

Constance Jones, Christine Ladd-Franklin, and Victoria Welby

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**CONSTANCE JONES, CHRISTINE LADD-FRANKLIN, AND
VICTORIA WELBY: GRANDMOTHERS OF ANALYTIC PHILOSOPHY
IN *MIND*, 1888-1911**

FREDERIQUE JANSSEN-LAURET

1. INTRODUCTION: *Mind* AND THE GRANDMOTHERS OF ANALYTIC PHILOSOPHY

Mind in the 1890s hosted papers which advocated a version of the sense-reference distinction pre-dating Frege's, a novel logical calculus with a NAND-operator, and a tripartite philosophy of language incorporating context-dependence and implicature. Yet they are almost completely ignored by mainstream historians of analytic philosophy. Why? Because their authors, E. E. Constance Jones, Victoria Welby, and Christine Ladd-Franklin, were women born in the 1830s-40s. They did not neatly fit the established narrative of early analytic philosophy as a child born to three young 'founding fathers' (G.E. Moore, Bertrand Russell, and slightly later, Ludwig Wittgenstein) as the twentieth century dawned, inspired by the seminal mathematical logic of its 'grandfather', Gottlob Frege.

Jones, Ladd-Franklin, and Welby are among those whom I have called 'grandmothers of analytic philosophy' (Janssen-Lauret 2022, Janssen-Lauret 2023a, Janssen-Lauret forthcoming). They were of Frege's generation and, like him, proposed ideas in the philosophy of logic and language (sense and reference, context-sensitivity, implicature) which were not widely taken up until the middle period of analytic philosophy. They further resemble Frege in having influenced some of the canonical early analytic philosophers – although Russell explicitly minimised the influence of Jones and Ladd-Franklin, and most historians of analytic philosophy tend to ignore all three 'grandmothers' completely.¹

Russell's student Philip Jourdain pressed him in correspondence to cite Jones (1890: 46-52). In *Mind* in 1905 (p. 483), Russell had instead cited Frege's 'Über Sinn und Bedeutung' (1892). Russell replied to Jourdain, 'you say in your letter, that Miss Jones's distinction of signification and denotation must be much the same as Frege's Sinn and Bedeutung. But of course *some* such distinction is a commonplace of logic' (quoted in Grattan-Guinness 1977: 119, Russell's italics). In *Mind*, Jones (1910) was forced to present her reply to Russell as a defence of Frege's view, and to confine her own, earlier articulation of it to the footnotes. Jones's signification-denotation distinction, though largely equivalent to Frege's sense-reference distinction, was written out of history. It seems likely that the dismissive treatment she received at the hands of Russell, as well as Moore (Senechal 2012: 51) was

¹For example, their authors are not mentioned in Beaney's *Oxford Handbook of Analytic Philosophy*, Brandom's *Tales of the Mighty Dead*, Floyd and Shieh's *Future Pasts*, Glock's *What Is Analytic Philosophy?* or Soames's *The Dawn of Analysis*. Ladd-Franklin is not even mentioned in Waithe's *Women Philosophers*.

responsible. Initial neglect by their contemporaries often sets women on a ‘feedback loop of exclusion’ (Connell and Janssen-Lauret 2022: 201) which leads to fewer citations by subsequent generations, and as a result, less attention from historians.

Russell’s portrayal of Ladd-Franklin in his *Human Knowledge* was facetious, ‘I once received a letter from an eminent logician Mrs. Christine Ladd Franklin, saying that she was a solipsist, and was surprised that there were no others. Coming from a logician, this surprise surprised me’ (1948: 195-196). Not only is this description sexist in using ‘Mrs.’ to refer to a woman with a doctorate, it does not accurately represent what Ladd-Franklin’s letter (excerpted in Trybus 2020) said.

Victoria Welby, a self-taught philosopher of language, finally found the time to set herself up as a gentlewoman-scholar when her children were no longer small. Welby was well-read in the newly emerging sciences of evolutionary biology and psychology and argued that the study of language must be brought into dialogue with them. When Russell first disavowed the idea that ‘symbols were always, so to speak, transparent’, he admitted that he had first seen a rebuttal of that idea in ‘Lady Welby’s work on the subject, but failed to take it seriously’ (Russell 1926, 118). Almost a hundred years after Russell’s admission, the time has come to find room for these remarkable women and their contributions in the canon of analytic philosophy.

2. JONES

2.1. Jones’s Life, Works, and Context. E. E. C. Jones (1848-1922) was a philosophical logician, author of four logic books, sometime Mistress of Girton, and a well-known figure in her day. Although born to a privileged family at Langston Court in Herefordshire, Jones had not been expected to grow up into a highly educated woman, or a gainfully employed one. In her autobiography, she recounted how the women of her mother, Emily Oakeley’s, family learnt just enough Latin to teach their sons until the boys went to school (Jones 1922: 11). Her mother taught her daughters what she knew – fluent French, good Italian, music, perhaps some introductory Latin – but the girls had a sheltered upbringing, banned even from reading novels. Jones’s physician father, John Jones, did not support higher education for women, at least not enough to finance his daughters’ studies. She was only able to attend the new Girton College for women as a result of the generosity of her aunt Jane, her father’s more progressive sister. Jones’s choice to read Moral Sciences (philosophy) was originally the result of a constrained choice due to her neglected early education: she did not have sufficient Latin or Greek for Classics. But when she began to study Logic with J.N. Keynes, Ethics with Henry Sidgwick, and Mental Philosophy with James Ward, she excelled. In 1880, Jones became the first woman to secure a First in Moral Sciences. After four years’ care-giving for her then terminally ill aunt Jane, Jones returned to Girton, first as librarian, then Lecturer in Logic. Of the three grandmothers whom I discuss here, Jones had the most success in securing an academic career, previously only available to men. Some of the next generation of young women logicians, including Dorothy Wrinch and Susan Stebbing, studied at Girton while she worked there. Jones

became Mistress of the College in 1903, saving it from financial ruin around the start of WWI.

Jones published a paper in *Mind* on Ward's rebuttal of dualism (Jones 1900b), and also defended the ethics of her mentor Sidgwick, whose posthumous works she had edited, in a critical notice in *Mind* (Jones 1921). Yet, as Stout wrote in her obituary, 'Logic, however, was her special subject' (Stout 1922: 383). Logic was the field in which Jones published most, and produced the most original work, and on which I will concentrate here, especially on her exchange with Russell in *Mind* on signification and denotation, that is, what Frege called 'Sinn' and 'Bedeutung' (see Janssen-Lauret 2023b for their separate exchange at the Aristotelian Society).

2.2. Signification and Denotation: Jones's Early Papers in *Mind*. In her first book, Jones had formulated the signification-denotation distinction (Jones 1890: 46), two years before Frege's 'Über Sinn und Bedeutung' (1982). She soon recapitulated her account of the distinction in a critical notice (Jones 1892a) and developed it further in two original research papers in *Mind* in 1893 (Jones 1893a, 1983b). Jones used a variety of terms for what we, in Anglophone circles, have learned to call 'sense' and 'reference', the latter not being the most literal translation of Frege's 'Bedeutung'. While Jones occasionally used the word 'reference', she usually called it 'denotation', 'application', or 'denomination'. She never used the word 'sense' for what Frege called 'Sinn', but instead 'signification', 'attribution', 'intension', or sometimes 'meaning'. (When commenting on Frege, Jones, a fluent German speaker, left his terms untranslated (Jones 1910).) Where Jones tended to refer to her view as her 'Analysis of Categoricals' or, later, her 'New Law of Thought' (Jones 1911), I will here speak of her 'signification-denotation distinction', or sometimes 'meaning-denotation distinction', the terms also used by Russell.

In the first of Jones's original papers in *Mind* she explained her signification-denotation distinction as follows,

'what I regard as the very essence of Categorical statements –namely, the reference (in affirmatives) of two terms to one object, in such a way as to indicate that the object (or group) pointed out by the one term has also the characteristics signified by the other—the proposition thus expressing an explicit analysis in synthesis, a *diversity* of characteristics in *one identical* object or group' (Jones 1893a: 219).

In modern terminology, this means that in a subject-predicate statement ('categorical'), a copula ('is') connects two terms with different meanings (significations) to assert that they ascribe different properties ('characteristics') to one and the same, quantitatively identical, referent. Thus the affirmative (non-negated) subject-predicate statement is true just in case the referent really has those two properties, if the characteristics co-exist 'in' one identical referent. A negative categorical, containing the 'is not' copula, says that two terms with different significations do not apply to the same referent (Jones 1890: 46).

Jones formulated her signification-denotation distinction as part of what we might now call her search for the general form of the (atomic) proposition. Traditionally, Aristotelian logicians had argued that logic was governed by three laws: Excluded Middle (A or not

A), Non-Contradiction (not both A and not-A), and Identity (A is A). Jones endorsed the first two, but objected that most premises and conclusions in syllogisms are not identities of the form ‘A is A’. Most are informative identifications, of the form where the copula connects terms with different significations to describe one denotation, expressing ‘quantitative identity in qualitative diversity’ (Jones 1890: 46). As a result Jones proposed her analysis as logical (purely formal) truth about Categoricals (simple, atomic statements):

‘all simple Judgments may be stated in one of the forms (1) S is P, (2) S is not P, which express (1) Identity, or (2) Distinctness [of Application] in Diversity [of Signification] –hence these forms and this analysis are absolutely General or Formal, as far as Simple (or Categorical) Judgments are concerned’ (1893b: 453).

In later works, including in *Mind* (Jones 1911a), Jones explicitly recommended her analysis as a New Law of Thought to replace the old, deficient Law of Identity.

It is true that there is much in Jones’s proposal for the general form of the proposition which was superseded by polyadic logic. Her proposal does not take account of relational propositions or of atomic propositions which contain multiple quantifiers. But none of that invalidates the important truths that, first of all, Jones’s proposal contained a fully-fledged version of the sense-reference distinction and, second, that her proposal constituted progress in philosophy.

In Jones’s early *Mind* papers, she defended the merits of her proposal over those of others’ analyses of atomic propositions. Jones, who advocated anti-psychologism about logic, found Kant’s account in terms of a ‘combination of conceptions’ too ‘subjective’ (Jones 1893b: 448-449), Hegel’s, according to which subject and predicate must stand in a ‘universal relation’, ‘not ... a *general* account’ (Jones 1893b: 449), and Mill’s, on which categoricals may express ‘Sequence, Coexistence, Simple Existence, Causation, or Resemblance’ insufficiently ‘formal’ (Jones 1893b: 450). All three thus, by Jones’s lights, fall short of being fully logical. One of Jones’s main foils was Lotze, whose efforts to uphold the traditional Law of Identity and demonstrate that all monadic predications are, after all, reducible to the form ‘A is A’ she termed ‘extraordinarily feeble’ (Jones 1893b: 449). She commented that his assertion that ‘S is P “taken just as it stands” is “a contradictory and self-destructive form of expression”’ (Jones 1893b: 450) by itself seemed to constitute a *reductio* of Lotze’s view. Another logician whom Jones took to task for attempting to reduce all categoricals to identities was Jevons. Unlike Lotze, Jevons did admit informative identities, of the ‘A is B’ variety, which he called ‘equations’, but Jones held that he thereby left insufficient room to distinguish sameness of individual from sameness of quality (Jones 1893b: 451). Jones then drew an analogy between her own view and that of the idealists Bradley and Bosanquet, but added, with polite understatement, ‘I do not feel sure that their use of the notions of Identity (*numero tantum*) and Similarity (*specie tantum*) is always free from confusion’ (Jones 1893b: 451).

In her earlier works, Jones tended to waver between presenting her position as the common sense position, widely held by others, and claiming originality for her own signification-denotation distinction, criticising others either for coming close to expressing it but failing,

or for expressing a negated version of it. While above we see her arguing that her view is to be preferred to those of many of the big-name logicians of her generation and the previous one, in her 1890 book the only one she had explicitly criticised was Bradley. There she had quoted passages from Venn and De Morgan which, while not explicitly formulating the signification-denotation distinction, seemed to support it implicitly (Jones 1890: 49-50, n.1). Russell, as we saw in the introduction, took the former view, that the signification-denotation distinction is mere common sense, or implicitly presupposed by many logicians. But there is good reason to believe the latter instead: that the distinction was original with Jones and made an advance on her contemporaries. Jones herself came to believe the latter more strongly over the years, writing, ‘It was first, I believe, put forward in print in a little book of mine in 1890. A view which I understand to be the same as mine was published by Prof. Frege in 1892; and in Mr. Bertrand Russell’s *Principles of Mathematics* (1903)’ (Jones 1911a: 49).

In *Mind* in 1893, Jones mildly criticised Bradley for writing, ‘In “ $S = P$ ” we do *not* mean to say that S and P are identical. We mean to say that they are *different*, that the diverse attributes S and P are united in one Subject’ (Bradley 1883: 29), noting that the second sentence did not make sense unless the subject was one numerically identical thing, and conjecturing that Bradley must have been restricting his use of ‘identical’ to the ‘exactly similar’ sense of the word (Jones 1893: 451; see also her similar criticism of Bradley in Jones 1890: 49 fn.1). In subsequent papers, including one in *Mind*, Jones gained in confidence and drew a clearer boundary between her views and the idealists’. When Jones herself said ‘identity in diversity’, she had meant a judgement in which a qualitatively identical subject is presented under diverse modes of signification. By contrast, Bradley, Bosanquet, and other idealists like Joachim, had instead meant that the subject is ‘*not* “exactly alike but not identical,” nor is it “numerically identical,” but it is identical-in-difference [=?’]’ (Jones 1908: 389, quoting Joachim in *Mind* 1907: 414); her ‘[=?]’ is meant to gently communicate bafflement at what kind of identity he might have in mind which is neither qualitative nor quantitative identity. The idealists held that in judgements of identity, such as ‘Caesar was the conqueror of Gaul’, we do not make a statement about one self-same individual but effect a mental synthesis of ‘two outlines which partly coincide’, and we ‘cannot speak of the coincident part as the same, except by an ideal synthesis which identifies it first with one of the two outlines and then with the other’ (Bosanquet 1888: 358). Jones roundly criticised the idealists Bosanquet, Joachim, and G.E. Moore’s (anti-idealist) latest work as all equally confused and easily refutable by appeal to ordinary language, because ‘identity is taken [by them] to mean qualitative identity, exact similarity’ (Jones 1900-01: 168; see also Jones 1908: 389-390).

2.3. Comparison with Frege. Jones’s position resembles Frege’s in that she stressed the difference in cognitive content between ‘A is A’ and ‘A is B’-style identities,

‘In such sentences as *George Eliot is Mary Ann Evans*,
Robert Cecil is Lord Salisbury,
Tully is Cicero,

it would be denied by some logicians that these names (except, perhaps, *Lord Salisbury*) have necessarily any signification at all. I am here only concerned to maintain that in these sentences Subject and Predicate are, in every case, diverse; and are, by the force of the affirmative copula, applied in each Proposition to one identical person. ... The information conveyed in all these cases may be trite ... but circumstances are conceivable in which it may be useful or new.’ (Jones 1893b: 447)

Jones also recognised that by contrast to statements of the form ‘A is B’, those of the form ‘A is A’ are analytically true: ‘they can have no intelligible contradictory’ (Jones 1890: 52). Jones was also the first to show awareness that the signification-denotation distinction allows us to say that some terms have signification/meaning but no reference, ‘Whoever affirms that any term can be devoid of denomination (and hence have no application, not be the name of anything) would allow, I suppose, that such a term must have determination (meaning)’ (1890: 88), although she was hesitant to commit to this view herself.

Jones’s view differed from Frege’s in that she took signification to be the ascription of a property. Frege, of course, thought of senses as self-standing abstract meaning-entities, distinct from properties, words, and mental states. Unlike Jones, he posited a third realm to harbour these abstract modes of presentation, which according to him exist in addition to individuals and properties. Nor did Jones share Frege’s idiosyncratic view that the referent of a sentence is its truth-value. Both Jones and Frege noted the logical possibility of sense without reference, but Jones explicitly shied away from endorsing this view. This was because she held, in common with many of her contemporaries, a very permissive position on existence. In *Mind* in 1893, she wrote, for example, ‘It is plain that if I speak (or think) of XY’s, XY’s must “exist” somehow, in idea, in my mind’ (Jones 1893a: 220-221 fn. 3). Jones thought subjects of predication have some form of existence unless the supposition of their existence is contradictory (Jones 1910: 380). It should be noted that it is also contested among Frege scholars whether Frege himself endorsed the view that empty descriptions, or fictional names, have sense without reference (Evans 1982: 27-28). We will see that Russell did not attribute that view to Frege. Russell took Frege to believe that empty descriptions and fictional names are assigned an arbitrary referent (Russell 1905: 484).

2.4. The Jones-Russell Dispute in *Mind*. Russell was certainly familiar with the work of Jones, a stalwart of the Cambridge philosophical community whom he had regularly heard at the Moral Sciences Club and the Aristotelian Society (Waithe and Cicero 1995: 40-42). Nevertheless, in his 1905 *Mind* paper ‘On Denoting’, he credited Frege with what he there called the distinction between ‘meaning’ and ‘denotation’, and failed to cite Jones. But Jones’s influence on Russell’s *Mind* paper is apparent in several key features. First, Russell used Jones’s term ‘denotation’ for reference. Frege’s term, by contrast, had been ‘Bedeutung’, whose literal English translation is ‘meaning’. While it is apparent in Frege’s paper that he means to give ‘Bedeutung’ a specialised, technical usage, it is striking that Russell used ‘meaning’ not for Frege’s ‘Bedeutung’ but for what Frege called ‘Sinn’. ‘Sinn’ very naturally translates into English as ‘sense’. It is etymologically cognate with ‘sense’

and shares with it the type of uses where we speak of making sense (*Sinn ergeben*), using a word in a stricter sense (*im engeren Sinne*) or, by contrast, being senseless (*sinnlos*). We saw above that Jones sometimes used ‘meaning’ for signification, as for example in the quotation from Jones 1890: 88. Russell also embraced almost word-for-word Jones’s ‘identity of denotation/application in diversity of signification’ formula. He wrote, ‘If we say “Scott is the author of Waverley,” we assert an identity of denotation with a difference of meaning’ (Russell 1905: 483).

What’s more, Russell wrote in *Mind* as though he viewed senses as properties, *à la* Jones, rather than as Frege’s abstract meaning entities. His use of ‘The Solar System, the twentieth century, etc., are constituents of the *meaning* [of “the centre of mass of the Solar System at the beginning of the twentieth century”]’ (Russell 1905: 483) indicates that these constituents are properties. If he had meant to refer to words, he would have put quotation marks around ‘The Solar System’ and ‘the twentieth century’, as he did for the full phrase ‘the centre of mass of the Solar System at the beginning of the twentieth century’ (Russell 1905: 483). If they had been abstract senses, we might have expected them to be italicised.

Nevertheless, Russell did not cite Jones once in his *Mind* article, but only Frege. Jones was thus forced, in her reply in *Mind*, to present her defence of the signification-denotation distinction as a defence of Frege. Jones’s paper contained a footnote noting that the view Russell attributed to Frege in fact dated back to her 1890 *Elements*. In her *Mind* paper, Jones responded to Russell’s three well-known arguments against the distinction from ‘On Denoting’. Although Jones purported to speak on behalf of Frege, and used his terms ‘Sinn’ and ‘Bedeutung’ untranslated, the details of her reply read like a defence of her own view, not Frege’s. For example, Jones ignored Frege’s position that empty descriptions are assigned arbitrary denotations, mentioned by Russell (1905: 484) and instead relied on her own permissive views about existence.

To Russell’s first objection, that expressions with the same denotation are everywhere substitutable *salva veritate*, but they are not in ‘George IV wished to know whether Scott was the author of Waverley’ and ‘George IV wished to know whether Scott was Scott’, Jones replied that ‘Scott is the author of Waverley’ and ‘Scott is Scott’ differ in that the former, but not the latter, is informative. ‘A is B’ statements convey identity of denotation in diversity of signification, but ‘in *a is a* it is only denotational identity of *x* with itself which is asserted’ (Jones 1910: 380). To Russell’s second and third objections, that his view can, but hers or Frege’s cannot, explain why neither ‘the present King of France is bald’ nor ‘the present King of France is not bald’ is true, and that in cases where the difference between A and B does not exist (or subsist), we appear to have a proposition about a non-entity, Jones replies using her permissive views on existence. She wrote, ‘nothing of which Existence is predicated can without contradiction be denotationally identified with anything of which Existence (in the same sense) is denied’ (Jones 1910: 380). She suggested that a case might be made that ‘the present King of France’ is a contradictory term: ‘if the A in *A is B* is *the present (A.D. 1909) King of France*, then *that* A is *A not-A*’. Her reasoning is compressed but appears to be that since France has been a republic since 1789, we can infer that the King of France in 1909 is not King of France in 1909. If not, then ‘it

is assigned to some sphere of predication (“universe of discourse”) in which it occurs—which means that the kind of “being” or “existence,” is fixed by the context, by certain further determinations of the subject-term’ (Jones 1910: 381). Similarly, ‘If A and B do not differ, “the difference between A and B” of which we think and speak, is still an object with *Sinn* and *Bedeutung*, with “being” or “existence,” and attributes, assumed hypothetically’ (Jones 1910: 381).

Russell finally responded directly to these points of Jones’s in their exchange at the Aristotelian Society (Russell 1910-11, Jones 1910-11, see also Janssen-Lauret 2023b). Jones there objected to Russell’s response, which she felt continued to distinguish insufficiently between qualitative and quantitative identity. She argued that in ‘the author of *Waverley* is the author of *Marmion*’, the ‘is’ expresses identity of denotation; not, as Russell ambiguously puts it, ‘identity’. The statement does not express qualitative identity of the two qualities, but quantitative identity of the person who wrote the books. While Russell maintained that definite descriptions have no meaning in isolation, but can only be given contextual definitions, Jones held the view, which Frege had also developed independently, that definite descriptions are denoting phrases. Jones raised the worry that without the notion of knowledge by acquaintance, which she had doubts about, this view leads to an infinite regress: unless we have some signification to give to the description, we cannot know what it means or denotes. We might be able to build up meanings from the ground if we had acquaintance with things denoted, but in practice we always build some meaning into our name-statements: they are never just ‘a mere noise or shape’ (Jones 1910-11: 181).

In the same year, in *Mind*, Jones further distinguished her views on identity from those of the idealists Bosanquet and Bradley. Jones, whose philosophy of logic was strongly anti-psychologistic, argued that while we may say a synthesis takes place when we learn or infer an informative identity claim, it is our learning or understanding which depends upon the synthesis, and not the truth of the identity statement (Jones 1911a: 42 n. 2). Therefore, synthesis is ‘important ... in connexion with the meaning of Inference’ (Jones 1911a: 51) but not part of the content of the statement of identity. Her argument for distinguishing qualitative from quantitative identity in a way which Bradley and Bosanquet had not, and very early Moore and Russell at the time of their ‘New Philosophy’ had not, rested ultimately on ordinary language. While ‘sameness’ in ordinary English is ambiguous between a qualitative and a quantitative use, we can nevertheless readily discern ‘individual identity, ... such Sameness as I mean when I say: “That is the very same paper-knife that I mislaid last week”; “He is so altered that you would hardly believe him to be the same person”; “This is the same spot—the same time,” [from] qualitative similarity between a plurality of things ... such Sameness as I mean when I say: “Oh, this indiarubber will do just as well, it is very nearly the same” or “Those umbrellas are all just the same—you could not tell one from another”’ (1900-01: 168-170).

Although the difference between quantitative and qualitative identity is real and discernible in ordinary language, Jones wrote, ‘Even some of the acutest thinkers do not seem to have escaped the snare [of conflating the two]. The source of the ambiguity is not far to seek, for of the two fundamental kinds of Sameness, (1) extensional or denotational sameness, and (2) qualitative sameness, (2) is very constantly (though by no means always) a

sign of (1). E.g. if a stowaway is observed to have all the published characteristics of an escaped criminal, the similarity is regarded as an indication of “identity”. It may however turn out to be a case of “mistaken identity” ’ (Jones 1911a: 52).

Jones made a clear advance on her idealist contemporaries, who interpreted ‘identity-in-diversity’ as necessarily involving an ideal synthesis; her use of the ‘identity-in-diversity’ nomenclature instead pointed to a modern sense-reference or signification-denotation distinction, interpreting identity statements as identity of denotation in diversity of signification. Her colleague Augusta Klein commended Jones’s view in *Mind*, writing, ‘the post-Hegelian doctrine which treats all predication as the statement of an Identity in Difference ... has been strikingly illustrated by a theory expressed first by Miss Constance Jones as long ago as 1890, and, a little later, by Prof. Frege’ (Klein 1911: 521). Klein was far from the only one of Jones’s contemporaries to embrace her distinction enthusiastically and to consider it progress in philosophy. J.N. Keynes wrote that he had ‘practically borrowed the above [sense-reference distinction] from Miss Jones, who describes an affirmative categorical expression as “a proposition which asserts identity of application in diversity of signification” ([Jones 1892] p. 20)’ (Keynes 1906: 190).

3. LADD-FRANKLIN

3.1. Ladd-Franklin’s Life, Works, and Context. Christine Ladd-Franklin (1847-1930) was a formal logician who invented a novel calculus with a NAND-operator and held sophisticated philosophical views on logical consequence and domains of discourse. Although regarded as brilliant by her contemporaries, she never held a secure academic job.

Christine Ladd, born in Connecticut to a feminist family, studied science at Vassar College, taking classes with the astronomer Maria Mitchell. Though wanting to pursue further study in physics, Ladd was unable to persuade a physics professor to accept a woman working in his laboratory. Her teachers encouraged her to work instead on pure mathematics. In striking contrast with twenty-first century prejudices, pure mathematics and logic were considered well-suited to female students by the Victorian establishment, at least those among them who approved of women’s education at all. Unlike physics or biology, these subjects involved no worldly knowledge potentially affecting a woman’s virtuous reputation, and could be studied independently from home or without leaving the walls of a women’s college (Jones 2000, Janssen-Lauret 2022: 9, 14-15). Having spent some time teaching and publishing prolifically in mathematics journals, Ladd was encouraged by J.J. Sylvester, Professor at Johns Hopkins, who had liked her publications, to apply for a PhD. Johns Hopkins was, at the time, an all-male university. She applied as ‘C. Ladd’, but was denied official admission or recognition when she turned out not to be a lad after all. Sylvester, who had himself been grievously discriminated against as a Jewish mathematician both as a student in Cambridge and a junior professor in the U.S. (Kenschaft 2005: 9-12), intervened to ensure that Ladd received a fellowship stipend and was able to work with him and Peirce on her PhD. Ladd became the first American woman to complete one, in 1882. Her PhD was approved by her department, published (Ladd 1883), and cited as an important work, including in a review by Venn in *Mind* (Venn 1883: 595-601) and

also by Whitehead (1898: 116). Nevertheless, Ladd was not actually allowed to graduate with her degree, simply because she was female. Soon after completing her PhD, Ladd married her colleague Fabian Franklin and began to use a hyphenated surname. The couple published a short note together in *Mind* arguing that some sense can be made of Mill's doctrine of Natural Kinds in terms of commonality of origin (Franklin and Ladd-Franklin 1888). They had a son who died in infancy and a daughter, who was to grow up to be the suffragist activist Margaret Ladd-Franklin, and whose language-learning and reasoning Ladd-Franklin *mère* regularly used as examples in her publications. As a married woman, Ladd-Franklin found it even harder to find academic employment than single women did. Though still publishing prolifically in logic, she had to make do with a string of temporary lectureships. Finally able to secure a place in a laboratory when she joined her husband on research leave to Germany, Ladd-Franklin did pioneering work on colour vision in the newly emerging science of psychology. Ladd-Franklin was finally officially awarded her PhD forty-four years after submitting it, in 1926.

3.2. Ladd-Franklin in *Mind*: Her Logic and the Antilogism. Ladd-Franklin was a polymath, making important contributions to pure mathematics, symbolic logic, philosophical logic, and psychology. Here I will concentrate on the work she did in *Mind* on logical form and logical consequence, in particular her use of a symmetric exclusion (or NAND-) operator to throw new light on syllogistic form. She also published two papers on colour vision in *Mind* (Ladd-Franklin 1893, Ladd-Franklin 1894), as a result of her laboratory work in Germany.

Ladd-Franklin's formal logic did not belong to the Frege-early Russell tradition, which regarded logic as a *lingua characterica*, a universal language to speak about absolutely everything, but to the Boole-Peirce-Schröder tradition of algebraic symbolic logic. Its calculi allow the variables to range over classes in extension as well as over propositions. Boolean and Schröderian algebras were based on class inclusion: x is included in y iff every member of x is a member of y . But Ladd-Franklin built her system around exclusion: ' $x\bar{\vee}y$ ', the holding of the class exclusion relation between x and y , is true whenever x and y are disjoint. Ladd-Franklin used an overline to express either negation or the complement of a class, and double negation by deletion of the overline. As a result, ' $x \vee y$ ' is the negation of ' $x\bar{\vee}y$ ', and true whenever x and y overlap. Because ' x 's and ' y 's may range over propositions as well as classes, ' $x\bar{\vee}y$ ' also has the straightforward 'NAND' reading, meaning 'neither a nor b', when interpreted propositionally.

Ladd-Franklin preferred exclusion to inclusion in formulating logical forms and inferences. Unlike inclusion, exclusion is symmetric. Because of this symmetry property, Ladd-Franklin's notation is order-indifferent: $x\bar{\vee}y$, $y\bar{\vee}x$, and $xy\bar{\vee}$ all mean the same and are freely interchangeable. Writing ' $x\bar{\vee}y$ ' instead of 'No x is y ' would, Ladd-Franklin predicted, make it easier to see why it is equivalent to, for example, 'All x is non- y ', 'there is no y which is x ', and 'the combination xy does not exist'. Traditional Aristotelian logic describes these as different propositions because, as Ladd-Franklin wrote in *Mind*, they 'do not affirm or deny the same predicate of the same subject' (Ladd-Franklin 1890: 76). But in ordinary language, we naturally recognise these as different ways of saying the same thing: "No

ripe grapes are sour,” “No sour grapes are ripe,” “Nothing which is sour when ripe is a grape” are statements which no child would have any trouble in seeing to be equivalent’ (Ladd-Franklin 1890: 86). The exclusion operator makes this equivalence apparent and dispenses with grammatical surface features concerning subject and predicate which are irrelevant to the underlying logical form.

In a paper in *Mind* in 1892 named (perhaps unduly modestly), ‘Dr Hillebrand’s Syllogistic Scheme’, Ladd-Franklin laid out her reduction of the syllogism (dating back to her Ladd 1883), along the while taking issue with E. E. C. Jones who had attributed that reduction to Brentano’s disciple Hillebrand (Jones 1892a).² Ladd-Franklin explained that she derived the syllogism from sentential logic with the exclusion operator as a special case of a general argument. The general argument, with ‘+’ representing class union, is the following:

‘No A is B, No C is D, [therefore] No AC is either B or D.’ (Ladd-Franklin 1892: 528)

Formally: $(A\bar{\vee}B)(C\bar{\vee}D)$, therefore $(AC\bar{\vee}B + D)$ ’ (Ladd-Franklin 1892: 528)

For example: “No bankers have souls. No poets have bodies. No bankers who are poets have either souls or bodies’ (Ladd-Franklin 1892: 528).

The above is not a syllogism, but a special case of it is: ‘when D and B are contradictory terms’ (Ladd-Franklin 1892: 528). That is, when D is the same as not- B – in Ladd-Franklin’s symbolism, \bar{B} . In this case, the conclusion of the argument contains the phrase ‘ $B + \bar{B}$. But, in a Boolean algebra, this phrase denotes the whole universe of discourse – symbolised by 1 – because it refers to the union of some class and its universe-complement, which taken together comprise everything. (That is, everything in the universe of discourse, which for algebraicists like Ladd-Franklin, unlike for Frege and Russell, could vary. See also (Janssen-Lauret 2023a).) As such phrases can make no difference to the truth value of a formula containing ‘ $\bar{\vee}$ ’, Ladd-Franklin decided that it could be safely dropped.

Now we have the following instance of the argument above,

‘No A is B, No C is \bar{B} , [therefore] A which is C (since it is neither B nor non-B) is not anything’ (Ladd-Franklin 1892: 528)

Formally: $(A\bar{\vee}B)(C\bar{\vee}\bar{B})$, [therefore] $(AC \bar{\vee} B + \bar{B})$ or, $(AC \bar{\vee} 1)$ ’ (Ladd-Franklin 1892: 528)

For example: ‘No bankers have souls. No poets are without souls. therefore There are no bankers who are poets.’ (Ladd-Franklin 1892: 528).

The general formula from which Ladd-Franklin derived the syllogism, then, is the following:

$$(a\bar{\vee}b)(c\bar{\vee}\bar{b})\bar{\vee}(ac\vee)$$

Ladd-Franklin derived the syllogism from this form by the following steps: 1. Expressing all universal propositions negatively and all particular propositions positively – that is, expressing universal generalisations in the form where they have the negative copula, i.e.,

²On Hillebrand, see also Cosci forthcoming.

in terms of exclusion: e.g. ‘ $a\bar{\vee}b$ ’ (‘No A is B’) or ‘ $a\bar{\vee}\bar{b}$ ’ (‘No A is non-B’, that is, ‘All A is B’), and particular properties with the positive copula, that is, in terms of inclusion. 2. Negate the conclusion. 3. ‘The argument must now consist of two universal propositions, and one particular proposition; and the necessary and sufficient condition for validity (as appears from (1)) is that a term common to two universal propositions must have unlike signs, and a term common to a universal and particular proposition must have like signs’ (Ladd-Franklin 1892: 530), where ‘unlike signs’ means that one has ‘ $\bar{\vee}$ ’ and the other \vee . This, according to Ladd-Franklin, is the general form of the syllogism. As the vocabulary is order-invariant, it can also be symbolised as ‘ $(a\bar{\vee}b)(c\bar{\vee}\bar{b})(ac\vee)\bar{\vee}$ ’, that is, three formulae, the premises and the negation of the conclusion, which exclude each other – they are, taken together, inconsistent.

In Ladd-Franklin’s view, the exclusion relation, being symmetric and easily understood, constituted a highly perspicuous form in which to present reasoning, syllogistic and otherwise. The sense of being struck by an inconsistency between two or three of another person’s statements, or between another person’s statement and one’s own beliefs, she held to be at the heart of argument as it takes place in ordinary-language conversations. ‘So natural is it, indeed, that we have an abbreviated form of speech for it, by which we are able to give the whole force of the phrase “are mutually inconsistent propositions” by means of the simple word *but*’ (Ladd-Franklin 1892: 529). And, she noted, we learn to use the word ‘but’ to good effect very early.

That the Inconsistency, as a form of argument, is not of late psycho-genetic development, I have proof in the fact that I have heard it used by a child of four, and in this way:-

“Nobody eats soup with a fork, Helen.”

“But I do, and I am somebody ! ” (Ladd-Franklin 1892: 529)

In a later paper in *Mind*, she wrote about having coined the term ‘antilogism’ for a syllogistic rebuttal (Ladd-Franklin 1928: 532). She rehearsed again the memorable example about the little girl eating soup with a fork, although in 1928 the girl’s name is ‘Emily’ (Ladd-Franklin 1928: 532). A paper on her antilogism in *Mind* the next year praised it to the skies: ‘No scheme in logic that has ever been proposed is more beautiful than that ... of Dr. Ladd-Franklin’ (Shen 1927: 54).

4. WELBY

4.1. Welby’s Life, Works, and Context. Victoria Alexandrina Maria Louisa Stuart-Wortley was born in 1837, to Lady Emmeline Manners, a poet, playwright, and travel writer who was also the daughter of the Duke of Rutland, and Charles Stuart-Wortley. Just a few days after her christening, her godmother was crowned Queen Victoria. After Charles Stuart-Wortley’s death seven years later, Victoria travelled around North America, Spain, Portugal, Morocco and the Middle East with Lady Emmeline. Upon losing her mother, she lived with her maternal relatives before taking up the position of Maid of Honour to the Queen. In 1863, she married William Earle Welby, Conservative MP for Grantham, who became Sir William Earle Welby-Gregory in 1875. They had three children, one

who died young and two who survived: Charles Glynne Earle Welby, who became Sir Charles, the 5th Baronet, in 1898, and Emmeline Mary Elizabeth, known as Nina, who grew up to be a poet and historian, as well as the editor of her mother's papers under her married name, 'Mrs Henry Cust'. When her children were no longer small, Welby finally found the time for academic study. Independently wealthy Victorian gentlemen not infrequently set themselves up as scholars. But at a time when women's education was politically controversial, this was a daringly progressive choice for a lady. Welby first published a collection of essays on theology (Welby 1881), but soon became convinced that the key to vexed questions of science and religion lay in the study of meaning, in which the academic establishment rarely engaged. Welby published mostly on language from that point onwards, developing in journal articles, including two in *Mind* (Welby 1896a, 1896b) and several books (Welby 1897, 1903, 1911) a philosophy of language she called 'significs'. Here I will instead concentrate on the early development of her philosophy of language in her two papers in *Mind*. Despite all the original work she published, Welby is known to analytic philosophers almost exclusively for her correspondence with Peirce.

Peirce had reviewed Welby's *What Is Meaning?* alongside Russell's *Principles of Mathematics*. Peirce called her book 'feminine' and 'painfully weak' (Peirce 1903: 143) and got her name wrong, calling her 'Lady Victoria Welby'. But like all female intellectuals in the very early analytic years, Welby was used to persevering in the face of patronising attitudes. On the whole she felt pleased that he considered the books 'two really important works on logic' (Peirce 1903: 143). Russell, by contrast, was annoyed (Pietarinen 2009: 482).

Though marginalised with respect to gender, Welby had always been privileged with respect to family connections in the worlds of politics and literature. She also had the means to host large groups of like-minded intellectuals at Denton Manor, the house she shared with Sir William, who appears to have supported her scholarly career despite his conservative politics. In addition, she kept up an impressive volume of correspondence with dozens of well-known scholars including Russell, Bradley, James Baldwin, the editor of the *Encyclopaedia of Philosophy and Psychology* to which Ladd-Franklin and Welby both contributed articles, Mary Everest Boole, Henry and William James, Benjamin Jowett, Henri Bergson, G.F. Stout, Henri Poincaré, and Christina Rossetti. Most famously, Welby exchanged letters with Peirce for years, letters which scholars of American pragmatism regularly quote, though generally to clarify something about Peirce's views rather than Welby's. Welby strove not just to discuss philosophy in her letters, but also played the culturally-coded feminine role of the good Victorian hostess by putting like-minded correspondents in touch with each other.

Welby's intellectual generosity in both physically hosting other scholars and making introductions between them in person and in writing has been rather a double-edged sword for her philosophical reputation and her place in history. She gained a broad range of people with whom to exchange ideas, but is now often portrayed more as a useful facilitator for the great men than a powerful intellectual force in her own right. Certain historians describe her main philosophical contribution as introducing Peirce to British analytic philosophers (e.g. Pietarinen 2013: 140), sometimes while at the same time admitting that Welby

independently came up with some of the same ideas: ‘she did understand that Peirce, *like herself*, had put his finger on a new and emerging problem in philosophy—the study of meaning’ (Hardwick 1977: xxxii, my italics). Several commentators describe Welby’s work in unhelpfully gendered, even sexist ways (for examples see Connell and Janssen-Lauret 2023 §1).

Welby initially published as ‘Lady Welby’ (e.g. Welby 1891), using the customary title for the wife of a baronet, namely ‘Lady’ concatenated with her married surname only. But she soon began to express a preference for the gender- and class-neutral ‘V. Welby’, under which she published all her papers in *Mind*. Her polite request to be so called in a letter to Peirce, however, has generally been badly misinterpreted by historians. Welby wrote, “Before I say more, may I confess that in signing my book ‘V. Welby’ I hoped to get rid as far as possible of the irrelevant associations of my unlucky title? I am called “V. Lady Welby” merely to distinguish me from my son’s wife, now Lady Welby; which is a custom of ours. Thus I have no right to be called Lady Victoria Welby’ (Welby 1977: 13). Myers and Petrilli claim that in this letter, Welby told Peirce that ‘upon her son’s marriage’, Welby ‘lost’ (Myers 1991: 3) the use of ‘Lady Victoria’ because ‘her daughter-in-law had acquired the right to place the title “Lady” before her Christian name’ (Petrilli 2010: 329). None of this is correct. Welby had never been Lady Victoria. In the British tradition, the right to place ‘Lady’ before the first name is restricted to daughters of peers of the rank of Earl or above (such as Welby’s mother, Lady Emmeline), who have it by virtue of birth, not marriage. Welby’s father had been, as the second son of a baron, without a title.³ In her letter, Welby had expressed that after her husband’s death in 1898, when her son had become Sir Charles, his wife inherited the title ‘Lady Welby’ without further qualification, while Welby’s official title then became ‘Victoria, Lady Welby’. But what she had primarily meant to convey to Peirce was her preference for being, *qua* scholar, known by a name which revealed nothing about the gender or class of its bearer.

4.2. Welby’s Philosophy of Language in *Mind*. Welby made strikingly original and sophisticated points about the philosophy of language, a field of study which was then in its infancy. When Russell and Moore were still undergraduates, Welby expressed ideas independently raised by Frege around the same time, e.g. about the importance of context in interpreting language, but also adumbrated points made forty or fifty years later by Stebbing, Wittgenstein, and Quine, a kind of mature philosophy of language not achieved by the canonical thinkers of analytic philosophy until its middle period. Welby is fruitfully interpreted as an early analytic philosopher because of her attitude towards the relationship of philosophy to science, although in some respects opposed to Moore and Russell’s New Philosophy. Although she deplored the New Philosophy’s naïve conception of language as transparent, she shared with the canonical early analytic philosophers, especially Russell and Whitehead, an urge to develop a philosophy to fit around new developments in science. Russell in particular had been concerned to create a philosophy fit for the new mathematics—the Revolution in Rigour—and the new physics—general relativity. Welby

³Her father was not, as Petrilli (2010: 328) claims, the Duke of Rutland, who was in fact Welby’s maternal grandfather.

was one of the first to see that a complementary new philosophy of language was also needed to fit around new developments in evolutionary biology, social science, and the newly emerging science of psychology. Russell and Whitehead saw that Dedekind and Einstein overthrew previously assumed philosophical and common-sense certainties such as ‘no whole is the same size as its proper part’ and ‘the past no longer exists’ (Janssen-Lauret 2022: 8). Wanting to preserve the truth of those scientific claims, they concluded an overhaul of philosophy was necessary. Welby argued in a very similar manner that new developments in psychology and evolutionary biology overthrew previous naïve ideas about mind and language. We can no longer think of language as a system installed in the rational mind fully formed, with each word neatly corresponding to some mental idea which it represents.

Evolutionary theory reveals, according to Welby, that language is continuous with other forms of behaviour, different in complexity from animal behaviour but an outgrowth of it (1896a: 24). Another strikingly modern and naturalistic feature of Welby’s work is her warning against ‘the fetish of a possible Plain Meaning, the same at all times and places and to all’ (Welby 1896b: 192). Another is her entertaining response to Lewis Carroll’s assertion that ‘any writer of a book is fully authorised in attaching any meaning he likes to any word’. Welby parodied it by imagining a Queen’s Speech in which ‘the Queen was made to announce “hostile measures” which had previously been defined as “friendly overtures” with reference to foreign powers’ 1897: 10-11). Welby quipped that Carroll’s practice ‘would strike at the heart of humour itself’ (Welby 1897: 11)—the implication being that the author of *Alice in Wonderland* would surely not want *that*. Thus she questioned the ‘myth of the gallery’, of a museum of Plain Meanings of which words are only arbitrary labels, sixty years before Quine. Welby also argued, on naturalistic grounds, that facts were theory-laden: “We may appeal, and are right to appeal to “hard, dry” facts; but we perforce put something out of ourselves even into these. They become “facts” under the quickening touch of “mind,” while that emerges from a dim world of prepossession, bequeathing us many a primitive legacy from pre-intelligent sentience, and perhaps from little-suspected sources lying yet further back’ (Welby 1893: 515). Here Welby foreshadowed, in the 1890s, something Quine and the later Wittgenstein would express 50 to 60 years later.

In her *Mind* papers, Welby presented an early version of her tripartite theory of meaning. She distinguished three levels of representation or significance. The first and most basic one she called ‘sense’, by etymological association with sense perception—to be kept sharply separated from the Fregean use of ‘sense’. Welby’s ‘sense’ covered either association of individual words with referents or individual occurrences of associating language and sense-experience (1896a: 26-7). Sense, according to her, was directly linked to ostension and organisms beginning to generate (though not deliberately to make) a simple type of meaning, for which Welby coined the verb ‘to sensify’ (1896b: 188). It comes relatively early in psychogenetic and evolutionary development. In her later works Welby made explicit that ‘sense’ also encompasses occurrences of uninterpreted language (1903: 5-12). A paper on the development of significs by L.E.J. Brouwer, for example, whose teacher Mannoury had been a member of the significs movement, claims that primordial (‘organic’) languages count as uninterpreted unless a hearer or interpreter must be presupposed to

make sense of them (Brouwer 1945: 204). ‘Sense’ can therefore potentially be used to include pure uninterpreted syntax.

The second level of representation Welby, in her *Mind* papers, referred to as ‘import’ (Welby 1896a: 24), and in later works sometimes also as ‘meaning’ (1903: 12). In *Mind* Welby chose the label ‘import’ because she worried about the psychological connotation of ‘to mean’ and ‘meaning’, since in their primary sense these mean ‘to intend’ and ‘intention’; the linguistic sense, Welby maintained, is secondary. Import, Welby wrote, is connected to the aims and rules of formal logic. It requires words to be concatenated in an ‘orderly’ grammatical manner, and governed by logical inference (1896a: 32-38), but also requires that the language is used with intention to communicate (1896a: 28). Although Welby felt hampered, perhaps at times embarrassed by her lack of formal education and described herself consistently in very modest terms, her breadth of reading is, to the modern reader, impressive. In her *Mind* papers she cited Mill, Keynes, Venn, Jevons, Johnson, and other logicians, as well as a range of works in psychology, philosophy of mind, and precursors of linguistics such as Ward, Jespersen, and Dewey. Unusually among Victorian Western philosophers, Welby had some knowledge of the Indian philosophical tradition. She cited a translation of the *Vedantasara*, a 15th-century Advaita Vedanta text, whose three levels of word meaning she saw as comparable to her significs (1903: 46).

While Welby cited approvingly the increased precision of the debate among logicians over the ‘import’ of propositions, of which Jones (not cited by Welby) was part, she felt that logicians would benefit from distinguishing the second level of representation from the third (1896a: 35). She objected, for example, to Venn using ‘mean’ and ‘apply’ interchangeably. She also queried Venn’s assertion that by putting more meaning into a name we restrict its range of application, because this appears to contradict the previous point (1896a: 37). Welby proposed using ‘apply’ for reference only. It is not clear whether Welby considered import to be psychogenetically prior to signification, or whether she took both to develop in tandem out of a base level of sensifying. But it is clear that she saw epistemological potential in separating the two and carefully examining everyday and scientific discourse for conflation between them.

Welby’s third level is signification, which covers the emotional force, moral and social range of language used in context (1896b: 25, 1903: 5-6). Welby later specified that signification is ‘expressive of the implicative’ (1903: 12). Since she included logical consequence under ‘meaning’, here she is best interpreted as referring to the pragmatic sense of the word, to what analytic philosophers now call ‘implicature’ (Grice 1975). Welby stressed the importance of context, intent, mutual interpretation, and pragmatic considerations to language from 1893 onwards. By contrast, Russell confessed that he would continue to think ‘of language as transparent—that is to say, as a medium which could be employed without paying attention to it’ (1959: 14) until at least 1919. Welby’s work had been his first impetus to think about language differently. Yet Welby is rarely credited for this influence, for being a philosopher of language in her own right, or for shaping the analytic tradition in any way.

5. CONCLUSION: MAKING ROOM IN THE CANON FOR THE GRANDMOTHERS OF ANALYTIC PHILOSOPHY

In the very early analytic period, *Mind* offered space to female authors defending their own views on such topics as the sense-reference (or signification-denotation) distinction, exclusion as the foundational logical operator, and the nature of linguistic meaning and its relation to behaviourism, psychogenesis, and social context. These papers by Jones, Ladd-Franklin, and Welby were well-regarded by several of their contemporaries. Jones was credited with the invention of the sense-reference distinction by Keynes, Stout, Jourdain, and Klein, Ladd-Franklin's work was praised by Venn, Whitehead, Royce and Shen, and *Mind* honoured Welby with a prize named after her, on which Welby published a note in the journal (Welby 1901). Yet despite the obvious interest of their contributions to the key themes of analytic philosophy, they remain neglected in the analytic tradition, perhaps because of Russell's dismissive treatment of all three 'grandmothers'.

The fact that all of these women published on either formal or philosophical logic might appear surprising to the twenty-first century reader, who may well think of logic as culturally coded masculine. In the late Victorian and Edwardian era, by contrast, those adhering to mainstream cultural mores who condoned women's education at all would have found both logic and pure mathematics appropriate subjects for a lady to study. Their masculine-feminine axis mapped onto the separation of spheres into the public and private, with the former being masculine and the latter feminine. Logic and pure mathematics, which required no worldly knowledge and could be studied at home or from within the safe walls of a women's college, fitted reasonably well within the private sphere. The public-speaking cut and thrust of politics, classics, and the kind of applied mathematics involved in commerce were much more male-coded fields to a Victorian than logic. Jones chose to specialise in logic because she had not been taught sufficient Latin for a degree in Classics. Ladd-Franklin opted for mathematical logic because no male physics professor would admit a woman to work in his laboratory. Both were stalwarts of established traditions in late nineteenth-century logic – the import of categorical propositions, algebraic logical calculi – and made important moves – the signification-denotation distinction, the antilogism and exclusion operator – which constituted progress in philosophy. Welby, an autodidact, though involved in the debate about the import of propositions remains a little less straightforward to place with respect to the established debates of her day. Nevertheless her work was innovative and ahead of her time in foreshadowing several key moves made by later analytic philosophers.

The views on language expressed by Jones, Ladd-Franklin, and Welby in *Mind* reached a level of maturity far surpassing those expressed in the very early works of Moore and Russell with which they were contemporaneous. Like Frege's remarks on language, these women's views on meaning and representation had more in common with those of canonical mid-analytic philosophers such as Quine, Wittgenstein, Austin, or Grice. This, as well as their age and time period, is a quality these women have in common with Frege. They are therefore rightly called 'grandmothers of analytic philosophy'. By contrast to the 'grandfather', Frege, the 'grandmothers' have until now been almost entirely ignored by

historians of analytic philosophy. In recovering their contributions and pointing to the intrinsic interest of their works, as well as their demonstrable influence on canonical analytic philosophers such as Russell, I aim to begin the process of preparing for them their proper place in the analytic pantheon.⁴

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