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THE WRITTEN LIAR AND THOMAS OLIVER

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The general history of the paradox known as The Liar, or, The Epimenides, can be found in [1] and [2], while a lengthy philosophical analysis of modern versions is made in [3]. Present concern is with anticipations of A. P. Ushenko's [4]. The claim of [4] to philosophical novelty was rejected in [5], re-affirmed in [6], rejected again in [7], but it's material novelty has never, it seems, been questioned. Ushenko's version is as follows:

All propositions written within the rectangle of Fig. 1 are false

Fig. 1

Already on March 21, 1931, A. Tarski's [8] had been presented to the Warsaw Society of Sciences and Arts by J. Łukasiewicz, publication taking place two years later. We quote from [9], which refers to Łukasiewicz:

> For the sake of perspicuity we shall use the symbol '*c*' as a typographical abbreviation of the expression 'the sentence printed on this page, line 5 from the top'. Consider now the following sentence:
>
> *c is not a true sentence.*

A count shows that the last quoted line is the fifth line of the page referred to. Ushenko would make a special point of his paradoxical proposition being printed or written. The Łukasiewicz version lacks indeed the rectangular outline but is essentially the same as referring to a printed expression appearing on a well-defined portion of a page. However an eye-witness gives assurance that Łukasiewicz was accustomed to use his blackboard as such a rectangular figure and to write on it "All propositions written on this blackboard are false" or words to that effect.

Previously, again, in 1913 P. E. B. Jourdain had published another presentation of the paradox in [10]. Let the two following rectangles represent the front and back of a card.

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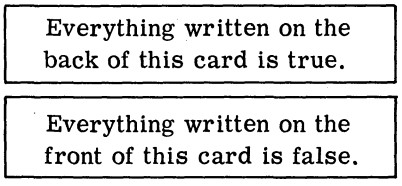


This item is not considered in [3], and is due to a kindly reminder by Prof. Alonzo Church.

Evidence for medieval times has long been available in Prantl's [11]. The reference is to a passage not in any logical work but in the *Metaphysics* of John Buridan (*ob. post* 1357) VI, qu. 7:

> non sufficit universaliter ad veritatem affirmativae quod termini supponant pro eodem, et hoc manifestum in vocatis insolubilibus, ut si in illo folio sit scripta solum illa propositio "Propositio scripta in illo folio est falsa"; quia illud subiectum "propositio scripta in illo folio" supponit pro illa propositione, quae est scripta in isto folio, et similiter hoc praedicatum "falsa" supponit pro illa propositione, quia ipsa est falsa et non vera. Igitur non sufficiebat ad hoc, quod propositio affirmativa fuisset vera, quod termini supponant pro eodem.

We translate: "It is not in general enough for the truth of an affirmative proposition that the terms should suppose for the same object, and this is clear in the so-called insolubles, as for instance if there is written on a given page only the proposition 'the proposition written on this page is false'; because the subject, 'the proposition written on this page' supposes for the proposition which is written on that page, and likewise the predicate 'false' supposes for that proposition, because the proposition is false and not true. Therefore, for an affirmative proposition to be true, it is not enough that the terms suppose for the same object." Similar things occur in Buridan's *Sophismata,* c.8, the thirteenth and fourteenth sophismata, where the paradoxical written propositions are more complicated. For an example of such we go to Albert of Saxony's (*ob.* 1390) *Perutilis Logica* [12] in the chapter *De Insolubilibus:*

> Posito quod illa propositio "rex sedet vel aliqua disiunctiva scripta in hoc folio est Socrati dubia" sit scripta in illo folio, *a*, et nulla alia, posito quod Socratem lateat an rex sedeat vel non sedeat, posito ulterius quod Socrates sit doctissimus in arte et inspiciat hanc propositionem in hoc folio. Tunc queritur an illa propositio sit scita a Socrate esse vera, vel scita a Socrate esse falsa vel dubia.

We translate: "Let only the proposition 'the king sits or some disjunctive proposition written on this page be doubtful to Socrates' be written on the page, *a*; let Socrates be in ignorance whether the king is sitting or is not sitting; further let Socrates be most learned in the art of logic and be looking at the proposition written on this page. Then it is asked whether that proposition is known by Socrates to be true, or known by Socrates to be false or to be doubtful." The point to notice is the occurrence of the page reference "*a*", corresponding to Ushenko's "Fig. 1". It is quite superfluous in this single occurrence, and one wonders whether the original text did not contain it also within the paradoxical proposition.

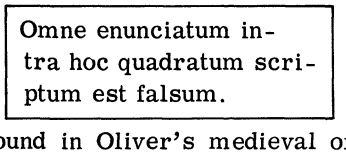
The fore-going examples involve a written proposition but do not stress

its written character. Paul of Venice (*ob.* 1429) does this. We quote from his *Logica Magna* [13]:

> Item dato quod haec solutio solvit insolubilia fundata in actu dicendi tamen non solvit alia in aliis actibus fundata ut posito quod sit scripta ista propositio "Socrates legit falsum" quam Socrates legat et nullus alius; . . . . Quinta opinio dicit quod Socrate dicente se ipsum dicere falsum nihil dicit, quod Socrate intelligente se intelligere falsum nihil intelligit et ita de aliis . . . . isti haberent dicere quod si scripta esset haec propositio et nulla alia, "falsum est", nihil esset scriptum, quod est manifeste impossibile.

Again we translate: "Further, given that this solution solves the insolubles based on the act of saying, yet it does not solve others based on other acts; e.g. let this proposition be written, "Socrates reads what is false", and let no-one else read it: . . . . The fifth opinion says that when Socrates says that what he is saying is false he says nothing, that when Socrates understands that he is understanding what is false he understands nothing, and so with the rest . . . . these people would have to say that if this proposition alone was written, "it is false", nothing would be written, which is evidently impossible." Ushenko also considers and rejects that "fifth opinion" when he says in [6] p. 79: "The vicious circle . . . . cannot be avoided if, following Russell, we declare that *a*, intended to apply to itself, is not a proposition but a meaningless expression." We evidently have to conclude that his "new Epimenides" is one more case of rediscovery, a process by now very familiar to historians of logic.

The medieval examples just adduced all describe but do not exhibit the Ushenko situation. It is easy to imagine those writers drawing an illustrative diagram while teaching, but it does not seem to have got into their published works. The first case of a published diagram known to us occurs in the *De Sophismatum Praestigiis Cavendis Tractatus Paraeneticus* by Thomas Oliver, dated 1583, first published at Cambridge in 1604, and reprinted at Frankfurt in 1605 [14]. This work has so far gone unremarked by historians of logic, and anyone acquainted with late 16th century logic will surely agree that it is extremely unexpected that such a thing should occur at that date. On p. 32 (we use the Frankfurt edition) there appears:



Possibly this will be found in Oliver's medieval or later sources, among which are Peter of Spain (13th c.), Buridan, Albert of Saxony, Hentisber, Marsilius of Inghen (14th c.), Clycthoveus (1473-1543), Cardan (1501-1576), but pending any such finding, we reproduce photographically this earliest known exhibition as opposed to description, of the written Epimenides. Oliver quotes verbally Cardan's discussion of Hentisber's treatment of the primitive version of the paradox, Falsum dico, which occurs in Cardan's *Dialectica,* without diagram, [15].

Thomas Oliver (vide [16] which largely relies on the work under discussion) was a mathematician and medical practitioner in Bury St. Edmund's, England, who died in 1624. The following points seem noteworthy.

ψευδόμενον oppugnat axioma nihil simul est & non est.

quamcunque notionem communem, ſed eam ipſam quam ἀξίωμα ἀξιμάτων dicimus, quamque niſi obtinuerimus, non ſolum vt Academici nihil certo, ſed nihil omnino ſciri poſſe concedemus: Dialecticis vrgent principiis; eſt igitur dialectici vel Ariſtotelis decretis, nodos eorum diſſoluere: Quod eo ſtudioſius faciendum eſt, quod ipſius dialectices & omnium diſciplinarum lumen clariſſimum nube cuiuſdam probabilitatis obumbrent. Quid enim illuſtrius; quid clarius; quid euidentius; Quid in dialectica notius, quam vt idem ſimul ſit & non ſit, fieri nullo modo poſſe? hoc enuntiatum tam apertum & perſpicuum inexplicabilia vehementer quatiũt, & obſcuritate quadam valde caliginoſa perfundunt. Atque vt res fiat illuſtrior, duo proponam inexplicabilia, & eorum hactenus proditas diſſolutiones perſequar minutius & ſtrictius. Primum ſit illud, quod intra quadratum hic ſcriptũ exhibemus: Alterũ Socrates dicit falſum, quod ab eo ſic prolatum intelligatur, vt præterea nihil dicat. Cum neceſſum ſit enunciatũ quoduis aut verum, aut falſum eſſe, de his inprimis petunt vera-

> Omne enunciatum intra hoc quadratum ſcriptum eſt falſum.

verane, an falſa ſint. Si vera concedantur, ex enunciati veri definitione ſumunt rem ita ſe habere; vt enuntiata ſignificant, ſignificant autem omne quod quadrato hic ſcriptũ eſt, enuntiatum, & quod à Socrate profertur, falſum eſſe: Reuera igitur enuntiatum hoc in quadrato ſcriptum, & quod à Socrate prolatum fuit eſt falſum: atque conceſſa ſunt eſſe vera: ſunt igitur vera, & non ſunt vera, contra illud ἀξίωμα omniũ ἀξιμάτων manifeſtiſſimũ. Si falſa dicantur vt omnes recentiores cõtendunt, ita ſe res habet, vt enuntiata ſignificant, ſignificant.n.tũ enuntiatũ omne ſcriptũ in hoc quadrato: tũ à Socrate prolatum falſũ eſſe. Per definitionem igitur enunciati veri, vtraque vera ſunt, quã ratione res in eandem difficultatem reuoluitur. His aculeis vehementer compũcti ſunt antiqui philoſophi, nullam tamen ſolutionem tradiderunt. Hæc inquit Cicero ſunt Chryſippęa ne ab ipſo quidem diſſoluta: recentiores vt dixi, variis ſe modis impliçarunt: omnes enim ab illis adhibitæ ſolũtiones meo iudicio ſunt inſualidæ, partim vanæ, partim ex eorum genere quas αὐτὸς τὸν ἄνθρωπον dicimus. Buridan⁹ enim occurrit ratiocinationi poſteriori vulgatam enunciati veri definitionem infringendo, verum eſſe negat enuntiatum, quod ita ſignificat integre, vt res ipſa eſt. Neque ab hac opinione videtur Clychtoueus longe receſſiſſe

Chryſippus ad ψευδόμενον tacuit.

Buridani ſolutio.

Clychtonei ſolutio.

Thomas Oliver's *De Sophismatum Praestigiis Cavendis* (Frankfurt, 1605)

(1) In his letter to the reader Oliver introduces his ruling idea, that the touchstone of good logic is ability to deal with the paradoxes. This idea had perhaps not been formulated since Zeno of Citium, the founder of the Stoa, (ob. 264 B.C.) and will not recur till the time of Russell.

(2) In the same letter Oliver makes a claim which the sequel will not substantiate, that he has indicated a path which will save people from despairing scepticism in the face of the paradoxes, and enable them to guard themselves *ab errorum labyrinthis*. References to the Cretan maze and the thread of Ariadne abound in logical writings about this time, and culminate in Leibniz. A number of such references are collected in [17].

(3) For the cleverer people who are not content to follow in the footsteps of others Oliver says he is going to prepare *methodum qua ad rei cuiusque cognitionem in suo genere perfectissimam ingeniosus quisque diligenter instruetur*. This project he seems not to have executed but its formation and wording are most interesting. W. J. Ong, in [18] has copiously documented the history of logical method from its rhetorical origins in John Sturm, through Melancthon and Ramus, with a forward glance to Bacon and Descartes; perhaps we ought to look further ahead still, and see Leibniz's program of calculation with an alphabet of thought which would be an Ariadne's thread to guide through all difficulties, as rooted in the by then venerable and long universal preoccupation with method. Certainly Oliver had the Ramists in mind on the one hand; on the other the transcendental character of his promised method might seem to portend something more than "the arrangement of many good arguments" which was Ramus's method.

(4) There follows a letter *Ornatissimis doctissimisque viris Cantabrigiensis academiae philosophis*, which announces his anti-Ramist standpoint and refers to the recent spread of Ramism at Cambridge. Some thirty years previously we know that Cambridge had been destitute of logical textbooks, whence the publication of John Seton's *Dialectica* (1572). Ramism, which later became deeply rooted there, had evidently already begun to fill the void.

(5) In the same letter Oliver excuses his deficiencies, especially in regard to his Latin style, which is in fact vigorous and polished, and seems conscious that he is an amateur writing to, and about to be published by, professionals. This is surely a very early instance of such an attitude; cf. (6).

(6) The first two chapters stress the need for expert cultivation of the mind in the search for truth. Ramism would develop an expertise of its own, but at his date it presented itself as a general over-simplification of difficulties, and Oliver regarded its brash rejection of earlier techniques as *temeritas*, an oft-recurring word.

> Multi hac misera aetate natura perspicaces, et omnibus ingenii dotibus praecellentes se temeritate quadam rerum cognitione spoliant, et in errores absurdos praecipitant. Indole sua et acumine solum nixi rerum dificillimarum, et naturae penetralibus abstrusarum investigationem audacter suscipiunt, in qua primo progressu sic implicantur, ut nisi mature pedem retrahant, et imbecillitatem agnoscant, nunquam aut perquam raro se deinceps explicabunt.

"In this wretched age many who are naturally perspicacious and equipped with all gifts of talent, temerariously despoil themselves of the knowledge of things and hurl themselves into absurd errors. Relying only on their natural character and penetration, they boldly undertake the investigation of the most difficult matters, hidden in the inner recesses of nature, and at the first step get so involved that unless they quickly withdraw and recognize their incapability, they will seldom or never extricate themselves afterwards." Parallels are drawn from the pursuits of town and country, from the fine arts and crafts, and from gymnastics, in all of which experience rather than general intellectual talent is what counts.

(7) The third chapter adduces the paradox of the Liar as evidence of the need for logical technique. It is given in three forms, the diagrammatic version displayed above, Socrates makes the sole statement that Socrates says what is false, and thirdly, I say what is false. No distinction is made between these three, and the first is not referred to after being stated, which makes its appearance the stranger and its origin the more puzzling. Oliver rejects all attempted solutions known to him and offers nothing of his own. Chapters IV-XI adduce some disputed points in geometry, medicine, and other fields, likewise called 'paralogisms' though clearly of another character, and offer some general reflections on methodology. Chapter VII notes the presence and usefulness of vague concepts, especially in medicine where no-one has been able to say definitely "how many individual experiments are required to establish a general experience".

(8) From Chapter IX we quote a passage which shows Oliver's style and mood at its best. Not all of sixteenth century logic was of the rhetorical kind he describes, but there was plenty of that, and the common treatment of syllogistic is fairly termed *inanis species*.

> Languent hac aetate studiosorum animi, et expugnata barbarie sterili linguarum elegantia consenescunt. Mathesis manca est, Medicina claudicat, in disciplinis reconditis nihil proficimus, quod neglecta rerum contemplatione in nugis fallacibus aetatem consumimus. Syllogismorum inanis species ubique fere invaluit, probabilitatis opinio mentes omnium propemodum occupavit, et certa rerum scientia maximam studiosorum partem spoliavit. Et tamen de agro logico runcando, et expurgando potius, quam herbis frugiferis conserendo, homines otiose consultant: et tamen adolescentes dialecticam ex poemate, vel oratione forensi, ubi est usus eius omnium minimus, ediscere iubentur: et tamen a dialectica huiusmodi vanis observationibus constituta, quondam invicta mathesis demonstrationum inexpugnabili robore stipata, et indubitatis principiis septa, et munita sub iugum mittetur et corrigetur. O miseros adolescentes, o infelices praeceptores, quid agitis? quo ruitis?

All this trouble is then ascribed to Ramus.

(9) An appendix to the work contains a commentary on Aristotle's An. Post. I. xi. 77a10-26 and includes an illustration from Euclid in the manner of Cardan's *Dialectica*, from which the idea of doing this was very likely derived.

(10) Published under the same general title, as the index *contentorum* shows, are three other short works, composed at varying dates, on a variety of topics.

The first is *De rectarum linearum parallelismo.* This is noted by Bonola in [19] who lists Oliver among "other able writers". He hopes to improve on Clavius (1574) and states that he formed his views many years before the latter's work appeared. But he also has Ramus in mind, saying that Ramus appealed now to the evidence of the perpendicular, now to the long discredited reasoning of Ptolemy. Oliver's treatment of the question is very similar to that of G. A. Borelli (1658), recorded in [19] in detail. In a certain sense this period (before Saccheri) is characterized by the "evidence of the perpendicular".

Second is *Geographica mensurandi locorum intervalla ratio nova intra planum unius circuli.* This is published as an appendix to the work on parallels, the preface to which (like that to the whole book) is dated 1603. The opening paragraph refers to a borrowing (*mutuum*) by Jodoc Hondius the Dutch map-maker from Edward Wright. The story, which involves another English logician, Thomas Blundevile (*The Arte of Logicke,* 1599) can be found in [20-1-2]. The *libellus nauticus* referred to, is Wright's *Certaine Errors in Navigation* (1599).

There follows a medical treatise *De missione sanguinis in pueris* (missing in our copy) with an appendix on Hippocrates *de morbo puerili.*

Finally comes *De circuli quadratura,* dedicated to Adriaen van Rooman (1561-1615) on whom see [23]. It is dated 1595, and closes with the statement that any serious student of his work will admit that the quadrature, even though not yet accomplished, can be effected. An appendix concerns the definition of the sphere.

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