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MacColl's elusive pluralism

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Résumé : MacColl a été récemment l'objet de trois intéressantes thèses. D'abord, il serait le probable père du pluralisme en logique. Ensuite, son pluralisme porterait un instrumentalisme sous-jacent. Enfin, les deux thèses précédentes expliqueraient l'oubli dans lequel il serait tombé après 1909. Bien qu'il soit à la fois pluraliste et instrumentaliste à certains égards, je suggérerai qu'il est difficile de trouver dans les écrits de MacColl un pluralisme qui puisse satisfaire les trois thèses précédentes en apparaissant pour la première fois chez MacColl, en trouvant ses sources dans un instrumentalisme adapté à la logique, et en étant l'explication à l'oubli dans lequel était tombé son auteur.

Abstract: MacColl is the recent subject of three interesting theses. One is that he is the probable originator of pluralism in logic. The other is that his pluralism expresses an underlying instrumentalism. The third is that the first two help explain his post-1909 neglect. Although there are respects in which he is both a pluralist and an instrumentalist, I will suggest that it is difficult to find in MacColl's writings a pluralism which honours the threefold attribution of having been originated by him, having been rooted in an instrumentalism adapted to logic, and being the occasion of his neglect.

The writer of this paper would like to contribute his humble share as a peacemaker between the two sciences, both of which he profoundly respects and admires. He would like to deprecate all idea of aggression or conquest. [...] Why should not logicians and mathematicians unite [...] under some common appellation?

[MacColl 1880, 47]

In Logic, there are no morals. Everyone is at liberty to build his own logic, i.e., his own form of language, as he wishes.

[Carnap 1937, 52]

We are pluralists about logical consequence. [...] We hold that there is more than one sense in which arguments may be *deductively valid*, that these senses are equally good, and equally deserving of the name *deductive validity*.

[Beall & Restall 2001, 1]

The birth of pluralism?

In their authoritative “Hugh MacColl and the birth of logical pluralism”, Shahid Rahman and Juan Redmond observe that “MacColl’s philosophy is a kind of instrumentalism in logic which led him to set the basis of what might be considered to be the first pluralism in logic” [Rahman & Redmond 2008, 539–540], thus echoing a suggestion of Ivor Grattan-Guinness to the same effect [Grattan-Guinness 1998].¹ Pluralism has become a hot-button issue in the philosophy of logic. Not only was it the official theme of a meeting not too long ago of the Society for Exact Philosophy² and of the Tartu Conference in 2008,³ but approving monographs now flow from the best university presses [Beall & Restall 2006]. If there were a better time than now to reflect on MacColl’s importance for logical pluralism, I would be hard-pressed to name it.

Seen Rahman and Redmond (henceforth: R & R)’s way, MacColl’s pluralism embeds a philosophical component and a linguistic component. The philosophical component is logical instrumentalism. Instrumentation also has two parts. On the one hand, it is a goal-sensitive doctrine according to which the tenability of a system of logic is a matter of how well it produces the outcomes for which it was designed. On the other hand, there are different yet equally legitimate purposes which a logic can be made to subserve.

The linguistic part of MacColl’s pluralism is captured by the idea that a logic’s formalism will contain classes of expressions bearing variable interpretations that facilitate the realization of logic’s shifting goals. Thus we read that:

there is nothing sacred or eternal about symbols; [...] all symbolic conventions may be altered when convenience requires it, in order to adapt them to new conditions or to new classes of problems.
[MacColl 1906, 1]

With MacColl we have one of those occasions with which intellectual history is littered. In his life-time, MacColl’s work was known to most of the major logicians of his day, with a number of whom he had a profitable correspondence. But with his death in 1909, recognition of the importance—indeed of the fact—of his writings ceased. What explains this regrettable collapse, this consignment to oblivion? R & R offer two suggestions. One is that since MacColl lacked the technical tools that lifted early twentieth century mathematical logic to its first maturity, he was unable to make good on many of

1. I. Grattan-Guinness now recants MacColl’s pluralism, as witness his contribution to this volume.

2. See the proceedings of the meeting published as [Woods & Brown 2001]. See in particular four of its chapters: [Beall & Restall 2001], [Priest 2001], [Woods 2001], and [Sher 2001].

3. Conference on Logical pluralism, University of Tartu, August 27–31, 2008, with a bevy of notables, ranging from Beall to Westerståhl. Papers from the conference are now starting to appear in print. See, for example, [Field 2009].

his most important insights. The other is that he “was probably the first to explicitly extend conventionalism and instrumentalism to logic” [Rahman & Redmond 2008, 534], which, they say, is “the basis of what might be considered to be the first pluralism in logic” [Rahman & Redmond 2008, 539–540]. And they add: “Unfortunately most of [MacColl’s] ideas were not developed thoroughly and many others remained in a state which makes them difficult to grasp” [Rahman & Redmond 2008, 540]. Accordingly, we have from R & R three interesting claims to keep an eye on.

THE PLURALISM THESIS: *MacColl is the probable originator of pluralism in logic.*

THE INSTRUMENTALIST THESIS: *This pluralism is embedded in and is an expression of MacColl’s adaptation of instrumentalism to logical theory.*

THE NEGLECT THESIS: *MacColl’s neglect by the post-1909 waves of modern symbolic logic, even the branches to which he made pioneering contributions, is explained, in part at least, by this instrumentalism and the pluralism which inheres in it.*

These observations of R & R’s provide me with the wherewithal to box my own compass and to chart my own course. This is the course of interpretation and assessment. I want to know how to understand the Rahman and Redmond-theses (henceforth: RR-theses) and I want to know whether they are true. It will not be clear sailing. Trouble threatens, partly MacColl’s doing and partly R & R’s. The first difficulty is occasioned by the fragmentary and ill-explained state of MacColl’s own pronouncements. The other flows from the fact that MacColl’s pluralism and instrumentalism are not self-ascribed but rather are attributed by R & R. They say that MacColl originates *our* concept of pluralism and instantiates *our* concept of instrumentalism.

There is a further challenge to be quickly considered. It arises from the so-called (and misnamed) principle of charity [Scriven 1976]. Charity bids me to interpret the RR-theses in ways that give them a fair shot at being true. But the RR-theses are claims about MacColl. Charity also requires that we read MacColl in ways that give *his* views a fair shot of being true. Where, then, does my first duty lie? Must I read MacColl with a view to making MacColl right or with a view to making R & R right? Let it not be supposed that these are always the same readings. For if that were the case, the only ways in which it would be permissible to read MacColl would be ways that give pluralism and instrumentalism *themselves* a fair chance of being true. But that’s too much front-loading for serious consideration here. What I want to know is not whether MacColl’s views are correct, but rather whether R & R’s characterizations of them are correct. This tells us something interesting about the charity principle. It triggers a tension when pairs of texts or parties are involved, with the one interpreting the other.⁴

4. Of course, one of the main challenges to the charity principle is determining how much slack to cut in order to give an utterance or text a fair shot at coming

Modus operandi

Here is how I propose to proceed. I will try to determine whether there are versions of present-day pluralism and instrumentalism which offer some promise of confirming the appropriately adjusted RR-claims. That is, I want to see whether there is a *modern* pluralism shaped by a *modern* instrumentalism which would have been neglected by the very people (whoever they turn out to be; see below) who, according to the Neglect Thesis, were the actual neglectors of MacColl's own instrumentally shaped pluralism. I will then try to determine whether grounds exist for attributing that pluralism and that instrumentalism to MacColl.

I don't want to minimize the difficulties that lie ahead. Our pluralism and our instrumentalism are not "free on board". They are themselves unruly families of not always compatible views, ranging in interest, plausibility and complexity from not very to very very. There are more ways of being a pluralist about logic, and an instrumentalist too, than I have space for here. I want, if I can, to subdue some of this abundance by operating at levels of abstraction consistent with the achievement of the paper's goals. The pluralistic and instrumentalistic themes that I will sound in the coming sections will be discernible for the most part to anyone familiar with the 20th century developments in logic. So, to the extent possible, I will flesh them out with a minimum of specific attribution. While the principal focus is present-day pluralism, at various places I will cut to MacColl, or segue to instrumentalism, when doing so will assist in testing the RR-claims. A slightly more stand-alone discussion of instrumentalism will occupy us in the "Instrumentalism" section below.

In the next section I'll be mainly concerned with house-cleaning. I want to sweep away some of the forms of pluralism which, while not devoid of interest, are not of much moment for present purposes. For recall, we are searching for a pluralism that MacColl invented and which expresses—or is shaped by—an instrumentalism of a kind that would explain its author's neglect.

Many-one pluralism

MacColl's contributions to logic are striking. He is an original and protean thinker, multi-tasking outside the box and beyond the reach of his technical powers. His pioneering work ranges far and wide, and his writings anticipate some of the most important developments in the work that was yet to come. In his writings we have the modal systems of strict implication, we have many-valued logic, relevant logic, and connexive logic, and we have probability logic. In one sense, this is already a kind of pluralism—one that answers Graham

out true. There isn't time for that here. For a recent discussion of how the charity principle does *not* work, see [Paglieri & Woods 2009].

Priest's question, "Logic: one or many?" with "Many" [Priest 2001] . MacColl as we might say, is a *many-one pluralist*. Less clear is whether this is the pluralism intended by the passage on the alteration of symbolic conventions, quoted above from MacColl's *Symbolic Logic*. Less clear than that is the reality of the connection to instrumentalism. Less clear still is the purported bearing on MacColl's neglect.

Consider a case. There is a well-known dispute in logical theory as to when a formalism achieves the status of logic. For most of his philosophical career, Quine was of the view that nothing is a system of logic beyond first-order quantification theory with identity [Quine 1970].⁵ Accordingly, the *S* systems of modal "logic" might be linguistic or philosophical theories of necessity, but they are not logics; and the FDE family of relevant "logics" might be theories of inference or belief revision but they aren't logics either.⁶ The divide between classical and non-classical logics is often marked by a dispute about which classes of expressions qualify as logical particles.⁷ This in turn gives rise to a certain kind of pluralist/unitarian tension. If we hold with Quine that only the usual logical particles⁸ under their classical interpretations are genuinely logical terms, then we are *logical-term* unitarians. But if we find against Quine, if we allow that the alethic modal ' $\Box$ ' and the epistemic modal ' K ' are also logical particles or that ' $\sim$ ', ' $\wedge$ ', ' $\vee$ ', ' $\supset$ ' and ' $\equiv$ ' non-classically interpreted also qualify, then we are logical-term pluralists.

Does being a unitarian about logic require that we reject instrumentalism? Does it require that we eschew the idea that "symbolic connections may be altered ... in order to adapt them to new conditions or to new classes of problems"? Quine's unitarianism is a substantial discouragement of these suggestions. Quine's unitarianism arises from the thesis that there is just one task for logic legitimately to perform, namely, to provide a philosophically coherent accommodation of the language of science. If logic had other good purposes—such as the formal analysis of necessity—then Quine's instrumentalism would have bade him to get on with it. Quine's unitarianism flows not from an anti-instrumentalism but rather from the philosophical conviction that there is nothing in what logic is needed for beyond the provisions of first-order quantification theory. Similarly, Quine's concomitant pledge to the canonicity of first-order formalisms counts for nothing against the point that formalisms

5. Let's be careful. Quine's views on *logic* allow for this possibility. But his *philosophical* views are not much at ease with it. On the other hand, the present position is explicitly held by Harman [Harman 1972].

6. For different versions of the view that implication and inference require different treatments, see [Woods 1968], [Woods & Walton 1972], [Harman 1986, chap. 1], [Apostoli & Brown 1995] and [Brown 2002].

7. Concerning which, even among the classically-minded, there is a notable definitional uncertainty. See [Tarski 1956], [Peacocke 1976], [Hacking 1979] and [Gabbay 1994].

8. Or some one of them to which the others are reducible by way of the functional completeness metatheorem.

can be adjusted when the conditions warrant it. It proceeds rather from the philosophical conviction that, as it happens, conditions *don't* warrant it.⁹

What now of the suggestion that MacColl is the (probable) originator of pluralism in logic? As we see, there is a perfectly good sense of pluralism, which MacColl's work certainly instantiates, for which the originality thesis won't hold up. In this sense, Aristotle himself was logic's first pluralist, what with his non-modal syllogistic, his logic of immediate implication¹⁰ and his modal syllogistic. Accordingly,

NOT ORIGINAL: *There is a sense of pluralism in logic—the many-one sense—according to which it is possible to be an instrumentalist without being a pluralist, and for which the thesis of a MacCollian nativity fails.*

This leaves the reverse question. Can you be a many-one pluralist without being an instrumentalist? One wonders. Take Aristotle again. Aristotle would say that adjusting one's notation in ways that facilitate an analysis of necessity is a legitimate and necessary thing for a logician to do.¹¹ The goodness or badness of modalizing the language of the syllogistic is to be judged by the extent to which the modal analysis actually comes off or at least is achievable in principle.¹² If this is what instrumentalism is, then Aristotle is an instrumentalist. If this is what instrumentalism is, then even *realists* are instrumentalists, and we have an answer to our second question:

NOT MACCOLL'S: *The present sense of instrumentalism is not the instrumentalism which scholars think is peculiar to MacColl.*

Of course, it is trivial that for instrumentalism in this sense the Neglect Thesis also fails.

MacColl's own words suggest an attraction to the following view: Anything that facilitates the attainment of a good end without falling foul of some sufficiently bad end inherits the good end's goodness. More briefly, the goodness of ends is imbibed by their means. This is hardly instrumentalism in any sense seriously deserving of the name. But let's cut it some slack and give it the name of *means-end instrumentalism*. Means-end instrumentalism stands to philosophically robust instrumentalism as white chocolate stands to chocolate. Accordingly, although MacColl is a many-one pluralist and a means-end instrumentalist, neither of these positions originates with him, and neither is a plausible basis for his neglect. This leaves us some further work to do, not

9. Of course, this is what we might call *vintage* Quine. Late in his career, he softened his resistance to intuitionistic logic and abandoned it altogether for quantum logic, albeit with regret [Quine 1992].

10. Misleadingly called immediate inference.

11. For example, Aristotle insisted that syllogisms be built of propositions only—or what we would call categorical propositions, that is, statements of the *A*, *I*, *E*, *O* forms.

12. Or, perhaps, initiates a research programme that ultimately succeeds.

least concerning the sense in which MacColl really was an instrumentalist—that is, a philosophically robust one. I want, as I say, to postpone the more important parts of the discussion of the instrumentalism question until later. For the present, let me call a brief time-out for a few words about formalisms.

There is nothing especially exotic about the observation that logics with different vocabularies can be put to quite different uses—think here of the language of classical first-order logic and the language of (say) *KT45*.¹³ Neither is there much of interest in the claim that a symbol of one language could also be given the interpretation customarily possessed by a different symbol of a different language—think here of the decision to give to the box symbol ‘ $\Box$ ’ of *S5* the interpretation standardly possessed by the ‘*K*’ symbol of the *KT45* adaptation of it. Regarding the first of these claims, we could say that different logical symbols can express different concepts. Regarding the second claim, we could say that a given logical symbol can be given different interpretations which express different concepts. Thus in the first instance, ‘ $\Box$ ’ expresses the necessity operator and ‘*K*’ the knowledge operator; and in the second, ‘ $\Box$ ’, which carries the standard interpretation of necessity, is given the customary interpretation of ‘*K*’ as a non-standard interpretation. This is not yet all there is to MacColl’s pluralism—not anywhere close.

So we sum up. Many-one pluralism is as interesting as the unitarianism it rejects and the logics to which it extends its hospitality. But it bears repeating that in the present context it is hardly interesting at all. For as we see, there is nothing original about MacColl’s many-one pluralism and nothing in it that requires an instrumentalist foundation; and so nothing that would induce its neglect on that basis.

Multiplicities

The founding datum for the more interesting pluralisms of present-day logic is *multiplicity*. There are, as the saying has it, more logics than you can shake a stick at. It is an unruly plenitude—crowded, chaotic and conflicted.¹⁴ It is a discipline excited into cellular excess by a misbehaving auto-immune system. It is a turbulence that over-runs its own quality controls.

The pluralisms I now want to discuss embed a strategy for saving face. In its most general form, it is a strategy which *sanctions* modern logic’s multiplicities while *dissipating* the bad odour they exude. It is a proposal to make of logic’s ceaseless pullulations a teeming prosperity,¹⁵ *une richesse sans l’embarras*. The two most problematic features of logic’s multiplicity are in-

13. *KT45* is an epistemic adaptation of *S5*. See, for example [Auman 1976].

14. For a classification of this multiplicity, and the suggestion that instrumentalism is not implied by pluralism, see [Haack 1978].

15. To borrow Quine’s words about quite another thing. (Of course!)

compatibility and blindness.¹⁶ The problem with incompatibility is falsity. For every cluster of pairwise incompatible logics, at least half are false. The problem with blindness is want of subject matter, the absence of something to be about. There are two ways of annulling these difficulties, each a form of denial. In its first form, which I'll call "existential denial", it is the claim that these logics aren't in fact in conflict with one another and aren't in fact blind. In its second form, which I'll call "even-so denial", the incompatibilities and the blindness are acknowledged, but their offensiveness is not. Seen the first way, the properties are bad but not present. Seen the second way, they are present but not bad. Of these two forms, existential denial has a much larger provenance in the literature. Since time presses, I shall confine myself to it, reserving even-so denial for another occasion.

Consider now a very simple case. $\mathcal{M}$ is a family of propositional modal logics spanning the period from 1918 to 1951. They are the eight strict implication logics of Lewis, $S1$ to $S8$, Brouwer's system B , Gödel's basic system G , Feys' system T , and von Wright's system M . What makes $\mathcal{M}$ an interesting cluster is that it has a structure, as in the figure below,¹⁷ which attracts some typical pluralist responses.

The arrows and dotted lines have the following significance:

1. $\rightarrow$ expresses containment.
2. Systems above line A have the Gödel rule RL (if $\vdash \varphi$ then $\vdash \Box \varphi$).
3. Systems below line A don't have RL .
4. Systems below line B have $\vdash \Diamond \Diamond \varphi$.
5. Systems above line B don't have $\vdash \Diamond \Diamond \varphi$.
6. Systems above line A are incompatible with $\vdash \Diamond \Diamond \varphi$.
7. Systems below line B are incompatible with RL .

16. These are not only different problems, but it is not easy to see how a cluster of logics could be afflicted by them concurrently. See below, the "The vernacular" section.

17. Which I adapt from [Follesdal 2004].

Perhaps $\mathcal{M}$ isn't much of a multiplicity. It is not nearly as big as the chart—let's call it $\mathcal{M}'$ —of normal logics in [Hughes & Cresswell 1968, 346], and the even larger chart $\mathcal{M}''$ in [Hughes & Cresswell 1996, 18]. But even $\mathcal{M}$'s comparatively modest multiplicity is enough to stir the pulse of pluralism. To see how, let me begin with a brief word about blindness. There are several logics in this cluster. This alone is offensive to unitarian leanings. There aren't, we might think, enough different things for these different logics to be logics *of*. It is a Kantian complaint: Theories without subject matters are blind. What, then, are we to do to restore to $\mathcal{M}$ the desired respectability?

Subconcept pluralism

Talk of subject matters in logic is loose talk. We should try to tighten up. Perhaps concepts are the way to go. It is widely agreed that the central target for logic is the concept of consequence. It is also generally supposed that when a logic's analysis of implication proceeds by way of its provisions for the logical particles, then their denotata are also targets for analysis. One way of specifying the subject matter of a logic is to equate it with its target concepts. In the case of the members of $\mathcal{M}$, their subject matter is implication, possibility and, say, negation and conjunction.¹⁸

Thinking of subject matters in this way solves the blindness problem for $\mathcal{M}$. But it does so in a way that appears to land us in the incompatibility problem. Consider, for example, *S5* and *S2*. While it may be true that they have this same subject matter, isn't it problematic that concerning $\Diamond\Diamond\varphi$ they make incompatible *provision* for it?

One way of reconciling difference of treatment to sameness of subject matter, and of doing so in a way that solves $\mathcal{M}$'s incompatibility problem, is to identify the sameness with a common generic concept and the differences with different *specific* subconcepts of it. Accordingly, the concept of implication would stand to its subconcepts in $\mathcal{M}$ as genus stands to species.

The distinction between generic concepts and their specific concepts helps us see the compatibility between

GENERIC UNITARIANISM: *A class of logics is generically unitarian to the extent that they have the same generic target concepts.*

and

18. There is currently a good deal of philosophical turbulence about concepts—stretching from the sceptical view that there aren't any (or its slighter version that no philosophical good could be got from them if there were any) to the more generous view according to which the problem isn't that there aren't any concepts but rather that philosophers haven't yet come close to getting at the philosophical good that is in them. Concerning the first of these positions, see for example [Machery 2009] and, concerning the second, [Margolis & Laurence 1996]. I have considerable respect for the problems thrown up by an ontology of concepts. But unless I am much mistaken, my invocation of them here will not require the disarming of those difficulties.

SPECIFIC PLURALISM: *A class of logics is specifically pluralistic to the extent that its target concepts include different subconcepts of common generic concepts.*

We have it that while $\mathcal{M}$ is generically unitarian it is also specifically pluralistic. Accordingly,

SUBCONCEPT PLURALISM: *$\mathcal{M}$ exhibits subconcept pluralism with respect to, say, implication, if and only if implication is one of its generic concepts, and its different treatments of implication are treatments of implication in their respectively different subconceptions.*

COROLLARY: *Sets of logics exhibiting subconcept pluralism with respect to their key targets are not in conflict with one another.*

I say again that this would seem to solve $\mathcal{M}$'s incompatibility problem. It does so in the manner of *existential denial*. Since the apparently conflicting sentences of the apparently conflicting systems in $\mathcal{M}$ are about different subconcepts of some commonly targeted generic concept, the incompatibilities are only apparent.¹⁹

In a good many approaches, the concept-subconcept arrangement is understood *semantically*. When G is a generic concept of which $G_1, \dots, G_n$ are subconcepts, then the term ' G ' (and its cognates) is n -wise ambiguous as between the meaning of ' G ', the meaning of ' G_1 ', the meaning of ' G_2 ', and so on. When this happens, we may say that specific senses are tied to generic senses by a relation of meaning-subsumption. Specific meanings of 'implies' imbibe its generic meaning as a necessary but not sufficient condition. This, too, appears to solve the incompatibility problem. If 'implies' is ambiguous as between 'implies'₁, 'implies'₂, and so on, then logics making apparently incompatible provisions for implication are in fact making perfectly compatible provision for different senses of "implies". Whereupon, we have a further specimen of pluralism, also of the existential denial sort:

AMBIGUITY PLURALISM (1): *$\mathcal{M}$ exhibits ambiguity pluralism with respect to, say, implication if 'implies' is n -wise ambiguous as between the meanings of 'implies'₁, 'implies'₂ ... 'implies' _{n} and the meanings of the 'implies' _{i} subsume the generic meaning of 'implies'.* **COROLLARY:** *Sets of logics exhibiting ambiguity pluralism with regard to its key terms do not conflict with one another.*

Our generic unitarianism and the ambiguity version of subconcept pluralism are clearly present in some of the pluralisms of the present day, notably in Beall and Restall (henceforth: B & R). B & R [Beall & Restall 2001, 1] are unitarians about the generic concept of validity (or equivalently, implication and consequence):

19. Hartry Field dislikes this solution. He points out that the word 'electron' differs in meaning in the theories of Thomson and Rutherford, but "Rutherford's theory disagrees with Thomson's *despite* this difference in meaning." [Field 2009, 345] (emphasis added).

- i. An argument is valid when there is no case in which the premises are true and in which the conclusion is not true.²⁰

But since they think that there are different species or subconcepts of this generic one, they are also subconcept pluralists about validity. Moreover, since they hold that subconcept pluralism arises from the ambiguity of “case” in the generic definition, their pluralism is of the ambiguity kind.

Do we find this same pluralism in MacColl? There is reason to think that we do. In his battle with Russell over the place of material “implication” in logic, MacColl is stoutly unitarian about the generic notion of implication.

- ii. φ implies ψ if and only if it is in no sense possible both that φ and $\sim \psi$.²¹

But MacColl is also wholly at home with the idea that there are different subconcepts of implication—relevant implication, connexionist implication, many-valued implication, and so on.²² There is also reason to think that MacColl would be drawn to the ambiguity version of subconcept pluralism. Accordingly, MacColl's Unitarianism about (deductive) implication can be expressed as follows:

- iii. φ implies ψ iff there is some sense of “possible” for which the conjunction of φ and $\sim \psi$ is not in its extension.

For as R & R rightly observe,

MacColl tried to reflect the distinctions of natural language in his formal system rather than the other way around, as Frege would.
[Rahman & Redmond 2008, 546]

How could the distinctions between strict, relevant, connexionist and many-valued implication be present in natural language without it being the case that “implies” is ambiguous in just those ways?

As easy as it is to find these pluralisms in MacColl, it is at least as difficult to see them as *originating* with him. The idea that there are various kinds of implication containing a common core notion is as old as Aristotle. Aristotle distinguished between the core notion of necessitation and the particular cases of syllogistic implication and immediate implication, with still further subdivisions looming in the fragmentary work on modal syllogisms. So I don't

20. Field disputes whether generic implication is in fact captured by (i). This is an important demurral and a can of worms. Field maintains that as long as (i) is bound by the seemingly faultless condition that “all cases” in (i) include all actual cases, then ‘implies’ can't even be “*extensionally* captured” by it. It is interesting to muse about MacColl's likely reaction to it. But since he didn't react to it—he wasn't aware of the problem—I won't pursue the matter beyond this point. See [Field 2009, 349–353].

21. Concerning Field's objection to B & R's (i), MacColl embraced his (ii) with all the innocence of B & R's embracing of their (i). What MacColl would have made of the objection is anyone's guess.

22. For certain many-valued systems, it is necessary to recognize an even more general notion of implication as providing for designated-value preservation.

yet think that it can be said that we have found a pluralism which MacColl invented and which forms the basis of his post-1909 neglect.

Different-concept pluralism

Conceptual difference matters for pluralism in ways that range beyond the generic concepts to which subconcepts are linked. Consider again a point to which we made fleeting reference in the “Many-one pluralism” section above. Since the late 1960s there has been a (contested) body of opinion among modern logicians to the effect that truth conditions on implication cannot serve as rules of inference or belief revision.²³ Still, whether distinct concepts or just one, it is widely agreed that logic’s principal targets include implication and inference. If we turn now to the heated dispute between strict implicationists and relevantists that livened things up in the 1960s and 70s, we see that if implication and inference are indeed different concepts, they offer hope for the dissolution of the stand-off between these two camps. The strategy in question is Reconciliation.²⁴ Reconciliation offers warring parties the prospect of win-win. It offers different things for conflicting intuitions to be true of. In the case at hand, it proposes that what relevantist intuitions are true of is inference and what “strictist” intuitions are true of is implication. *Ex falso quodlibet* is a case in point. Reconciliation proposes that even if every sentence were indeed a consequence of a contradiction, it is far from true that every one of those consequences should actually—or ideally—be *drawn*.²⁵

In the present example, conceptual difference performs its conflict-dissolving role independently of any link to subconcepts. True, there may be different subconcepts of implication and different concepts of inference, but these linkages are not what does the work here. Accordingly, we have yet another breed of existentially denying pluralism.

DIFFERENT-CONCEPT PLURALISM: *Systems $\mathcal{S}$ and $\mathcal{R}$ exhibit different-concept pluralism if and only if C_1 and C_2 are different target concepts shared by $\mathcal{S}$ and $\mathcal{R}$ and, with respect to some claim φ over which $\mathcal{S}$ and $\mathcal{R}$ disagree, φ is true when construed as an $\mathcal{S}$ -claim and false when construed as an $\mathcal{R}$ -claim, and $\sim \varphi$ is true when construed as an $\mathcal{R}$ -claim and false when construed as a $\mathcal{S}$ -claim.*

AMBIGUITY PLURALISM (2): *Ambiguity pluralism (1) generalizes to fit different-concept pluralism.*

23. Again, the distinction goes back as far as Aristotle and is implicit in the syllogistic by way of the distinction between what a set of premisses *necessitates* and what may be *sylogistically inferred* from them.

24. So-called in my *Paradox and Paraconsistency* [Woods 2003].

25. See also [Woods 1989].

A brief reprise

There is reason to think that MacColl is a means-ends instrumentalist both about the goals of logic and the wherewithal for their fulfillment. He is drawn to the idea that one of logic's tasks is to illuminate its own target concepts, and, correspondingly, to the view that those concepts are a logic's subject matter. MacColl is a unitarian about generic concepts such as implication and possibility, but is a pluralist about their respective subconcepts. He also holds to the ambiguity version of subconcept pluralism and of the different-concept pluralism to which it generalizes.

In none of these respects do MacColl's pluralisms either require or take expression from any instrumentalism other than the weak and not quite aptly named thing I've been calling means-end instrument. And none of these pluralisms was in any very obvious way invented by MacColl. If RR-theses are to have a good showing, we'll have to work harder and dig deeper.

The goose-gander problem

Quine's quarrel with MacColl is—anachronistically—that since logical-term pluralism is out of the question (“They don't know what they are talking about”), modal, many-valued, relevant, connexionist and probability logics aren't logic; and that the right answer to Priest is “One”.

Logical-term unitarianism gives rise to an interesting pair of questions. Does, as Quine seems to think, logical-term unitarianism imply unitarianism with regard to logic itself? That is, if the usual run of connectives classically interpreted are the sole logical terms, does it follow that the classical logic of propositions, and it only, is the one true propositional logic? The same question bites in the other direction. Is it possible for one to be a unitarian about the one true logic and yet a pluralist about the systems' own logical terms? These questions give us what we might call the *goose-gander problem*; that is, if unitarianism is sauce for the goose of logical systems, how could it not also be the sauce for the gander of logical particles? It is the problem of determining whether the one true logic—were there to be such a thing—precludes or permits non-standard use of its own connectives.

Let us say that there is a *negative solution* for the goose-gander problem if and only if both standard and non-standard uses of a system's connectives does not expose the system itself to a systems-pluralism. A pair of well-known cases invoke a negative solution to this problem—Putnam on the relation between quantum logic and classical connectives, and Dummett on the relation between intuitionist logic and classical connectives. Seen Putnam's way, although quantum logic is the one true logic, the classical distributive laws can be allowed to apply to macro-objects because of the insignificance of superpositions for them [Putnam 1968]. Similarly, Dummett claims that, although

intuitionism is the one true logic, there are specific purposes—e.g., matters of effective decidability—for which classical logic may properly be employed [Dummett 1978]. In each case, classical logic is said to be a legitimate part of logic, made so in part by the sublogic relation.²⁶ Then we have it that:

SUBLOGIC PLURALISM: *When the goose-gander problem has a negative solution with respect to a logic $\mathcal{L}$ and its connectives $K_1, \dots, K_2$ there exists a sublogic $\mathcal{L}^*$ of $\mathcal{L}$ whose treatment of the K_i is non-standard by the lights of $\mathcal{L}$.*

This would also be a good place to recognize the important idea of *application pluralism*. In the Putnam and Dummett examples, classical uses of the connectives are justified when they serve particular applications of the home logic—the description of meso-objects in the first case and the exploration of effective decidability in the second. By substituting “application” for “treatment” in the indented lines just above, we give this applicational pluralism official notice.

Before quitting this section, it is well to note that there are conflicts which sublogic pluralism doesn’t resolve. Especially notable is Putnam’s and Dummett’s own rivalry about the one true logic, never mind their agreement about classical logic as their respective sublogics. Complicating the picture is the selection by Kripke and others of intuitionist logic as a sublogic of classical logic.²⁷ Taken in conjunction with Dummett, we would seem to have it that intuitionist and classical logics are both super and sublogics of one another. What this suggests is that sublogic pluralism is a conflict-dissolver (if at all) only in relation to some fixed point. The fixed point is the logic chosen for the role of superlogic. As we see, not only can the fixed point change, it can do so in ways that reverse the logic-sublogic relationship of a given arrangement.

My reading of MacColl suggests a greater affinity to applicational pluralism than to the sublogic pluralisms of Putnam, Dummett, Kripke and the others, which would have been technically beyond his reach. In light of MacColl’s conviction that “all symbolic conventions may be altered when convenience requires it, in order to adapt them to new conditions or to new classes of problems” [MacColl 1906, 1], which affirms his applicational pluralism, he might have accepted the sublogic pluralisms exemplified by the cases under review, had he but known of them. But, again, interesting as it would be to speculate about the possibility, it is not a question on today’s order paper. So we will move on.

This leaves the question of a MacCollian nativity. Is there reason to think that MacColl originated the idea that a logic’s legitimacy is a function of how it is applied? The answer is No. Applicational relevance has been with us

26. Similar arguments are available for the one and only status of classical logic, notwithstanding its provisions for stand-alone, purpose-specific non-classical—in fact, intuitionist—uses of the connectives. Beall and Restall are a case in point [Beall & Restall 2006, 32 & 72–73].

27. See [Field 2009, 344] who attributes to B & R the attribution of it to Kripke.

since logic's founding. Aristotle's syllogistic again is a case in point. In *Topics* and *On Sophistical Refutations*, Aristotle wants a theory of deduction that would serve as the theoretical core of a wholly general account of argument, an account that would help regiment the problematic distinction between good-looking arguments and good arguments. Syllogisms were purpose-built for this purpose. Their distinctive properties reflect it, whether the irredundancy constraint on syllogistic premisses or the non-circularity constraint on syllogistic conclusions. Aristotle also had a logic of immediate implication, the best-known parts of which are enshrined in the square of opposition. But immediate implications are no good for argument. For one thing, they are serial question-beggers. Aristotle was an applicational pluralist about logic—syllogisms are needed for argumentative contexts, and immediate implications, while they chart the interaction of quantification and negation, aren't for Aristotle rules of argument.²⁸

The vernacular

A subconcept pluralism is often bound up with a certain philosophical approach to subconcept *individuation*. On this view, there are as many subconcepts of the concept *C* as there are *in the vernacular* different senses of the term "*C*" and its cognates. If the word 'possible' is *n*-wise ambiguous then possibility is a concept of which there are precisely *n* subconcepts. As we saw, B & R are generic-concept unitarians about implication and pluralists about its subconcepts. Moreover, since they hold that subconcept pluralism arises from the ambiguity of "case" in the generic definition of implication, their pluralism is of the ambiguity kind. What is not clear, to me at least, is whether the senses of "case" on which the pluralism of B & R turns are required (or assumed) to be ambiguities *in the vernacular*. If so, the ambiguities they attribute to "case", in virtue of which "valid", and "implies" and "consequence" in turn are ambiguous, are ambiguities present in English Today, as Paul Ziff once called it.

The vernacular question is critical for the blindness problem. Let's revisit $\mathcal{M}$, $\mathcal{M}'$ and $\mathcal{M}''$. Are there as many senses of 'possible' or of 'implies' as there are irredundant members of $\mathcal{M}$ or the vastly greater number in $\mathcal{M}'$ and $\mathcal{M}''$? Are "possible" and 'implies' more than 50-wise ambiguous in English? One would hardly think so. Accordingly, if the ambiguity version of subconcept pluralism is true and if vernacularism is given its head, most of the logics in $\mathcal{M}$, $\mathcal{M}'$ and $\mathcal{M}''$ are blind. And, if this is so, the incompatibility problem is correspondingly solved, but only by default and not in any intellectually satisfying way. For if blind logics don't say anything, it is trivial that they

28. Not to overlook that Frege's and Russell's own logics were purpose-built to implement a particular thesis from the philosophy of mathematics. These logics were the hand-maidens of *logicism*.

don't say anything incompatible with each other. And, if this is the case, existential denial fails for blindness and succeeds for incompatibility only on a technicality. Given his own vernacularism, MacColl would have rejected most of present-day modal logic. There aren't nearly enough different senses in English Today to service modal logic's unseemly sprawl.

MacColl's vernacularism? Yes, let's not forget that MacColl "tried to reflect the distinctions of natural language in his formal system, rather than the other way around, as Frege would". This is nowhere more evident than MacColl's dispute with Russell over the conditionality of ' $\supset$ '. As R & R point out,

MacColl's central notion is that of the conditional. He not only acknowledges that this connective holds a privileged place in his logic, he also makes the conditional the center of his philosophy. [Rahman & Redmond 2008, 545]

MacColl himself writes:

For nearly thirty years I have been trying in vain to convince [Russell *et. al.*] that this assumed invariable equivalence between a conditional (or implication [SIC]) and a disjunctive is an error. [...] Thus, Mr. Russell, arguing correctly from the customary convention of logicians, arrives at the strange conclusion that (among Englishmen) we may conclude from a man's red hair that he is a doctor, or from his being a doctor that (whatever appearances may say to the contrary) his hair is red. [MacColl 1908, 152]

MacColl's position is that there is no sense of "if ... then" in any natural language for which "If he has red hair then he is a doctor" is a true conditional sentence. Right or wrong, this puts him squarely in the vernacularist camp.²⁹

In our consideration of it up to now, conflict-resolution pluralism can claim the attraction of win-win settlement. But when it comes to the real nature of implication, there is nothing win-win about MacColl's solution. It is a zero-sum resolution, with the strict-implication analysis the big winner and the material-"implication" analysis the loser hands down. So, on this question, MacColl's resolution strategy is an application of what, in *Paradox and Paraconsistency* [Woods 2003], I call Surrender. Surrender, which is exemplified by *reductio* arguments and Aristotle's and Locke's *ad hominem refutations*,³⁰ is the psychological opposite of Reconciliation. It is a means not

29. Their further dispute concerns the necessity or otherwise of having in one's object language a genuine conditional-expressing connective such that whenever φ implies ψ , there is a true object-language sentence whose conditionality is expressed by that connective with φ as antecedent and ψ as consequent. Since MacColl thought that ' $\supset$ ' wasn't such a connective, he also thought the one-to-one correspondence claim was moot.

30. For Aristotle, see *On Sophistical Refutations*, 22, 178^b 17, 170^a 13, 17–18, 20, 177^b 33–34, 183^a 22, 24; *Topics* φ 11, 161^a 21; and *Metaphysics*. For Locke, see the chapter "Of reasoning" in [Locke 1961]. Note that *ad hominem* manoeuvres in Aristotle's and Locke's sense are not fallacies.

of saving your opponent's face, but rather of beating him into submission. Nothing pluralist here.³¹

The vernacularity issue puts a good deal of pressure on the following question: If a term '*C*' is *n*-wise ambiguous, where are those *n*-different senses *to be found*? Vernacularists are drawn to a predictable answer. If '*C*' is *n*-wise ambiguous in *L*, then these various senses of '*C*' will be present in the linguistic practice of competent users of *L*. So, if "implies" is ambiguous in English, all its senses will be located in English Today.

It takes little effort to see that vernacularism is a spoke in the wheels of modern logic. True, some of logic's most abiding targets are concepts anchored to meanings fixed by the usages of English Today. Even so, aren't these meanings the products of language use, and isn't language use subject to change? Isn't what things mean in English subject to the linguistic conventions of English? And aren't conventions solutions to coordination problems? Don't they settle what, in uttering an expression, its utterer should be understood as meaning? If the meanings of English as we have it just now are too few to generate the concepts constituting the multiple subject matters required by our sprawling logics, couldn't we hurry things along? Couldn't we adopt new conventions? *Couldn't we make new meanings?*

Suppose that we could. Then we would have as many concepts for logic to pronounce upon as it is possible for us to make meanings for. And this would give us *made-meaning pluralism*.

Making meaning

Of its several forms, conventionalism is the only form of instrumentalism which is philosophically interesting in its own right and convincingly linked to a like pluralism. Whether it can be attributed to MacColl is another matter to which I shall return two sections hence. Before attending to it head-on, I want first to say something about this business of hurrying things along, that is, making new meanings to suit one's logical convenience. In so doing, it is helpful to mark a distinction between a system's *conceptual adequacy* and its

31. It is important to note that both Reconciliation and Surrender are negotiation tools, and like all negotiation tools are consensual in nature. For Reconciliation to work, both parties to the conflict have to agree about what their respective positions are true (and false) *of*. Some relevantists do not agree that what relevant logic is false of is implication, and some strictists do not agree that what relevant logic is true of is inference. Similarly, for an Aristotelian or Lockean refutation to work, the refuted party has to agree that his position does genuinely conflict with other commitments he is not prepared to give up. There are situations in which such agreements are impossible to get. One person's *reduction* of an absurd proposition can equally be another person's sound demonstration of a surprising (even shocking) truth. This presents negotiators with what in [Woods 2003] I called Philosophy's most difficult problem.

mathematical virtuosity, which, in turn, is presaged by an earlier distinction of Kant. I'll deal with mathematical virtuosity in this section and the Kantian contrast in the section after.

Mathematical virtuosity is tied up with what I once heard Joke Meheus call a "decent" logic.³² One way in which to achieve this decency is to have a logic with a recursively specifiable formal grammar, a suitably rigorous proof theory, an appropriately set-theoretic semantics, and the demonstrable presence or absence of metatheoretical properties such as consistency, completeness, soundness, and decidability.³³ Also important is that the syntax of the logic should be able to regulate the flow of its proof procedures, and that its syntax and semantics also be structured to admit of metaproofs that employ the various forms of mathematical induction. Recurring to $\mathcal{M}$, no one doubts that all its members are decent.³⁴

It would be hard to overestimate the importance of mathematical virtuosity in modern logic. There are people for whom decency is logic's be-all and end-all. If that were so, then the right kind of multiplicity for logic would be as many or as few as meet the requirement of decency. A less triumphalist posture cuts that claim in half; that is, to say it makes of decency a necessary, but not sufficient, condition of logic's tolerable size. For suppose it were otherwise. Then the force of eliminating the decency requirement would—let me put this without delicacy—leave it open that some of our logics could be just any old rigged-up formalism. Without prior constraint, a debauchery would ensue, in which *Anything Goes* in logic.³⁵ As it happens, not anything a woebegone scribbler scratches together counts as a system of logic, never mind the formal purity of his intentions. In days not long gone, some of the worst old duffers of the Soviet Academy were self-announced dialectic logicians. But it is not going too far to say that they weren't in any sense relevant to our present concerns logicians *at all*. Suppose it were otherwise. Then there would be a *bona fide* notion of implication—for breezy ease of reference call it Stalinist implication—which these hacks got exactly right.³⁶ Generalizing, what we get when we suppress the decency requirement is the Jazz Age in logic, the no-holds-barred tumble of *Anything Goes*. If anything is certain about MacColl's own pluralism, it is that it is not the *Anything Goes* variety.

It is interesting to reflect on the extent to which MacColl himself may have been drawn to the decency requirement. Whatever their respective differences, decent logics are nice pieces of mathematics. What is distinctive

32. At the session on 'Abduction' at the *Cognitive Science Society* Conference in Chicago in July, 2004.

33. Others, of course, are less impressed by completeness than by categoricity. But the basic idea remains the same.

34. Not always with ease. Getting a semantics for *S1* was particularly brutal.

35. With thanks to [Stove 1996]. See Cole Porter, "*Anything Goes*" (Copyright 1934 WB Music Corp).

36. Of course, as some wags have it, dialectic implication *is* Stalinist implication. But that's a light-heartedly intended in-joke about Priest's *politics*, not his logic.

about the newly emerging logics of MacColl's time was not so much the range of their subject matters—modal, relevantist, connexionist, many-valued, and so on—but rather the expectation that the analyses of those subject matters would be given mathematically adequate formulations. This gives modern logic two masters to serve: the course of conceptual adequacy—of getting, say, the concept of implication *right*—and the cause of mathematical adequacy—of producing the system's theorems *decently*. MacColl had reservations about the mathematization of logic, as witness the epigraph at the head of this paper. He was not much taken with reductions of logic to algebra, by the idea that logic had a mathematical subject matter. Although he himself was influenced by the algebraist methods of the day, he favoured a propositional rather than an algebraic approach, in the interests of “pure logic”. In the epigraph, MacColl counsels against warfare between the logicians (he means philosophically-minded logicians) and mathematicians about the form that a successful rapprochement might take. In “Symbolic logic” (1880) he gives a hint:

Symbolic reasoning may be said to have pretty much the same relation to ordinary reasoning that machine-labour has to manual labour. [MacColl 1880, 45]

MacColl goes on to say that the right kind of formalism enables

any ordinary mind to obtain by simple mechanical processes results which would be beyond the reason of the strongest intellect if left entirely to its own resources. [MacColl 1880, 45]

I take this to mean that a well-behaved logic is one whose procedures are mathematical in a methodological and abstract sense. This is the way in which “mechanical processes” are made possible. But what is neither necessary nor desirable in logic is that it be endowed with an expressly mathematical subject matter.

Analysis and synthesis

Vernacularism requires that the usages that generate the concepts which serve as the subject matter of a logic have a prior presence in natural language. There is a significant tradition in philosophy which regards the vernacularist stance as a parochialism to no good end. This is where Kant enters the picture.

Throughout his philosophical life Kant advanced a distinction between analysis and synthesis.³⁷ Analysis, says Kant, is the business of making our concepts clear. Synthesis is the business of making clear concepts. Analysis is the business of philosophers. Synthesis is the business of mathematicians. A

37. Early is *Inquiry Concerning the Distinctness of Principles of Natural Philosophy and Morality, and Logic*, (1704) [Kant 1974a]. Late is *Logic* (1800) [Kant 1974b].

similar distinction is invoked, with attribution to Moore rather than Kant, by Russell in his *Principles of Mathematics*. It is the distinction between philosophical analysis and mathematical definition, which latter “is widely different from that current among philosophers” [Russell 1903, 15]. Russell writes:

It is necessary to realize that definition, in mathematics, does not mean, as in philosophy, an analysis of the idea to be defined into constituent ideas. This notion, in any case, is only applicable to concepts, whereas in mathematics it is possible to define terms which are not concepts. [Russell 1903, 27]³⁸

Mathematics is the business of making clear concepts. What would we want clear concepts for if not for an interest in the things they instantiate and the things they make true. Making up concepts is a way of making things true. It is a heady idea—*making things true*. Theories, says Quine are free for the making up, echoing Eddington’s crack that they are put-up jobs. Is this really true? What is the source of this creative potency? And what, if any, are its limits?

The distinction between analysis and synthesis in logic also gives us the attractive means to re-engage the distinction between a logic’s mathematical adequacy and its conceptual adequacy, and to do so in a way that sheds light on logic’s contemporary pluralism and on the further consequences it holds for the vernacularity thesis. According to the synthesis part of the present distinction, it is possible for a logical system to generate new concepts. When the system is merely decent—that is, when it is merely mathematically adequate—the concepts it innovates are nevertheless *bona fide* concepts of logic. If this is right, then the vernacularity thesis is wrong. It is wrong because mathematically adequate systems originate concepts that have no presence in English Today. And, mark well, this now provides that mathematically adequate logics meet the conceptual adequacy condition *as a matter of course*. For how could they *not* be faithful to the very concepts their theorems create?

38. There is a point on which Kant and Russell appear to be at odds. Kant thinks that it is possible to make concepts up. Russell thinks that it is possible to innovate definitions which, had they defined concepts, would have been made-up concepts. Russell is driven to this rather striking hesitation by having embraced the Moorean folly that since the intuitive logic of classes is inconsistent, there simply *is* no concept of class, leading Russell to say “I have failed to perceive any concept fulfilling the [post-paradox] conditions required for the notion of class” [Russell 1903, v–vi]. This is not a matter on which anything of deep importance for our purposes hangs. So I shall simply pass it by. Whether Kant is right in thinking that concepts are free for the making or Russell is right in thinking that there are mathematical definitions free for the making, the fact remains that for both men, these inventions are entirely legitimate in mathematics, that they are the source of genuinely principled descriptions, some of which are provably valid.

Rainy-day pluralism

The present idea is that mathematical adequacy is a sufficient condition of synthetic content, hence guarantor of its possessor's conceptual adequacy. No mathematically adequate logic is blind. Of course, if mathematical adequacy solves the blindness problem, it does not, just so, solve the *application* problem. If synthesis is given its head, mathematical adequacy gives conceptual adequacy, but it does not guarantee *applicational adequacy*. Consider an example.

Dialetheic logic. About seven logicians in the wide world think—I mean, *really* think—that there are true contradictions. Yet true contradictions are the whole motivation for dialetheic logic. It is a logic (a family of logics) that caters for a highly selective set of true contradictions. Nearly everyone thinks that the very idea of a true contradiction is nonsense, that there is no conceivable sense of “true” and no conceivable sense of “contradiction” for which any contradiction is true. But this is wrong. Since approximately 1979, the year in which Priest's LP début'd, dialetheism has been a mainstream research programme in logic. Its papers appear in the leading journals and its monographs appear with the best university presses. Why would this be so? The answer is that the dialetheic systems of the present day are decent logics. They are accomplished pieces of abstract mathematics. They have good generative grammars, rigorous and complete proof methods, mathematically lucid set-theoretic semantics, and they permit principled discernment of the presence or absence of the usual run of metalogical properties—consistency, soundness and so on. And withal it builds yet another concept of implication, and another conception of logical truth.

The moral to draw from the dialetheic project parallels is that in logic, as in mathematics, mathematical versatility suffices for synthetic conceptual adequacy, without guaranteeing a concomitant applicational adequacy. Prior to Riemann there was no sense in which space was bent. Prior to dialetheic logic there was no sense in which contradictions are true. But for anyone who accepts the role of Kantian syntheses in logic, after dialetheism there is a concept of true contradictions and interesting attempts to find fruitful applications for it.³⁹

We have been assuming throughout that multiple systems of logic are to be tolerated to the extent to which they are both mathematically and conceptually adequate. Of late we have taken note of a difference in practice—if not always an expressly voiced one—between vernacularity and syntheticity interpretations of what conceptual adequacy requires. What we have not yet determined is whether a third condition should be imposed—the requirement of applicational adequacy in the here and now. If actual practice is anything to go on, the answer to this question is emphatically in the negative. Imagine

39. Most notably, a revival of intuitive set theory and intuitive semantics, contradictions and all. For a brief interim progress report see [Woods 2003, 169–174].

that one of your students comes to you asking: “What is the road to a solid career in logic?” The answer, for good or ill, is: “Let your constructions be graced with mathematical versatility.” Bearing on this is a remark of Johan van Benthem’s:

Now that we all understand the virtues of a model-theoretic semantics satisfying general Montagovian standards of rigor and clarity there is joy in *playing around* with virtually every specific detail of Montague’s original paradigm. The following [...] illustrate various aspects of this new wave of *free speculation*. [Van Benthem 1979, 337]⁴⁰

On the face of it, this is disturbing—the triumph of *homo ludens* over *homo sapiens*. But that’s not the way it plays in logic’s present-day pluralism. Not only can playful logics produce new concepts whose existence owes nothing to their applicational fruitfulness, but—as the Riemann example reminds us—whose present want of applicability can be tomorrow’s applicational triumph.

This gives rise to a further species of pluralism. Let us call it *rainy-day pluralism*.⁴¹ Rainy-day pluralism is the pluralism of inventories of conceptually innovative unapplied logics awaiting the possibility of future employment. They are systems of logic put away for a rainy day, as the expression goes. They are the proceeds of logical investigation at its most abstractly *experimental*.⁴² It is a pluralism that relieves logic of the necessity of capturing pre-ordained, pre-existing concepts, and gives to logic free hand at making new ones up, ready for application if such there be, but worthy objects of our attention all the same, as nice pieces of abstract mathematics. Modern logic is wedded to the idea of making things up. Not everything is fair game, but if your formal apparatus is decent, if your creative efforts are crowned with the requisite mathematical virtuosity, you have a remarkably free hand.

Instrumentalism

We come at last to MacColl’s instrumentalism. It is an instrumentalism characterized by R & R as a kind of conventionalism. They say that:

40. Emphases added.

41. It is well to note that, for all its considerable latitude, rainy-day pluralism is not Anything Goes pluralism. Not anything goes in rainy-day pluralism. Rainy-day logics must meet the tough standards of mathematical virtuosity. Rainy-day logics have to be decent.

42. Of course, historical accuracy requires that we note that in its early days, modern dialetheic logic was never thought of as an applicationless plaything built for the shelf of logics in waiting. From the outset, dialetheic logicians had clear targets in mind. There were true contradictions awaiting them pre-theoretically. Their job, as they saw it, was to produce a logic that would accommodate that fact. However from the point of view of virtually everyone else, since there is *no* pre-existing datum for dialetheic logic, the only virtues it can have—and does in fact have so far—are the virtues of mathematical virtuosity.

MacColl was probably the first to extend conventionalism and instrumentalism to logic. [Rahman & Redmond 2008, 534]

MacColl himself also speaks of conventions in logic:

[A]ll symbolic conventions may be altered when convenience requires it, in order to adapt them to new conditions or to new classes of problems. [MacColl 1906, 1]

Both these ideas have generated large and important literatures. It would not be far wrong to say that instrumentalism and conventionalism are the dominant themes in 20th century philosophy of science, in forms ranging from theoretical terms and sentences, nominal definitions, theoretical models, idealizations, abstractions and fictions. These practices raise two obvious questions, one of which conventionalism purports to answer and the second of which is the draw for instrumentalism. The first question is, "How are these structures wrought?" The second question is, "What are they *good for*?"

To the extent possible, I want not to entangle myself in their formidable complexities. I want to know whether MacColl is a conventionalist, and I want to know whether, if he is, this has played a role in his neglect. To make this as light a burden as possible, I want to try to find a minimal condition on conventionalism, and then to determine whether MacColl satisfies it. If he does, there is more work to do. If he doesn't, our work is fortunately at an end. In this spirit, I will take it as given that any form of conventionalism which we could even consider ascribing to MacColl must include the Kantian principle of concept-making. Poincaré's own conventionalism—of which MacColl would have been aware—is preceded by Kant's doctrine of concept-making and would hardly have been possible without it [Poincaré 1905]. In so saying, I don't want to make too much of Kant's presence here. It is not in the least necessary to be a Kantian to accept that meanings can be made. For our purposes, Russell's principle of mathematical definism would do just as well.

THE CONVENTIONALIST MINIMUM: *A theory is conventionalist only if some of its ineliminable findings are of the theorist's making.*

COROLLARY: *If a conventionalist theory's subject-matter is furnished by its target concepts, at least some of these are of the theorist's making, hence are internal to the theory.*

It is well to emphasize how little of conventionalism the conventionalist minimum captures. It offers us little more than a shot in the dark. If, perchance, MacColl rejects the principle, then he is no conventionalist, never mind the forms his pluralism might take. Acceptance is another thing altogether. It leaves the issue of MacColl's conventionalism wide-open and unresolved. So which is it to be? Can we plausibly pin this conventionalist minimum on MacColl? Upon reflection, and on balance, I think that we cannot. There are three main considerations that should give us pause. One is MacColl's vernacularism, his conviction that logic's rightful conceptual targets have a prior presence in the vernacular, hence are external to the theory. Another is his

hesitation over the out-and-out mathematicization of logic, a hesitation which, whatever its details, would certainly have called into question the very idea of mathematical adequacy as guarantor of conceptual legitimacy. The third is unitarian obduracy about generic implication and conditionality. Since there is no sense—vernacular or otherwise—in which ‘ $\supset$ ’ expresses a conditional, there is no sense—vernacular or otherwise—in which if $\varphi \supset \psi$ then if φ then ψ .⁴³ Equally, since there is no sense of implies—vernacular or otherwise—in which, for example, arbitrary pairs of falsehoods imply one another.

Not only was MacColl not the adapter of this conventionalism to his logic, it would have been an idea to invite his hostility.

Neglect

MacColl was plurally pluralist—different-concept, subconcept, ambiguity and vernacularist. Of none of these was he the inventor, and—with the exception of his vernacularism—none would have earned the scorn of his post-1909 contemporaries, notwithstanding the various other things they disagreed about. Similarly, while made-meaning pluralism is grist for the mill of conventionalism, it is not a pluralism MacColl would have been happy with; and yet without it, it is difficult to see how we could get him to satisfy even our minimal conventionalism.

What, then, explains MacColl’s neglect? Why did his contemporaries and correspondents stop writing about him? The first and almost last answer is that he *died*. The default position in logic, as in the rest of life, is post-mortem neglect. Beyond that, MacColl lacked an academic position and a cosmopolitan habitat. MacColl worked on logic in fits and starts. His writing is confused and his technical skills were limited. Maybe in large part it was just dumb luck (Why does everyone read Quine’s “Two dogmas” and no one Morton White’s “Analytic-synthetic: an untenable dualism”? Why did everyone read Strawson’s “On referring” and hardly anyone Geach’s “Subject and predicate”?).

I have heard it said that the principal reason for MacColl’s neglect was his outrageous prodigality with ontological commitment, his brazen subscription to existence-neutral quantification. Should we make something of this?

Meinong was similarly minded. Not a logician, Meinong was a psychologically trained philosopher drawn to the problem of intentionality. To that end, he contrived a theory of objects which was tailor-made for the kind of interest MacColl exhibited in pluralistic Universes of Discourse, within which he distinguishes the class *e* of existent items and the class 0 of non-existents—objects such as centaurs and round squares [MacColl 1906, 1–4].⁴⁴ It is interesting

43. And a jolly good thing, too. Even MacColl would allow that if (if φ then ψ) then $\varphi \supset \psi$. But if we also put it that if $\varphi \supset \psi$ then if φ then ψ , we have the equivalence of ‘ $\supset$ ’ and ‘if ... then’. Rather embarrassing that!

44. MacColl referred to 0 as the “null class”. However, by this he didn’t mean that 0 was empty, but only that its members were objects that didn’t exist. When

that Russell in an appendix of *Principles of Mathematics* took after Meinong with a certain vigour. Although Russell didn't like what Meinong had to say about these matters, an appendix in a major work can hardly be called neglect. Russell seems not to have danced a like attention on the similar views of MacColl. If this is neglect, it is not the existence-free character of MacColl's logic that occasioned it. When it comes to objects, MacColl is Hamlet to Russell's Horatio. "There are more things in heaven than are dreamed of in your logic, Russell." MacColl's existence-free logic is countable as yet another logic to throw into the mix, along with all the other existentially loaded ones, but not in ways that swell the ranks of systems-pluralism to any great extent. By far the greater part of MacColl's impact on pluralism is in the size of logic's ontology. But since this is not the pluralism that currently occupies us, I shall let it be.⁴⁵

I confess that I am bested by the neglect question. Most logicians come and go without creating the slightest occasion for neglect. Neglect implies prior recognition, and it is no small feat to have been noticed by the likes of Russell, Peirce and Schröder. If eventual neglect is the cost of such recognition, it is a price most of my friends would cheerfully pay. MacColl was in a very different class. The heavy hitters of the day paid attention to him, although none was his champion in the way that Russell was of Frege.

Then he died and was forgotten. That's the way it goes.

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it comes to fictions and the like, Frege would have their names denote the empty class 0. Whereas MacColl would have the referents of those names *populate* his 0. A different 0, needless to say.

45. I myself think that MacColl's existence-neutral logic is one of his more impressive achievements, especially in its role as a logic of fiction. Recent work by Shahid Rahman and his colleagues reveals how robust the MacCollean scaffolding in bearing the weight of a fully developed free logic [Rahman & Redmond 2008].

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