scientific knowledge' and 'narrative knowledge'. #back

2. Take, for instance, the definition of research activities offered by the OECD's *Frascati Manual*, which proposes 'standards for surveying and measuring research and development (R&D)': 'The term R&D covers three activities: basic research, applied research and experimental development.... **Basic research** is experimental or theoretical work undertaken primarily to acquire *new knowledge* of the underlying foundation of phenomena and observable facts, without any particular application or use in view. **Applied research** is also *original investigation* undertaken in order to acquire *new knowledge*. It is, however, directed primarily towards a specific practical aim or objective. **Experimental development** is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing *new materials, products or devices*, to installing *new processes, systems and services*, or to improving substantially those already produced or installed' (30; emphases added). Research, in other words, always entails the production of novelty (see also Briggs & Lucy, 'Art'). #back

3. I owe my awareness of the Royal Society's specific existence, and its role in instituting many of the principles of scholarly communication and publication that are still respected today, to a talk given by Cameron Neylon early in 2015. For a recording of a version of that talk, see Neylon, 'Boyle's'. See Lomas, *Invisible*, for an engaging account of the Royal Society's origins and formation. #back

4. As an aid to understanding research as an event, Michel Foucault's *Archaeology of Knowledge* remains an essential reference: 'However banal it may be, however unimportant its consequences may appear to be, however quickly it may be forgotten after its appearance, however little heard or however badly deciphered we may suppose it to be, a statement is always an event that neither the language (*langue*) nor the meaning can quite exhaust. It is certainly a strange event: first, because on the one hand it is linked to the gesture of writing or to the articulation of speech, and also on the other hand it opens up to itself a residual existence in the field of a memory, or in the materiality of manuscripts, books, or any other form of recording; secondly, because, like every event, it is unique, yet subject to repetition, transformation, and reactivation; thirdly, because it is linked not only to the situations that provoke it, and to the consequences that it gives rise to, but at the same time, and in accordance with a quite different modality, to the statements that precede and follow it' (*Archaeology*, 28). #back

5. If, 'in principle, no scientist embodies knowledge or neglects the "needs" of a research project, or the aspirations of a researcher, on the pretext that they do not add to the performance of the "science" as a whole' (Lyotard, *Postmodern*, 63), it is nevertheless the case that the limits to this embodiment, the ignorance or neglect (lack of attention), present for Lyotard as a function of deliberate disregard from the community of experts: 'Countless scientists have seen their "move" ignored or repressed, sometimes for decades, because it too abruptly destabilized the accepted positions, not only in the university and scientific hierarchy, but also in the problematic. The stronger the "move", the more likely is *to be denied* the minimum consensus' (ibid.; emphasis added). #back

6. Games of perfect information are games, like chess, where no information is hidden from any of the players. They are distinguishable from games of imperfect information, like poker, where one or more players know something (i.e. their own cards) that other players don't. #back

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