

YVONNE LORIOD AND THE PRACTICE OF ANALYTICAL MEMORY

Once you've studied harmony, fugue, counterpoint, composition – when you've done all that, then you can analyse music, whether classical, romantic, or modern, with great ease. And you can also learn music by heart more quickly, knowing it from a formal, harmonic, and rhythmic point of view; it makes it easier to know and memorise a work.

– Yvonne Loriod in 1965<sup>1</sup>

An unexpected corpus of manuscripts turned up in the archive of Olivier Messiaen:<sup>2</sup> from scores and sketches fell scraps of paper bearing the minuscule handwriting of the pianist Yvonne Loriod (1924–2010), some with reductions of entire concertos crammed onto index-cards, others featuring melodies decorated with doodles of birds and ocean waves. Their strange concision and diminutive size suggested covert usage. As the number of these documents increased, it became clear that these were in fact *aide-mémoires* – notes and schematic reductions condensing large forms and highlighting troublesome passages – which Loriod playfully referred to as her '*pense-bêtes*'.<sup>3</sup> Having recovered from the initial surprise of finding what seemed like 'cheat sheets' among the papers of a performer renowned for her extraordinary memory, it became apparent that the *pense-bêtes* offered a rare glimpse of a pianist's solutions for apprehending and recalling musical form and structure – analytical strategies to overcome mnemonic challenges. Situated at the intersection of gnostic formal analysis and the drastic pressures of live performance, these documents invite a multifaceted approach: drawing upon methods and insights from history, music psychology and performance studies, we suggest that the study of these *pense-bêtes* offers valuable and novel contributions to both musical performance studies and the history of music analysis.<sup>4</sup>

The use of analysis in the service of memorisation is widely attested among leading pianists and in music performance scholarship, even as the analytical methods and processes involved in

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<sup>1</sup> Institut national de l'audiovisuel, Paris (hereafter, F-Pinat), PHD99271197, Micheline Banzet-Lawton, '*Trois Jours avec...* [Yvonne Loriod, jour 1]', broadcast on 19 April 1965; 'quand nous avons les classes d'harmonie, de fugue, de contrepoint, de composition, quand nous avons fait tout ça, ensemble, nous avons une plus grande faculté d'analyse des œuvres, classiques, romantiques et modernes, et nous pouvons apprendre plus rapidement les œuvres par cœur, les connaissant au point de vue formel, au point de vue harmonique, rythmique, ça facilite en tout cas la mémoire et la connaissance de l'œuvre.' Unless indicated otherwise all translations are by the authors.

<sup>2</sup> Bibliothèque nationale de France, département de la musique, fonds Olivier Messiaen et Yvonne Loriod (hereafter, F-Pn).

<sup>3</sup> Loriod uses the term '*pense-bête*' in a range of contexts from her private notes to her interview with Serrou (2002). Unlike *aide-mémoire*, Loriod's choice of the term '*pense-bête*' has an informal, trivialising tone that makes light of the documents' importance.

<sup>4</sup> The *locus classicus* for the opposition of 'gnostic' and 'drastic' is found in Abbate 2004, drawing on the thought of Vladimir Jankélévitch.

memorisation are rarely defined with precision and most often undocumented – part of performers’ ‘informal’, ‘largely non-discursive’ expertise (Agawu 2004, p. 274; Cook 2013, p. 44). Many of the pianists cited in Roger Chaffin, Gabriela Imreh and Mary Crawford’s now-classic study of memory and piano performance allude to ‘conceptual’ or ‘analytical memory’ (Chaffin et al. 2002, pp. 32–42).<sup>5</sup> Loriod, though not cited by Chaffin et al., conforms to the trend observed in their interviews with pianists, writing about multiple forms of memory, including ‘*la mémoire de l’analyse*’ in notes drafted in 1958.<sup>6</sup> Scholars have since used the term ‘structural memory’ to describe one process by which musicians, more or less consciously, use systems of hierarchical organisation to organise and retrieve information in performance, much as music analysts restructure or represent musical works in terms of hierarchical structures (Chaffin et al. 2016, pp. 562–63). Yet even as numerous studies assert the utility of analysing form for the memorisation process, the nature of this work is always individual and subjective: there is ‘no single correct understanding of the structure of a particular piece of music; it is the musician’s own representation of the structure that provides the framework for retrieval’ (Ginsborg 2022, pp. 240–41).

The substance of performers’ analysis and its role in memorisation has been difficult to assess, especially from a historical perspective, given the reticence of many artists to speak about the specifics of their working processes, whether from a propensity for dissimulation (Chaffin et al. 2002, pp. 28–30), or more simply because they are unaccustomed to verbalising these strategies. There is a range of possible reasons for this: the ease – or, as psychologists of memory would call it, ‘spontaneity’ (Chaffin et al. 2016, p. 559) – with which much memorisation takes place among talented or expert musicians; the idea that one’s personal strategies are too idiosyncratic to be useful to others; and even cultural taboos. For one, there exists a perception that to discuss the mechanics of memory could result in the disenchantment of what concert audiences often consider a most impressive feat of live performance: as Imreh somewhat cynically observes, ‘part of the reason for the scarcity of good material is the cult of the performer, which often allows pianists to get away with drawing a veil over the details of how their magic is produced’ (Chaffin et al. 2002, p. 30). Furthermore, the topic broaches intimate questions of the ageing body: as pianist Angela Hewitt (2023) recently remarked in an exceptionally candid essay for *The Guardian*, ‘Memory is a subject we don’t like to talk about – like sex, love and religious beliefs – most likely because we are afraid of losing it’.

Whereas prior studies have assessed the processes of analytical memory through performer testimony (anecdotes, surveys, or practice-based research), Loriod’s *pense-bêtes* offer an exemplary opportunity to study these processes from a historical perspective, grounded in sources such as annotated scores, performance notes, and other documents used to prepare performances and recordings.<sup>7</sup> Her *pense-*

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<sup>5</sup> For example, Chaffin et al. (2002, pp. 37–42) cite remarks on analytical memory by pianists Claudio Arrau (‘I use analytic memory last, after the work has gone into my body – my muscles, my ears, my vision.’); Alicia de Larrocha (‘Second, there is the kind of memory which for me is almost the most important [...]: I analyse the work – the phrases, the intervals, the cadences, the form, and so on.’); and Isidor Philipp (‘I am sure that analytical memory is a basis of secure memory’).

<sup>6</sup> Loriod, Notes for an article ‘Les 8 mémoires du pianiste’, F-Pn, RES VMB MS-207 (2). Loriod’s eight types of memory are: ear, fingers, eyes, analysis, internal associations (emotional impressions of the work), external associations (contextual memories from preparing the work for performance), unconscious memory of rote repetition and personal imagery devised for purposes of recollection.

<sup>7</sup> In some ways, these materials are analogous to those long exploited in compositional sketch studies, with the difference that they reflect the genesis of a performance, rather than that of a musical work. Materials of this nature have increasingly become objects of research, as musicologists interested in performance have returned to scores to reconsider the social and material values of notation as a musical process rather than musical product (see, e.g. Payne and Schuiling 2017; Schuiling 2019; Morabito 2020; Schuiling and Payne, eds 2022).

*bêtes* would not be considered full-fledged analyses according to institutionalised conventions of the discipline today; however, it would be misguided to consider this a shortcoming. As scholars like John Rink (1990), Nicholas Cook (2013 *inter alia*) and Daphne Leong (2019) have demonstrated, performers' analytical insights contain valuable contributions to music theoretical knowledge. However, rather than identifying how structural features emerge through music performance, our focus is on how a performer has empirically and pragmatically used analytical methods. One of our aims in this research has been to locate forms of theoretical knowledge in Loriod's working process. Her purpose in producing *pense-bêtes* was not to generate analyses as such, but rather to redeploy analytical methods she inherited in her Conservatoire education in the service of accomplished performances by heart. In studying these documents, therefore, we seek to better understand what Loriod and other performers mean when they speak of analytical memory, and to take this thought seriously as music analysis.

Loriod was widely praised by her teachers and students, colleagues and critics alike for her phenomenal memory – a reputation that in turn increased the stakes of memorisation for her career as a performer. In marathon performances, she impressed audiences with the sheer volume of music she commanded by heart (the complete *Well-Tempered Clavier* in four evenings, or the complete W.A. Mozart Concertos in seven), and the complexity of the scores she committed to memory as a specialist in new music. Her phenomenal memory became a sort of mythology (Dingle 2013, p. 200): her agent's publicity flyer noted that 'her prodigious natural memory enabled her to perform the Parisian premiere (for the first time, from memory, in eight days) the piano concertos of Béla Bartók and Arnold Schoenberg, the complete works of Messiaen, André Jolivet, Pierre Boulez and other international contemporary composers.'<sup>8</sup> Her colleague, Claude Helffer, recalled her Schoenberg premiere with awe, remarking, 'I've never managed such an achievement!' (Helffer and Serrou 2005, p. 41).<sup>9</sup> Loriod herself promulgated this legend, making memory integral to her performative 'persona' (Auslander 2006): as she recounted in a 1964 interview, 'I had the fortune to be born gifted with an excellent musical memory. From my youngest childhood I knew everything by heart easily' (cited in Bourdet 1965).<sup>10</sup>

The spontaneity with which Loriod internalised so much music so quickly means that many of her scores preserved in the French National Library, including those of the Bartók and Schoenberg concertos, bear few physical traces of her memorisation and learning process. As her career advanced, however, Loriod seems to have become more vulnerable to the psychological pressures of the monumental projects that had become a hallmark of her talent. In the early 1960s, she began creating her *pense-bêtes*, a practice of 'deliberate memorization' (Chaffin et al. 2016, p. 559). Loriod's archive contains dozens of *pense-bêtes* in a variety of formats, spanning the remaining decades of her career. The *penses-bêtes* range from a few bars scribbled on centimetres of manuscript paper to multiple sheets of A4 or larger; Loriod added heft to these flimsy leaflets by stuffing napkins or tissues between sheets taped together, or by glueing sheets to thin cardboard.

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<sup>8</sup> F-Pn, VM FONDS 30 MES-14; 'Sa prodigieuse mémoire naturelle lui valut de créer à Paris (pour la première fois de mémoire, et en huit jours) les Concerti de BARTOK ; de SCHONBERG, toutes les œuvres de MESSIAEN, JOLIVET, BOULEZ, et des compositeurs contemporains internationaux'.

<sup>9</sup> 'Yvonne Loriod avait une mémoire phénoménale qui lui a permis d'apprendre notamment le *Concerto pour piano* de Schönberg en huit jours et de le jouer par cœur. Je n'ai jamais réussi pareil exploit!'

<sup>10</sup> 'J'ai eu la chance de naître douée d'une excellente mémoire musicale. Dès ma petite enfance je savais tout par cœur aisément.' Loriod's invocation of a quality received at birth – implying predestination and a lack of external influence – may be compared with Messiaen's own rhetorical strategy, as discussed by Yves Balmer (2009).

Although few of the *pense-bêtes* are dated, it seems that her practice grew more elaborate with time. Compared to the earliest examples from the 1960s, which tend to be dense, compact and lacunary, *pense-bêtes* from later decades often contain a greater proportion of the music (even for works she had performed dozens, or hundreds, of times), covering ever-larger pages. The earliest dated example is from 1962, for a performance of Mozart's Concerto in A Major, K.488; she seems to have broadened her use of the *pense-bête* technique during her marathon cycle of Mozart's complete piano concertos in 1964, and continued to develop it well into the 1990s. A significant portion of her *pense-bêtes* were created for the works of Messiaen, which became her near-exclusive calling cards from the 1970s onward, although there are also occasional *pense-bêtes* for less frequently performed repertoire by J.S. Bach, Mozart and Claude Debussy. We have found no evidence of the use of *pense-bêtes* from before the 1960s, and no *pense-bêtes* for the works that were cornerstones of Loriod's solo repertoire up to that point.<sup>11</sup> Could Loriod's age have been a factor contributing to her increasing recourse to *pense-bêtes*? Age is certainly felt by many pianists to contribute to faltering security in memorisation, for reasons both cognitive and circumstantial.<sup>12</sup> Whatever the cause, Loriod's need to create *aide-mémoires* is good fortune for the researcher – her vulnerability allows us to catch a glimpse of cognitive-analytical processes which would have otherwise remained internal and unwritten. As we shall argue, however, Loriod's *pense-bêtes* are less compellingly read as evidence of a weakness or faltering of memory than as testimony to how she trained her memory to remain so strong.

There is a longstanding disciplinary tendency to study performers' analysis in relation to interpretation and expression (Berry 1989 is a *locus classicus* in this tradition). Loriod's *pense-bêtes*, however, do not yield insight into her distinct interpretative style – her skill in 'elucidating the structures and combining clarity, speed, and rhythmic precision with an acute sensitivity to timbre' (Timbrell 1999, p. 166, see also Cook 2017, pp. 183–87). Instead, the epistemological strength of Loriod's analytical reductions resides in their capacity to shed light on a performer's 'framework for retrieval' (to reprise Ginsborg's terms), that is, her means of orienting herself within a musical form away from the score. The role of analysis in memorisation rarely leaves a written trace and has therefore not been an object of scholarly scrutiny at the intersection of analysis and performance studies. The focus of our attention is not Loriod's distinct interpretive style but her strategies for recalling the details of complex form in concert, whether in Mozart or Messiaen.

One important finding is that these strategies of analytical memorisation remain surprisingly similar for both tonal and post-tonal repertoires. In both, Loriod maps out (or 'cues') what scholars of musical memory call 'switches' (e.g., Chaffin et al. 2002, pp. 95 and 107–8) – passages that closely resemble one another but which feature slight variations or which diverge part of the way through – at both local and large-scale formal levels. We speak of 'local switches' (where a passage is repeated and varied in close succession) and 'formal switches' (where a passage is varied from its appearance in one formal section of a work to another, as for instance in the exposition and recapitulation of a sonata-allegro form). Such switches amount to special examples of a more general 'art of transitioning', which Cook identifies as crucial to performers' relationship with form. For Cook, the performer's 'pedestrian perspective' on a musical work entails heightened attention to elements as they are experienced in time. This concatenationism is in contrast to the 'observer's or analytical

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<sup>11</sup> Loriod's repertory staples during these years included Mozart, Beethoven, Schumann, Albéniz, Debussy, Schoenberg, Bartók, Jolivet and Boulez.

<sup>12</sup> See Chaffin et al. 2002, p. 51 on Jorge Bolet, Alicia de Larrocha, and Isidor Philipp; and Hamilton 2008, pp. 73, 81 on Anton Rubenstein and Sviatoslav Richter), see also Hewitt 2023.

perspective’, with its attending emphasis on ‘segments as wholes’ and encapsulated in schematic, synchronic reductions of form (Cook 2013, pp. 45–6).

As we will see, however, by marking both local and formal switches, Loriod’s *pense-bêtes* operate at multiple levels of reduction, effectively drawing from both perspectives. At the local level, Loriod’s attention to switches reflects the particular challenges posed by the differences-within-similarity of recurrent thematic materials, an equally troublesome feature of Mozart and Messiaen. If these composers’ thematic variations are sublimations of extemporised embellishment – whether from eighteenth-century musical performance (as represented by Mozart) or from avian vocal performance (as represented by Messiaen) – they become mnemonic traps for the modernist performer, beholden to the letter of the score. At the formal level, Loriod’s attention to switches reflects how divergent thematic trajectories drive the elaboration of the work. Here, a minor difference-within-similarity can be decisive in leading the soloist toward dominant or tonic space in a classical sonata form, or in navigating the irregular strophic forms that often characterise Messiaen’s compositions.

We begin our study of these historical documents by reconstructing the cultural environment of mid-twentieth-century classical and contemporary performance in which they emerged and signified. In our reading, Loriod’s *pense-bêtes* were coping mechanisms for the pressures of a milieu (a ‘notation culture’, perhaps, following Schuiling 2019) in which memorisation was conceived as a precondition of mastery – a context only intensified by the reputation she had created for herself as a pianist tackling monumental complete-works projects by heart. Then, we examine several *pense-bêtes* as instances of performers’ analysis tailored to memory-related issues. In particular, we survey several of Loriod’s *pense-bêtes* for performances of Mozart and Messiaen to show the range of analytical strategies she deployed to create a succinct framework for mnemonic retrieval. These two beloved composers, for whom Loriod produced the vast majority of her *pense-bêtes*, were pillars of her repertoire, especially as her career matured in the 1960s and 1970s – Messiaen, as the composer whose work she famously championed, and Mozart, with whom she staved off perceptions of being a new music specialist. This selection will foreground both similarities and differences in her approaches to memorising classical and modernist repertoire. We begin with four brief examples that show Loriod working out ‘dangerous passages’ with local, schematic solutions, demonstrating how the *pense-bête* practice may be viewed along a continuum with her score annotations as part of an externalised (written) analytical step in the memorisation process. These examples provide a good point of entry into her more eminently analytical and elaborate score reductions. Following these four ‘dangerous passages’, we examine in greater depth three case studies featuring full formal reductions produced by Loriod for the first movements of Mozart concertos K.488 and K.482, and for Messiaen’s ‘Le Traquet rieur’.

### ***Pense-bêtes* and the pressures of memorisation**

The positive value placed on memorisation in Western classical music is historically contingent: memorisation was met with scepticism over much of the nineteenth century, in contrast to the widespread admiration of today. Memorisation is entangled with the perception that music emerges not from simply reading the score (an external apparatus), but rather from deep within the performing artist, thereby contributing to the audience’s sense of the performer’s mastery and expressivity (Williamon 2002, pp. 113–14; Hamilton 2008, pp. 73–81). The modern performer, who trades on these perceptions, risks compromising them by offering too candid a glimpse of rote processes of memorisation.

Like many pianists existing within this value system, including several chronicled by Imreh (Chaffin et al., 2002, pp. 26–65) and Hamilton (2008), Loriod presented her mnemonic aptitude as an innate (even God-given) gift: ‘I’ve been enormously lucky,’ she disclosed to Bruno Serrou in an unusually frank interview,

because the good Lord gave me a gift – would you believe that I never had to learn anything by heart? I knew Bach just as well as Mozart and Debussy, and never had to learn by heart. I had classmates who had to memorise a Bach fugue by writing down each line, and then when they tried to play it by heart, it was a disaster. But I never had any problems. I never, ever had to learn to play by heart (Loriod-Messiaen and Serrou 2002, ch. 2).<sup>13</sup>

Evidence from Loriod’s archive belies the notion that she *never* had to exert herself (or write down each line!) to learn music by heart – even if the majority of her memorisation took place on an unconscious, spontaneous level. Her insistence is both a statement of truth (her mnemonic facility), but also a performative response to cultural expectations.

Late in life, however, Loriod did publicly acknowledge her use of *pense-bêtes*. In reminiscing, again to Serrou, about the 1972 premiere of *La Fauvette des jardins*, the last substantial solo work Messiaen wrote for her, Loriod began by recalling her state of nerves. Her comments suggest that the recourse to *pense-bêtes* was born of exceptionally stressful experiences: ‘What a responsibility it was, in front of *tout-Paris*, to premiere a work by Messiaen. And what’s more, the *Fauvette* lasts thirty minutes, I was playing by heart, and it was essential that I not mess up. It was a terrifying responsibility’ (Loriod-Messiaen and Serrou 2002, ch. 22).<sup>14</sup> Her sense of ‘responsibility’ speaks to the ‘severely, punishingly conformational’ arena of Western classical music performance more broadly (Howe 2016, pp. 200–01), compounded by unique pressures of her performative persona – of being ‘Yvonne Loriod’ – given the reputation she had garnered and her increasing focus on a renowned composer’s œuvre. In this context, the *pense-bêtes* served to quell her nerves: she continued, ‘I played everything by heart. From time to time, there was a little *pense-bête* that I would put there, just a little *pense-bête*, like children who sleep with a Teddy bear. It was like a tissue, which I had written two or three things on. Of course, had I actually looked at it, I would have messed up’ (Loriod-Messiaen and Serrou 2002, ch. 22).<sup>15</sup> Loriod is likely right to surmise that had she taken her eyes off the keyboard to check her notes, she would have disrupted the flow of her performance. Even so, her disclosure is not without dissimulation: the reference to a ‘tissue’, while pertinent to some *pense-bêtes*, hardly describes the one she used for *La Fauvette des jardins*, a full sheet of paper containing a near-complete melodic reduction of the work (Fig. 1). The more important point to emerge from Loriod’s account, however, is that the *pense-bêtes* served two inter-related purposes: a means of memorisation, to be sure, but also a means of combating nerves stemming from the pressures of classical music performance.

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<sup>13</sup> ‘Alors je dois dire aussi que j’ai eu énormément de chance, parce que le bon Dieu m’a donné des dons, figurez-vous que je n’ai jamais rien appris par cœur ! Je savais tout de suite aussi bien les Bach que les Mozart que les Debussy, je n’ai jamais appris par cœur. Alors que j’ai des camarades qui, jouant une fugue de Bach, devaient écrire chaque portée pour se la remémorer, et ensuite elles essayaient d’apprendre par cœur, c’était abominable. Moi je n’ai jamais eu de problèmes. Je n’ai jamais, jamais appris par cœur.’

<sup>14</sup> ‘C’était une responsabilité, devant tout Paris, créer une œuvre de Messiaen. Et encore, cette “Fauvette”, elle dure trente minutes, je la jouais par cœur, il ne fallait pas que je me trompe. C’était une responsabilité épouvantable.’

<sup>15</sup> ‘Écoutez, voilà quarante ans que je jouais par cœur, ...non, peut-être pas quarante ans, je ne sais plus quelle année c’était. Je jouais tout par cœur. De temps en temps avec un petit pense-bête que je mettais là, c’est un petit pense-bête comme les enfants s’endorment avec un ours. C’était plutôt un mouchoir où j’avais écrit deux, trois trucs dessus. Si je les avais regardés, je me serais trompée, c’est sûr.’

**Insert Fig. 1 near here**

Other evidence confirms that Loriod indeed used her *pense-bêtes* in concert, demonstrating a continuity and mutual reinforcement between her processes of analysis and performance. While her littlest *pense-bêtes* could be easily placed flat in the piano, her larger ones entailed far more complex choreography.<sup>16</sup> Like many pianists, she had the habit of keeping track of performances and recording engagements in her scores, and she occasionally recorded use of the *penses-bêtes* in such lists, too: we find, for example, the annotations ‘avec pense-bête’ and ‘avec petit pense-bête’ written in scores next to performances of Mozart concertos, K.453 and K.503, from the 1960s.<sup>17</sup> Sometimes, Loriod’s annotations offer further insight into her state of mind regarding these documents. Next to a 1969 performance of Mozart’s concerto, K.450, she wrote, ‘(trac tjrs – joué, 2 penses-bêtes!)’<sup>18</sup>, show how nervousness (*trac*) prompted her use of the documents. Loriod’s remark about a performance of Messiaen’s *Catalogue d’oiseaux* in 1967 (‘Tout p[ar] c[œur] + pense-bêtes sauf Hulotte : musique à plat’) implies that she still considered her performances with the *pense-bêtes* to be ‘by heart’.<sup>19</sup> Meanwhile, her mention of the fact that she did *not* use a *pense-bête* during a 1977 performance of Messiaen’s *Réveil des oiseaux* (‘Y. T[rès] B[ien] et sans pense-bête’<sup>20</sup>) suggests that her recourse to the *pense-bêtes* extended well beyond those instances she recorded in writing.

The material discretion of Loriod’s *pense-bêtes* suggests that she did not want the *aide-mémoires* to detract from the reputation of the prodigious memory that they had been crafted to defend: ‘People would have said, “How did that happen? ‘La petite Loriod’ doesn’t play from memory anymore?” It would have been very shocking’ (Loriod-Messiaen and Serrou 2002, ch. 22).<sup>21</sup> Loriod was concerned the public might perceive her *pense-bêtes* as a mnemonic prosthetic, with the connotation of an unwelcome enhancement to her ‘natural’ ability using ‘artificial’ means – in other words, a form of mnemonic ‘cheating’. Loriod’s cynical intuitions about audience attitudes were probably well-founded, but we prefer to view the *pense-bêtes* more empathetically, as an accommodation of bodily, including mental, conditions (see, e.g., Howe 2016) – enabling her to perform more music at a higher level of memorisation, with less nervousness, for example.<sup>22</sup> In this light they may be viewed as a method of ‘self-care’, to borrow the term used by Adam Behan with respect to Glenn Gould’s coping mechanisms for ‘the concert hall’s debilitating and exhausting effects’ (2021, p. 56). Though it is improbable that she read them on stage, we know that they belonged to a panoply of reassuring routines carried out in preparation for high-stakes concerts, from taking Communion to receiving acupuncture. In most cases, the *pense-bêtes* likely served a greater purpose in the green room than onstage.

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<sup>16</sup> Documents relating to performances of *Oiseaux exotiques* in 1988 and 1996, for example, contain elaborate instructions detailing (either for herself or for an entrusted stagehand) how to arrange and manipulate multiple cardboard-backed *pense-bêtes* on the music stand; F-Pn, VM FONDS 30 LOR-5.

<sup>17</sup> F-Pn, RES VMD MS-113; RES VMD MS-128. ‘with *pense-bête*’; ‘with small *pense-bête*’.

<sup>18</sup> F-Pn, RES VMD MS-113. ‘(nervous, still – played, 2 *penses-bêtes*!)’

<sup>19</sup> F-Pn, FOL VM FONDS 30 LOR-9(1)A. ‘(All by heart + *penses-bêtes* except Hulotte, score placed flat)’

<sup>20</sup> F-Pn, RES VMB MS-261. ‘(Y[vonne] Very Good and without *pense-bête*)’

<sup>21</sup> ‘on aurait dit : “Ah ? Comment ça se fait ? La petite Loriod, elle ne joue plus par coeur ?” Ç’aurait été vraiment très choquant.’

<sup>22</sup> Blake Howe writes: ‘even the use of music notation might be counted as another assistive technology, one that prostheticizes a defective memory’ (2016, p. 200).

To accentuate the psychological role fulfilled by the *pense-bêtes* is not to diminish their importance in the memorisation process, however. Quite the opposite: these documents offer a view of expert musical memorisation at work, illustrating a number of techniques used by Loriod to ensure recall when confronted with different types of mnemonic pitfalls, or '*endroits dangereux*' ('dangerous passages') as she refers to them in her notes. The very act of creating *pense-bêtes* through recopying, analysing, reducing or schematising with pen and paper is integral to Loriod's cognitive process: an 'active externalism' (Clark and Chalmers 1998, p. 7) of the issues she faced when away from the score. Accordingly, to view the *pense-bêtes* as a sign of mnemonic weakness is to construct a misguided opposition: as will be demonstrated, the *pense-bêtes* are not adequate surrogates for a musical score but require thorough knowledge of the work in order to be useful. Rather than detracting from Loriod's reputation as a memoriser, these *pense-bêtes* contribute to our understanding of how her expert memory operated; how she trained and maintained it over time; and the precautions she took to ensure both security and discretion – key elements in the performance of memory.

Having introduced the context of *pense-bêtes*' emergence and use, we turn to a study of the ways that they encode different levels of musical form in the service of memorisation.

### **Dangerous Passages ('*Endroits dangereux*')**

#### *Passage 1: Memorisation annotations in the score of Debussy's 'Pour les quartes'*

Loriod's techniques of memorisation range along a continuum. She was intuitively aware of the blend of spontaneous and deliberate actions entailed in learning music by heart: as her former student Ana Telles recalled, 'She told me that, for her, memorisation always came naturally, through contact with the music she worked on. Nevertheless, she also explained that studying the formal and structural elements of a piece was indispensable to the memorization process' (Lechner-Reydellet and Telles 2008, p. 102).<sup>23</sup> While the majority of her process occurred spontaneously, tougher conditions required additional measures – from internalised but conscious efforts, to externalised annotations on the score and, under exceptional pressure, the realisation of schemas and reductions in the form of *pense-bêtes*. Though our ultimate focus here is on the *pense-bêtes*, here it is worth a brief detour via Loriod's annotated scores, which show traces of analytical and schematic thought related to her *pense-bêtes*.

One of the most frequent annotations found in Loriod's scores is the abbreviation 'p.c.' (for '*par cœur*', or 'by heart') – sometimes written in isolation (simply marking a problem area), sometimes elaborated with a strategy for addressing the issue in question. One example among many may be found in her score to Debussy's etude 'Pour les quartes', which Loriod frequently performed; she recorded the work in 1968. An echoing punctuation of three perfect fourths strewn from high to low, occurs four times on the first two pages, each at slightly different pitch levels (in Ex. 1a 'fa mi fa', in Ex. 1b 'fa sol mi', etc.). The minor differences in otherwise analogous passages pose a further challenge for memorisation because they occur in similar semantic contexts but are not exact transpositions of one another. Loriod reminds herself of this difference-within-similarity, abbreviating the figure to the upper notes of each interval, writing them out above each occurrence of the figure

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<sup>23</sup> 'Elle me répondit que chez elle, la mémorisation se faisait toujours naturellement, au simple contact des œuvres travaillées. Cependant, elle m'a précisé que l'intérêt pour l'étude des éléments formels et structurels d'une pièce est indispensable à ce procédé de mémorisation.'

(see Ex. 1).<sup>24</sup> She thereby converts the complex sequence into a ‘cue’ – a thematic prompt permitting what theorists of memory call ‘content-addressable retrieval’ (Chaffin et al. 2016, p. 564).<sup>25</sup> The economy of reduction is key: consciously memorising the top pitches suffices to retain the difference between each iteration of the figure. The minor memory problems posed by this etude were not significant enough for Loriod to take the process further and, to our knowledge, she never created a *pense-bête* for any of Debussy’s solo works.

**Insert Ex. 1a-d NEAR HERE**

### *Passage 2: Schematising ‘Le Lorient’ from score to pense-bête*

Persisting memory issues could not always be resolved by score annotations alone. A brief look at ‘Le Lorient’ (The Golden Oriole), a movement of predilection from Messiaen’s *Catalogue d’oiseaux*, illustrates how treacherous spots identified in score annotations may also appear in *pense-bêtes*. There are two *pense-bêtes* for this movement in Loriod’s papers: the first consists of a single line, scrawled in pencil and appended to the bottom of a more detailed *pense-bête* for ‘L’Alouette Lulu’ (The Woodlark), and most likely used in 1967<sup>26</sup> (Fig. 2); the other is a fuller reduction, dated 1988 (Fig. 3). These may be contextualised with Loriod’s annotated copy of the score.<sup>27</sup>

**INSERT Fig. 2 NEAR HERE**

**INSERT Fig. 3 NEAR HERE**

There are two main elements of interest.

The first, most straightforward element concerns the extreme reduction of a three-page-long sequence of what Robert Sherlaw Johnson (1975 [2008]) called ‘colour-chords’, alternating with the voluble song of the ‘Fauvette des jardins’. Loriod reduces this passage to alternating incipits: the uppermost note of each passage of colour-chords (C<s>, F<s> and A), followed by the beginnings of the subsequent ‘Fauvette’ entrances. The reduction of this sequence of chords to the top notes is an extrapolation of the same process glimpsed in the Debussy etude. Given the length and complexity of each of these birdsong passages, it is noteworthy that Loriod cues not the detail of the daunting passagework itself, which she has clearly memorised confidently, but rather a higher level in the

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<sup>24</sup> F-Pn, RES VMA MS-3000.

<sup>25</sup> ‘Content-addressable retrieval’ is defined in opposition to ‘associative chains’. As Chaffin et al. 2016 helpfully summarise: ‘A memory is content addressable if you can ask yourself, e.g., “How does the third repetition of the main theme go?”, and the music comes to mind. Associative chains have a major weakness: to reach any link in the chain you have to start at the beginning’ (p. 352).

<sup>26</sup> Loriod performed eight movements (including ‘L’Alouette Lulu’, ‘Le Traquet Rieur’, and ‘Le Lorient’) from the *Catalogue d’Oiseaux* the Genealogical Society in New York City on 13 December 1967. Her annotated copy of the first volume of *Catalogue d’oiseaux* references the performance, with the comment, ‘(Tout p.c. + pense bêtes sauf Hulotte, musique à plat)’. She may also have reused the same *pense-bêtes* for a performance of four movements of the *Catalogue* (‘Le Lorient’, ‘La Chouette hulotte’, ‘L’Alouette lulu’, and ‘Le Traquet Rieur’) at Cornell University in 1973, for which she wrote, ‘avec petits pense-bêtes’; F-Pn, FOL VM FONDS 30 LOR-9(1,A).

<sup>27</sup> Although *Catalogue d’oiseaux* was only published in 1964 – several years after Loriod had been performing the *Catalogue* from photo reproductions of Messiaen’s manuscript, which she had helped edit – it is only in her copies of the published score, which served her for later performances, that one finds indications pertaining to memorisation.

formal hierarchy, that is, the sequence of the colour-chords that launch each respective passage of ‘Fauvette’ vocalisation. This passage occupies the greater part of Loriod’s one-line *pense-bête* from 1967, and appears in strikingly similar form in 1988 (fourth system); the colour-chord incipits, circled in the former *pense-bête*, are highlighted in blue marker in the latter, providing readily visible landmarks for each iteration of the sequence.

The second element concerns a tricky sequence involving the song of the *loriot* at the beginning and toward the end of the movement (pp. 1 and 9 in the score, respectively). In both locations, the *loriot* sings four phrases, separated by brief silences. As above, the mnemonic concern comes not from variations in the birdsongs themselves, but rather from the precise length of the rests separating each vocalisation – an element of the score in which complementary forms of memory (e.g., aural, motor) are of little recourse. In the margin of the score, Loriod works out a retrieval scheme – the numerical sequences ‘2112’ and ‘1242’ – to represent in quaver units the lengths of the rests in the respective problem areas (Fig. 4). It was apparently more effective for her to represent these sequences of silences via numerical sequences than to ‘feel’ the variations of timing from one passage to the next. The same number sequences appear, in blue pen, to the bottom right of the one-line *pense-bête* of 1967, where she writes, ‘silences: 2112 | 1242’. The later, more detailed *pense-bête* of 1988 prioritises a fuller representation of the score: rather than reproducing the compact numerical schema, Loriod transcribes the upper voice of both sequences of *loriot* vocalisations – complete with rests – which are then circled with red ink.

**INSERT Fig. 4 NEAR HERE**

### *Passage 3: Trouble spot in ‘Le Baiser de l’Enfant-Jésus’*

Passages like those in the 1967 *pense-bête* of ‘Le Lorient’ apparently prompted significant difficulties from a memorisation perspective, due either to intrinsic qualities of the music, or to Loriod’s anxiety regarding a passage she may have mislearned. One of the most frequent problem areas to crop up across the corpus of *penses-bêtes* involves a short passage from ‘Le Baiser de l’enfant-Jésus’, the fifteenth movement of Messiaen’s *Vingt regards sur l’enfant-Jésus*, the monumental solo piano cycle dedicated to Loriod and which she premiered in its entirety in 1944, and frequently in whole or in parts thereafter. The *pense-bête* shown in Fig. 5 is only one of many in her archive featuring the same passage, suggesting that the material posed a consistent problem for Loriod.

**INSERT Fig. 5 NEAR HERE**

This particular object is remarkable on two levels: for the care and resourcefulness displayed in its fabrication and for the role of Loriod’s physical solutions, specifically fingerings, in the fabric of her cues. The music, written in felt pen on manuscript paper, has been cut and pasted onto a pocket tissue, rather as Loriod had described to Serrou. The use of the pocket tissue is poignant: it is something Loriod may have had on hand if she were preparing the *pense-bête* in haste before a performance; but it is also the most discreet possible item to take on stage, to which even the most cynical audience member could hardly object.

The movement is structured around a variant of the cyclical ‘Thème de Dieu’, familiar from several previous movements, now structured in an asymmetrical three-part configuration with two short phrases (the first leading from tonic to dominant, the second leading from the dominant back to the tonic), and a longer third phrase, taking a more circuitous route.<sup>28</sup> After an initial statement, the theme is restated and contracted, with new accompanying material varying the texture. The incipits in Fig. 5 correspond to the first of these adornments (p. 110 of the published score, Ex. 2): the left hand plays the ‘Thème de Dieu’ while the right hand adorns the theme with flowing demisemiquavers in the upper register, ‘gentle runs inspired by Chopin etudes’ as Messiaen described it (1992–2008, vol. 2, p. 480). This is where Loriod’s *pense-bête* picks up: she transcribes the first two notes of each demisemiquaver run accompanying each phraselet of the theme; over two statements of the theme, this amounts to six incipits. Each incipit is separated by the diagonal-slash barline Loriod uses to signify non-consecutive musical material, with a double slash in the middle, between the two statements of the theme. She also takes care to write down the *ottava* indication above the notes.

### INSERT Ex. 2 NEAR HERE

The existence of so many *pense-bêtes* for this passage is surprising, given the simplicity of the material in comparison with other parts of the *Vingt regards* that never appear in a *pense-bête*, plus its adherence to a tonal (and modal) structure and familiar thematic underpinning. As with ‘Le Lorient’, given the fact that she only included the first two notes of each run, she clearly had no problem remembering the passagework itself once she set off on the right track. Perhaps the most important details vouchsafed by the *pense-bête* are her chosen fingerings (the successive thumb in the opening run seems an especially idiosyncratic selection) and also the registral hand placement – that is, which passages begin in which octave range – an aspect that shifts depending on the run. Starting any run an octave too high or too low would pose problems as the run either ascended above the outer limit of the keyboard or descended into interference with the left hand. If Loriod had previously or repeatedly made such an error in rehearsal or performance, producing the *pense-bête* may have made her feel more comfortable on stage.<sup>29</sup>

#### *Passage 4: Rhythm and coordination in ‘Amen du désir’*

Finally, Fig. 6 corresponds to a passage from ‘Amen du désir’, the fourth movement of Messiaen’s *Visions de l’Amen* for two pianos, a work which Loriod and Messiaen performed together hundreds of times in the decades since they premiered it in 1943.<sup>30</sup> Here, in contrast to the above examples, the *pense-bête* presents not a retrieval cue but an integral transcription of a complex passage for the purpose of ensemble coordination.<sup>31</sup>

<sup>28</sup> Messiaen offers an analysis of the tonal underpinning of the use of his ‘Mode 2’ (1992–2008, vol. 2, p. 480).

<sup>29</sup> Loriod acknowledged in an interview the way memory issues could insinuate their way even into well-known repertoire: ‘Even when one plays a work a lot, and from memory, mistakes always slip in; even the greats – great musical figures like Rubenstein – sometimes you can say, ‘look, look, look, see there, he hasn’t looked back at his score for ten years!’ (‘Même lorsqu’on joue beaucoup une œuvre, qu’on la joue de mémoire, il se glisse toujours des fautes; même des grands, des grands noms de la musique comme Rubenstein, quelquefois on se dit, tiens, tiens, tiens, on voit là, voilà 10 ans qu’il n’a pas regardé son texte!’); F-Pinat, PHD99271198, Micheline Banzet-Lawton, ‘Trois Jours avec... [Yvonne Loriod, jour 2]’, broadcast on 20 April 1965.

<sup>30</sup> Messiaen claimed that he and Loriod performed the work nearly three hundred times (Messiaen and Samuel 1986, p. 222).

<sup>31</sup> For another reading of *Visions de l’Amen* from a perspective informed by performers’ analysis, see Leong 2019, 201–62.

## INSERT FIG. 6 NEAR HERE

The passage, in the movement's B-section, is a lyrical episode in the *secondo* part played by Messiaen. When the episode repeats (B'), the *primo* part (Loriod's) accompanies Messiaen's lyrical material with gong-like 'rhythmic pedals' in the extreme low register. The rhythmic pattern is complex, but not arbitrary: it is constructed on the basis of five simple rhythmic cells (two in the right hand and three in the left) based on Greek- and Indian-derived rhythms, recurring in sequence and labelled A through E in the published score.<sup>32</sup> (The same rhythmic sequence is found in the *primo* part in the first movement, 'Amen de la Création'.) However systematic and repetitive these cells may be when considered hands separately, the superposition of these two non-aligning additive sequences generates a complex and non-repeating composite rhythm, an unintuitive rhythm posing particular challenges to memorisation.

It is especially interesting to note that Loriod does not reproduce Messiaen's breakdown or labelling of the rhythmic cells in her *pense-bête* – this information, while useful to gain an appreciation for the structure of the music, is scarcely germane to a performance context, where the need to produce the composite rhythm interferes with the apprehension of each individual pattern. She does, however, use red marker to indicate notes marked *fortissimo* (in contrast to the softer dynamic that characterises most of the passage).<sup>33</sup> Furthermore, as another form of signpost, Loriod adds (in purple, then blue marker) notes relating to the theme played in the *secondo* part ('La' [=A], 'Do' [=C], 'Si' [=B], and so forth represent the first notes of phrases). The *pense-bête* thus contains valuable information about the disjuncture between the passage as composed and analysed by Messiaen, and the pertinent information for performance as distilled by Loriod. On the one hand, the significance of the rhythmic cells, while certainly known to Loriod, is not mobilised in her performance of the passage. On the other hand, whereas Messiaen appears to have deployed the rhythmic patterns that structure the *primo* part in autonomy from the thematic material of the *secondo* part, it is clear from the *pense-bête* that Loriod is keenly attuned to her partner in performance.

### Formal reductions

Even more frequent in Loriod's papers than *penses-bêtes* resolving dangerous passages in isolation are schematic reductions of entire movements or works, and it is in this latter category that Loriod's formal analytical thinking comes to the fore. These schemas, like the formal tables or graphs in certain traditions of analysis, offer a reduction of form, drawing attention to particular areas or features of interest according to certain hierarchical principles. However, we reiterate that Loriod's reductions are distinguished by their pragmatic orientation: their purpose is not to produce an analytical reading as such, but to facilitate effective performances. Accordingly, sections of Loriod's analyses may be highly detailed or lacunary depending on her needs.

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<sup>32</sup> For Messiaen's analysis of the rhythm in this passage, see Messiaen 1992–2008, vol. 3, pp. 252–54.

<sup>33</sup> These *fortissimo* notes align with the 'B' rhythmic cell in all but the one case where the left hand plays *fortissimo*, marked in red by Loriod in the final system.

Case Study 1: Chunks, Cues and Switches in Mozart's K.488, i; 27 January 1962

Loriod's reduction of the first movement of Mozart's Piano Concerto No. 23 in A Major, K.488, is the earliest *pense-bête* that can be dated with certainty, and is therefore a logical starting point from which to examine and contextualise her emergent technique of mnemonic reduction (Ill. 7).<sup>34</sup> Unlike most of Loriod's *pense-bêtes*, which are undated and which were clearly prepared, used, reused and refined on multiple occasions, this *pense-bête* may be traced to a specific performance on 27 January 1962, with the orchestra of the Bachverein, Düsseldorf, conducted by Joseph Neyses. The fact that Loriod used a *pense-bête* for this performance does not imply that the work was new or unfamiliar to her: she had K.488 in her repertoire at least since 1948 (when she performed it with László Somogyi while on tour in Hungary), and it may even be the first Mozart concerto she ever performed in public.<sup>35</sup> But Loriod's intense concert activities in the days preceding and following the Düsseldorf concert, featuring a wide array of repertoire in rapid succession with this one-off performance of K.488 in the mix, offers context regarding her frame of mind when creating the *pense-bête*.<sup>36</sup>

Materially, the *pense-bête* covers seven staves of manuscript paper, cut (judging from the uneven bottom edge) from the top of a sheet of A4. A thin horizontal strip bisected with a vertical crease, this *pense-bête* may have sat discreetly, flat on the plate of the piano, visible to Loriod but concealed from an audience. (Its design is simple compared to the more elaborately shaped and weighed *pense-bêtes* of later years.) Primarily written in black ink, touches of colour are introduced: red, to highlight the start of the second and third movements; and blue and green, which may reflect subsequent additions to the basic reduction (see Fig. 7).

**INSERT FIG 7 NEAR HERE**

It is worth describing the *pense-bête* in some detail, extending our review of Loriod's vocabulary of symbols and reduction techniques. Loriod organises the movement into what scholars of memory

<sup>34</sup> F-Pn, RES VMD MS-129.

<sup>35</sup> F-Pn, 'Transcription des agendas d'Olivier Messiaen', RES VMB MS-122(1). See also Loriod's copy of the Peter's two-piano edition of the score, RES VMA MS-2995, which includes annotations referencing Somogyi. Loriod also performed a 'Concerto en la majeur' in Paris on 12 May 1944, although this may not necessarily indicate K.488; see *L'Information musicale*, IV, May 1944, p. 282.

<sup>36</sup> Loriod's concert activities in the days preceding and following the Düsseldorf concert give an impression of her busy calendar and the variety of repertoire she was engaged to perform in short succession:

Date (1962)	City	Programme
17 January	Bordeaux	Messiaen, <i>Catalogue d'oiseaux</i> (complete, except 'Merle bleu', 'Merle de roche', 'Buse variable')
22 January	Freiburg	Stravinsky, <i>Mouvements</i> for piano and orchestra
24 January	London	Messiaen, <i>Réveil des oiseaux</i> for piano and orchestra
<b>27 January</b>	<b>Düsseldorf</b>	<b>Mozart, Concerto in A Major, K. 488</b>
29 January	Monaco	Recital with commentary by Jean-Victor Hocquard  Mozart, Adagio, K. 540 Mozart, Sonata K. 331, Andante grazioso Mozart, Fantaisie K. 475 Mozart, Sonata K. 570, Adagio Mozart, Sonata K. 576, Allegretto Mozart, Fantaisie et fugue K. 394

since the 1950s have called ‘chunks’ of variable sizes.<sup>37</sup> These chunks are then indexed in the *pense-bête* with cues – landmarks or moments within the music identified as noteworthy, to which particular attention is paid during performance, ranging from a single note to an entire phrase. She places particular emphasis on switches at the local and formal level to prevent the sort of automatic recall that could result in taking a ‘wrong turn’.

The entire first movement is condensed into two-and-a-half staves, divided into 41 bars, either contiguous (separated by a vertical barline) or non-contiguous (separated by an angled barline).

Loriod’s *pense-bête* begins with the soloist’s statement of the first theme, in which she marks out the antecedent (green numeral ‘1’) and consequent (‘2’). In this near-complete melodic transcription, Loriod abbreviates the semiquaver figures of the consequent with neume-like diagonal lines to denote the continuation of runs, which distinguish the passage from antecedent. Her abbreviation thus provides just enough information to stimulate recall of the variation between the phrases (the local switch). She leaves out the conclusion of the phrase in bars 7 and 8, the memory of which would be sufficiently cued by the presence of the runs. The angled bar and ‘T.’ at the end of the system mark an orchestral *tutti* and an ellipsis in the transcription until the next solo entry. Although they are typically considered important markers of form by analysts, cadences in general are not foregrounded by Loriod’s reduction and moments of cadence are often concealed in favour of beginnings – after all, cadences are not cues but conclusions.

The second system of Fig. 7 takes up with the piano’s entry in the transition to the second theme. Loriod condenses the semiquaver passagework to the first note of each bar until the final bar, beginning with G<s> – which affirms the arrival in V – fleshed out with four semiquavers. The significance of these four semiquavers, and the numeral ① above the B, will be clarified shortly. The continuity then breaks off, with a diagonal barline cutting to the piano’s statement of the second theme. There is no transcription of the closing theme; apparently once Loriod is firmly settled in the secondary thematic material, no further cue was needed. Following the ‘T’ (*tutti*) at the closing ritornello, the entire development is condensed into three bars, each one a cue indicating the incipit of a piano entry.

After the next orchestral *tutti*, the return of the first theme is indicated with a green ‘3’, continuing the enumeration from the two statements of that material in the exposition. In contrast to the antecedent-consequent structure of the piano’s presentation of the first theme in the exposition, here Mozart has distilled the material, with the orchestra performing the antecedent, and the piano responding with only the consequent, ornamented in a new way. The level of detail in Loriod’s reduction is again increased, highlighting those aspects which make this statement distinct from the previous two.

With the return of the transition, Loriod condenses the passagework as before, again fleshing out only the final bar of her reduction, which this time begins a bar earlier – on B, marked with ② – and redirects the proceedings toward the return of the second theme in the tonic. These two B’s marked ① and ②, and the groups of four semiquavers that follow, thus act as cues, setting Loriod on the right track – toward V or toward I – in two otherwise identical passages. In other words, she maps out a formal switch, signalling the respective continuation of the passage in the exposition and recapitulation. Having successfully switched back toward the tonic, Loriod does not bother to notate

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<sup>37</sup> The *locus classicus* for the notion of ‘chunks’ is Miller 1956.

the second theme, instead simply writing ‘2e thème’. This shift from notes to words illustrates the continuity between Loriod’s practices of analysis, memorisation, and performance.

As the recapitulation transitions again from the second theme toward the closing theme, Loriod includes at the beginning of the third system reductions of two more bars of semiquaver passagework. This passage, unlikely to be a point of emphasis in a conventional analysis, is perhaps the most interesting inclusion in her reduction, pointing to a key subtlety of Mozart’s score for the memorising performer. To see why, compare these bars to the analogous passage in the exposition (Ex. 3a): in both cases, Mozart is aiming toward a cadence, and evades that trajectory. In the exposition, this interruption takes the form of a ‘one more time’ reset (Schmalfeldt 1992) after the cadential 6-4, with the run restarting from B. Loriod did not bother to write this passage in its exposition form in her *pense-bête*. Whereas in the recapitulation we might expect a simple transposition of this passage (i.e., a ‘one more time’ reverting to E), instead, the figure restarts on B, as in the exposition; the lower neighbour is now raised, and the figure ascends to D natural before descending and repeating in sequence (Ex. 3b). Because the passage begins on B, these two bars resemble their cousins in the exposition more than the straightforward transposition that could have been expected here. The discrepancy between the recapitulation and the exposition is compounded by the similarity between the runs which both begin with double neighbours on B. This difference-within-similarity presents a formal switch that Loriod felt compelled to cue in her *pense-bête*. Although this idiosyncrasy – likely motivated by the upper limit of Mozart’s keyboard – is of little consequence to the formal structure and trajectory of the movement, it becomes a focal moment in Loriod’s reduction.

### **INSERT EXX 3a and 3b NEAR HERE**

As the recapitulation moves toward the closing theme, Loriod gives herself one final cue, taking up the material that had first been introduced by the orchestra in the ritornello that closed the exposition, now in the tonic – representing, once again, a redistribution of roles from the exposition. Unlike the previous switch, however, this thematic interjection is in fact a significant formal anomaly, and consequently a feature often remarked upon by analysts of this concerto.

The emphasis on switches in Loriod’s reduction, as well as the near-elimination of the development section with its unique material, corroborate Cook’s intuitions regarding the importance of variations and transitions in performers’ analysis (2013, pp. 45–6) – even as these cues and switches remain embedded in a clear, hierarchical comprehension of the formal structure, no less important for mnemonic retrieval. Given these observations, it is perhaps not surprising that the Finale, a sonata-rondo featuring the different-within-similar repetitions that that form entails, occupies the most significant portion of Loriod’s *pense-bête*.

Having examined what is (and what is not) included in Loriod’s reduction from a diachronic perspective, it is worth commenting on some general features. Like all of Loriod’s Mozart *pense-bêtes*, the reduction of K.488 is almost entirely devoted to the right hand (with minor exceptions in the finale), as though the ‘cues’ for memory reside primarily in the right hand (or better, perhaps, the melody, which more often than not amounts to the same), with the left hand falling into place once the right hand ‘cue’ is established. Loriod also takes care to note articulation on several occasions (see, e.g., staccato markings in bars 5, 6 and 15, and slurs, bars 1, 7 and 8). On the other hand, expression markings (e.g., dynamics) are rare in Loriod’s Mozart reductions, in contrast to her Messiaen reductions discussed below.

*Case Study 2: Levels of reduction in Mozart's K. 482, i*

A second Mozart concerto, K.482 in E<f> major, offers an occasion to compare Loriod's analytical memorisation strategies at multiple levels. Here, Loriod's reductions navigate the subtlety with which Mozart treats thematic variation and formal sequence, notably in the recapitulation. The challenges of memorising myriad differences-within-similarity inherent in this repertoire became more acute in the extreme context of Loriod's complete performance of Mozart's 22 solo piano concertos in 1964, given both the quantity of material performed from memory, and the subtlety of formal twists and turns in Mozart's concerto style. Even James Hepokoski and Warren Darcy – whose *Elements of Sonata Theory* epitomises Cook's 'observer's perspective' (2013, p. 45) in its project to distil a synchronic archetype of sonata forms – are stymied by the 'individualised' and variable structures in Mozart's 'stunningly complex' later concertos: 'Mozart's synthesis-solutions were now so individualized that the only way to do justice to them is to examine each of them separately and in detail' (2006, p. 594). Regarding K.482 in particular, Girdlestone (whom Loriod read in preparation for her complete Mozart concerto cycle of 1964) remarked, 'Never hitherto had Mozart varied his recapitulation with such art. The piano, especially, is determined to make all things new' (1958 [2011], p. 357).

There are two *pense-bêtes* for K.482 in Loriod's papers. The first is very detailed, comparable in scale to the near-complete melodic reduction of the *pense-bête* for *La Fauvette des jardins* shown above (ill. 8; cf., ill. 1). Though undated, it corresponds in its format and level of detail to the set of *pense-bêtes* that Loriod prepared en masse in anticipation of her Mozart concerto cycle of 1964 (see Fig. 8).<sup>38</sup>

**INSERT FIG 8 NEAR HERE**

The 1964 *pense-bête* elaborates a greater number of neume-like symbols to abbreviate complex melodic contours and figurations: dots replace notes (system 1, bars 9–11); circumflex-like markings indicate sharp upward and downward motion (system 7, bars 10–11), with more elaborate curves are represented as zigzags (system 11, bar 5). These symbols can also be combined (e.g., lines and dots, system 11, bars 2–4.). Verbal abbreviations and other symbols are also used in the *pense-bête*: reminders of which hand to use (system 2, 'dr.' for right hand, and system 7, 'g.' for left hand); 'BIS', to denote local repetitions. There are also formal indications that serve to place musical cues in a larger hierarchical structure: the use of the word 'TRAIT' (end of system 6) elevates an important '*trait de virtuosité*' (a virtuosic run) to the level of a formal landmark. The abbreviation, present in both of Loriod's reductions for K.482, highlights a feature that would surely not receive such prominent billing in a more conventional reading of the concerto's form. Loriod also oriented herself with more conventional formal indications, implementing a red dot in many of the *pense-bêtes* of the 1964 Mozart cycle to mark the beginning of the development.

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<sup>38</sup> Loriod performed K.482 on 19 December in a concert conducted by Boulez that also featured K.491 and K.488 which was the final instalment of the complete cycle; this was to our knowledge Loriod's first public performance of K.482. It is worth noting that Messiaen undertook his own analyses of these concertos, producing programme notes for Loriod's cycle and reviewing the works in greater depth with his analysis class at the Conservatory. These notes were later published in a single volume in 1992. Although Loriod transcribed aspects of these analyses in her pocket scores, their language and observations are absent from her *pense-bêtes*.

The second *pense-bête* for K.482, created in March 1966, is far a more concentrated reduction, limited to a handful of ‘dangerous passages’ (see Ill. 9) (Fig. 9). Here, the context was a three-concert tour of the Netherlands with the Limburg Symphony Orchestra, conducted by André Rieu, the week following a concert of four other Mozart concertos in Brussels. In this *pense-bête*, Loriod reduces the quantity of musical notation and focuses on problem areas, cued with minimal incipits that are framed with reference to solo and *tutti* sections as well as conventional formal terminology: *pont* (bridge), *2e thème* (second theme), *milieu* (middle, the French term for the central section of a sonata form without extensive thematic development), and *rentrée* (recapitulation).

**INSERT FIG 9 NEAR HERE**

Loriod’s annotated score (Eulenberg, 1936) often casts light on somewhat puzzling elements of the *pense-bêtes*.<sup>39</sup> This can be illustrated through two examples in which Loriod marks a problem area in the score, which is also subjected to varying degrees of reduction in the *pense-bêtes*. In both examples, the problems are complex: they arise from differences between the exposition and recapitulation, with variations in local thematic detail compounded by changes in *solo-tutti* distribution and formal sequencing.

The first example concerns the passages from bars 94–106 (in the exposition, Fig. 10a) and 264–276 (in the recapitulation, Fig. 10b). Loriod identifies these passages as problematic in her score and resolves them with different means in the *pense-bêtes* of 1964 and 1966. The dilemma is caused by the way Mozart reorganises and condenses material from the opening ritornello and solo exposition in the recapitulation.<sup>40</sup> Both passages reconfigure the concerto’s regal opening to involve the soloist in material introduced by the ritornello: a two-bar *tutti* fanfare followed by a four-bar descending chain of suspensions in the winds, a six-bar unit that is repeated with variations. In the solo exposition, this passage is the first moment of interaction between orchestra and soloist. The piano, silent during the fanfares, then ornaments the suspension chains with two forms of figuration (arpeggios, then scales, bars 96–99 and 102–105), before proceeding to the transition (bar 106). The recapitulation dispenses with the ritornello and opening solo, commencing directly with the fanfare and suspension chain in dialogue. This difference alone is a pitfall, compounded by the fact that, in contrast to the exposition, the pianist only adds figuration to the second iteration of the suspension chain (bars 272–276). Loriod calls out this difference in her annotated score, indicating ‘*p.c.* attention: seulement la 1<sup>e</sup> fois !’ [‘by heart, careful, only the first time’] (bar 96) then, then ‘Y. 2<sup>e</sup> fois sans arpegges’ [‘Yvonne, second time without arpeggios!’] (bar 266) (Fig. 10b).

**INSERT FIGS 10 A and B NEAR HERE**

To further complicate matters, in the following sequence of the recapitulation (bar 276), the pianist no longer pursues the transition material: instead, they prolong the primary thematic group, taking up a theme previously heard only in the opening ritornello (bar 13). In her score, Loriod marks these contrasts between the formal sequencing of the exposition and recapitulation with the ‘*p.c.*’ abbreviation, accompanied by the numbers ① and ② at bars 106 and 276.

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<sup>39</sup> F-Pn, RES VMD MS-130. Loriod’s fascinating score is annotated not only with her analytical remarks for memorisation, but also with comments on her own performances, others’ performances, indications from colleagues, conductors and Messiaen.

<sup>40</sup> In the already complex field of formal variation found in Mozart’s concerto, Hepokoski and Darcy point out the particular challenges represented by K.482, including the reconfiguration of S between R1 and R2, and the extensive reorganisation of the material from the R1 and S1 in the recapitulation (2006, pp. 542, 585, 587).

The *pense-bêtes* of 1964 and 1966 encapsulate through various means these issues of local and formal switches, of difference-within-similarity. Although the more detailed melodic indications of the 1964 *pense-bête* preclude the need to underline the differences in how these passages begin, the formal switches of bars 106 and 276 are indicated ① and ② as in the score, circled and highlighted in coloured pencil. In the formal framework of the more economical *pense-bête* of 1966, Loriod replaces the circled ① and ② with the ordinal 1° and 2° to indicate the same formal switch. At the start of recapitulation (system 6), she writes ‘*I non*’ (to avoid the pitfall of reprising the exposition’s arpeggios), followed by ‘*2 D, G*’, to remind her that both hands perform the run in bar 272 (in contrast to the RH-only figure in bar 102).

The second example concerns the opening of the second theme in the solo exposition (bars 152ff), which is later recast as an extension of the second theme in the recapitulation (bars 330ff). As in the previous example, the dilemma is the recapitulation’s reconfiguration of material from opening ritornello and the solo exposition, which results in formal switches compounded by local switches in phrase repetition.

The specific areas in question are the last events of the second thematic group, each extended by differing passagework leading respectively to the arrivals of perfect cadence in the key of the dominant and (what Hepokoski and Darcy call the EEC) and the equivalent cadential event of the recapitulation, resituated in the tonic (the ESC). The repetitions of this theme vary in number and nature between the exposition and recapitulation. Loriod parses this change in her score (bar 152, see Fig. 11), observing the ‘melody: a scale, a single period, repeated with variants’ and noting in the margin of her score that it is repeated four times in the exposition (‘*1° 4 fois !*’) and six in the recapitulation (‘*2° 6 fois !!!*’, Fig. 12).<sup>41</sup> She also highlights variations in the treatment of the rising scale from one iteration to the next, circling the gruppetto in bar 158 and underlining that the figure is then present in the third and fourth repetitions of the rising scale (‘*p.c. tjrs le 3e et 4e fois [gruppetto rhythm]*’). In the recapitulation (Fig. 12), Loriod calls out the newly interpolated material in bar 336 (*p.c. parenthèse*) and new forms of melodic variation (bar 333: ‘*do do !*’<sup>42</sup>, bar 340: ‘*syncope !*’).

**INSERT FIG 11 (= two images) NEAR HERE**

**INSERT FIG 12 (=two images) NEAR HERE**

This problem area is not specially foregrounded in the detailed *pense-bête* of 1964 – at most Loriod thickens the outlines of the notes in the entry of the rising octave figure upon its entry in systems 5 and 14 and is careful to indicate differences in articulation (see Fig. 8). In contrast, nearly half the 1966 *pense-bête* (Fig. 9) is devoted to resolving the issue of the varying treatment of the rising scale and the two varied interpolations of new material (systems 2–3, 7–8). Between 1964 and 1966 Loriod changed her articulation of the rising scale, and in the *pense-bête* of 1966 the gruppetto variation of

<sup>41</sup> (‘*mélodie: une gamme, 1 seule période répétée avec variantes*’). Incidentally, this phrase summarises Messiaen’s analysis in his own annotated score (the Schirmer, 1939, two-piano reduction, BnF Musique, RES VMA MS-2996) and a rare intersection of his own analytical interests and with Loriod’s more practical analytical needs in the context of memorisation.

<sup>42</sup> Loriod’s choice to indicate ‘do do’ as opposed to, say, ‘la la’ (the first repeating pitches), may have had an additional, verbal, mnemonic function: ‘dodo’ is French slang for ‘sleep’.

the third and fourth repetitions of this motif is not present. Instead, this later *pense-bête* focuses on the differing paths out the repeated rising-scale figure, indicated with ④ and ⑤.

Loriod's reductions sharpen our focus on the intricate joinery that makes Mozart's concertos such engaging objects of analysis – while also highlighting the stakes this intricacy raises for performers in an age of memorisation. For a pianist, the reconfigurations, contractions and elaborations in Mozart's recapitulations amount to a path on which one can easily lose their way, compromising an entire performance. This peril has implications for which musical moments rise to the hierarchical foreground, without necessarily being points of great expressive importance. (Where the analyst has the luxury of admiring the scenery, the pianist has to make sure not to miss an exit.) Indeed, the analytical work of Loriod's *pense-bête* is not directly in service of a particular aesthetic reading, but rather a fundamental precondition that allows her interpretation to bear fruit in performance. As such, it is an analysis engineered to reconcile Mozart's concertos with modern demands on the performer, with intendent expectations of fidelity to the score.

### *Case Study 3: 'Le Traquet Rieur', from farm to table*

Throughout the 1950s, Loriod served as Messiaen's companion and chauffeur during birdsong collection tours, learning from ornithologists and tape-recording birdsong at his side as he gathered material for the *Catalogue* he was conceiving for her special talents (Chadwick and Hill 2017, pp. 39–40).<sup>43</sup> Given her intimate exposure to his process, Loriod was uniquely privy to the artifice by which Messiaen collaged, interwove and permuted bird-characters into a musically legible formal structure. As a final case study, we will examine how Loriod's underlying strategies of analytical memory operate with reference to 'Le Traquet rieur' (the black wheatear), a movement from Messiaen's *Catalogue d'oiseaux* (1956–58), to demonstrate how Loriod's techniques of memorisation cut across classical and modernist repertoire.

The formal organisation of *Catalogue d'oiseaux* contrasts in significant ways from the conventional sonata-form model of the Mozart concerto movements seen earlier. As Ginsborg points out, analysis for memorisation draws upon the musician's 'semantic knowledge and particularly – in the context of Western classical music – familiarity with its tonal, harmonic, and compositional structures' stored in long term memory (Ginsborg 2022, p. 246). Such knowledge is evident in Loriod's use of formal terminology to structure and truncate whole movements into *pense-bêtes*. Much modernist music, however, poses a challenge to this knowledge, insofar it often seeks to break with precisely the past models that enable that form of long-term memory interaction. In his study of memorising atonal music for the piano, Alexander Soares uses the cadenza from Messiaen's *Oiseaux exotiques* as a case study for examining, from a practice-based research perspective employing a 'longitudinal method' (2015, p. 38) modelled on Chaffin et al. (2002), the precise challenges posed by Messiaen's birdsong music for memorisation. His approach – a valuable insight into a performer's memorisation journey from start to finish – nevertheless contrasts with the organic troubleshooting of Loriod's *pense-bêtes*,

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<sup>43</sup> Yvonne Loriod frequently evoked her birding trips with Messiaen in her transcription of his diaries. One such transcription reads: 'Hélas, le chauffeur Loriod conduisait beaucoup et attrapa un lumbago [...] Néanmoins son appétit des oiseaux (très communicatif au contact de Messiaen et de M. Huë) fit qu'elle continua à conduire sur la route de Saint Guilhem le désert, à l'étang de Vendres, à Valras, à la Grotte des Demoiselles [...]. Elle profita amplement des deux ornithologues et prit de grandes leçons pour interpréter les modèles ailés et leurs timbres.' (RES VMB-122(1), pp. 111–112).

as they emerged in her practice.<sup>44</sup> Furthermore, Loriod's unique familiarity with Messiaen's piano writing over many decades gave her a solid internalised understanding of his distinct harmonic and rhythmic language and pianistic writing – which was, after all, fashioned in dialogue with her own pianism (Messiaen and Samuel 1994, p. 202; Dingle 2013). It makes sense, therefore, that despite significant differences between Mozart and Messiaen's music, Loriod's basic strategies for analytical reduction and memorisation of Messiaen's *Catalogue d'oiseaux* – her attention to chunks, cues and switches from score annotations to *penses-bêtes* in varying degrees of reduction – share much in common with her approach to the Mozart concertos, even as she supplements these established strategies with other, especially visual techniques of memorisation and reduction to grapple with unique challenges presented by Messiaen's score.

In *Catalogue d'oiseaux*, each movement is structured around a single species of bird, with other avian interlocutors who appear interspersed in highly variable succession. These birds are set against the backdrop of a musically represented environment and climate, which for 'Le Traquet rieur' (Black wheatear) is the garigue on the Mediterranean coast of the Roussillon region. The title role, the *traquet rieur*, is featured in dialogue with three contrasting supporting characters: the *merle bleu* (blue rock thrush), the *traquet stapazin* (black-eared wheatear), and the *fauvette à lunettes* (spectacled warbler). Minor characters – the *goéland argenté* (herring gull) and *martinets noirs* (swifts) – offer interjections of local colour. 'Decor themes' serve to frame the structure, such as the element describing *joie de la mer bleue* (joy of the blue sea), supplemented with one-off musical depictions of wind and light on the waves.<sup>45</sup>

As thematic elements, Messiaen's birdsongs possess great variety: some birds (like the *traquet rieur*) present a distinct character even as their songs differ widely from one iteration to the next; other birds (like the *merle bleu*) return to core motivic formulas with slight variations; while still others sing more or less the same song from one iteration to the next (like the *goéland* or *martinets*). Whereas variation of a given theme might be limited to two or three locations across the structure of a Mozart concerto, in the *Catalogue d'oiseaux*, a single bird may reappear in a far greater number of variations and repetitions (sometimes even appearing in multiple movements across the cycle): for example, in 'Le Traquet rieur', the *merle bleu* has eight different, yet similar, interjections, six of which are unique – differences-within-similarity that generate as many local switches. This multiplicity is further complicated for the memorising performer by the different groupings and permutations of birdsong that coalesce into larger episodes or naturalistic scenes, with associated formal switches.

Analysing and reducing these movements into *pense-bêtes*, Loriod deploys familiar strategies of chunking and cuing, using incipits to indicate problematic switches between thematic entries. Compared to the incipits Loriod gives herself for Mozart themes, those in the *Catalogue* often include more detailed articulation, phrasing and dynamic indications – perhaps reflecting the relative importance of these details for establishing the characters of each bird in juxtaposition. She also gives fingering indications to cue physical memory (as seen in the example from 'Le Baiser de l'enfant-Jésus'); and particular attention is given to rests (as seen in the example from 'Le Lorient').

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<sup>44</sup> Loriod's papers contain several *pense-bêtes* for *Oiseaux exotiques* (F-Pn VM FONDS 30 LOR-5), which would make for an interesting comparison to Soares's study.

<sup>45</sup> For traditional analytical accounts of this movement, see Sherlaw Johnson 1975 [2008], p. 157, and Chadwick and Hill 2017, pp. 171–77.

More remarkably, Loriod devises striking visual aids, representing the concatenation of birds and natural features with colour-coded symbols, encapsulating the form as a whole in a rebus-like scheme. Her use of colour and imagery adds vividness to the musical cues that activate other areas of her memory (visual, spatial) – including her own knowledge of the natural and sonic environments on which these works are based. This can be seen with particular clarity in Fig. 13, the second of three *pense-bêtes* for this movement found in Loriod’s papers, and the ‘middle’ of the three in terms of scale of reduction. It is difficult to date this document with precision; Loriod sometimes used *pense-bêtes* to perform the *Catalogue* at least as early as 1967, but this document was likely created in the 1970s or ’80s.

**INSERT FIG 13 NEAR HERE**

Loriod’s representation of the form uses the following symbols:

- the titular *traquet rieur* is marked by Roman numerals in red circles at each of its principal appearances;
- the *traquet stapazin* is represented by a bold, serified ‘T’ (stylised to resemble the distinct field-marking of the bird’s tail feathers (see Fig. 14);<sup>46</sup>
- the *merle bleu* is a simple figure of a bird in flight, appropriately in blue coloured pencil, with additional annotations to mark ‘long’ and ‘very long’ variants;
- the *goéland* is represented by a similar bird figure, in black.

In addition to these ciphers, verbal cues are added for natural phenomena, quoting the indications from the score. Most prominent of these is the ‘*joie de la mer*’ – a sort of refrain that punctuates the movement – evoked by Loriod with a blue crescent and dotted waves. There are also the ‘*coups de vent*’ (gusts of wind, written out at the end of the final system, with a diagonal arrow, and the ‘*poudroïement*’ (glistening of the sun on the sea) given with dynamics. Note the significant musical divergences of incipits accompanied by a similar symbol, such as the roman numerals of the *traquet rieur* and the T of the *traquet stapazin*. Indeed, Loriod’s strategy is designed to draw attention to precisely these differences.

**FIG 14<sup>47</sup>**

That these symbols and words are sufficient to trigger Loriod’s memory demonstrates both the extent to which she associated these musical passages with the natural imagery suggested by Messiaen, as well as the fact that the principal challenge for memorisation in these works was often not only the notes themselves, but the formal sequence of events. Simple word choices can also serve to underline

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<sup>46</sup> Messiaen’s programme note for the ‘Traquet stapazin’ movement mentions the ‘T noir’ and presents the bird as an anthropomorphised character redolent of the first act finale of Mozart’s *Don Giovanni*: ‘Au bord de la route: un Traquet stapazin. Fier, noble, il se dresse sur les pierres, dans son beau costume de soie orange et de velours noir – un T noir renversé partageant le blanc de sa queue, un masque noir profond couvrant le dessous de son œil, ses joues, sa gorge. On dirait un grand seigneur espagnol se rendant à un bal masqué. Sa strophe est forte, brusque, brève.’ (‘At the roadside a black-eared wheatear. Proud, aristocratic, he stands on the rocks, in his finery of orange silk and dark velvet – a black inverted T dividing the white of his tail, a mask of deepest black covering eyes, face and throat. He might be a Spanish nobleman going to a masked ball. His song is loud, brusque, abrupt.’) (Messiaen 1964, vol. ii., n.p., quoted and translated in Chadwick and Hill 2017, p. 133).

<sup>47</sup> The authors have carried out due diligence in seeking authorisation for the reproduction of this album artwork for non-commercial research purposes via Universal and its subsidiaries, which incorporated the Vêga label in 1995.

the order of important structural events even when musical notation is unnecessary to recall their detail – see for example ‘merle bleu long’ and ‘merle bleu très long’. (These may be compared to Loriod’s verbal evocation of traditional formal labels as seen in Mozart’s K.488 – e.g., ‘2<sup>e</sup> thème’ – more useful as formal landmarks than as note-for-note reminders.)

A recurring landmark such as the ‘joie de la mer’ might be associated with different surrounding events at each appearance. For example, Loriod felt the need to remind herself, ‘pas Goéland’ (no herring gull) of her *pense-bête* (system 3) to avoid the switch of following the *martinets* with the *goéland* that occurs later in the movement (system 6). Similarly, the indication ‘re-merle’ after the second ‘joie de la mer’ serves to underline an exception: here, unlike the previous and following iterations of ‘joie de la mer’, it is the *merle* that sings first, not the *traquet rieur*.

The formal structure captured by Loriod’s *pense-bête* resembles the thematic table of this movement presented by Sherlaw Johnson (1975 [2008], p. 157), as a synchronic distillation of form into a sequence of interrelated episodes. However, for all its schematic clarity, Sherlaw Johnson’s technique neutralises the variety of each bird’s utterance – a compelling and naturalistic aspect of Messiaen’s score, but one which makes it so treacherous for the performer. Indeed, Sherlaw Johnson’s reduction illustrates the shortcomings (from the performer’s standpoint) of the traditional analytical focus on segments at the expense of local variations and transitions.

### INSERT Table 1 NEAR HERE

But Loriod had one final mnemonic tool – the last on her list of the pianists’ ‘eight memories’ mentioned at the very beginning of this article. Under the category of ‘personal imagery’, Loriod included what she called ‘landscape memory’: sensorial memories of the natural environments on which the music of the *Catalogue* was based to assist in the memorisation of music. ‘Like the bark of a tree to recall the style, the rhythm, and the timbre of a great spotted woodpecker. The coolness of the understory for the robin. Allow oneself to be penetrated by the habitat...’<sup>48</sup> Loriod’s reference to personal, sensorial experiences underlines that analysis is only one facet of memorisation, and that each facet is ultimately indissociable from the others.

## Conclusions

We conclude by returning to Cook’s distinction between the ‘observer’s’ and ‘pedestrian’s’ analytical perspectives. While Cook’s performer experiences a ‘concatenation’ of events from the linear, non-hierarchical perspective of the pedestrian, Loriod’s analyses are not devoid of hierarchy: on the contrary, her *pense-bêtes* nest mnemonic cues at various levels within a hierarchical system, using large-scale formal representations to aid mnemonic retrieval (see also, Ginsborg 2022, p. 240). Loriod’s analyses for memorisation thus mediate between Cook’s ideal types – which makes sense for a performer steeped in analytical and compositional training from her earliest childhood. It is likely that most performers do, in fact, combine any and all tools at their disposal, in conscious and unconscious ways, to facilitate the task of memorisation.

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<sup>48</sup> Loriod, Notes for an article ‘Les 8 mémoires du pianiste’, F-Pn, RES VMB MS-207 (2). (‘Et le mémoire du paysage lorsqu’il s’agit des chants d’oiseau. Côté écorce de l’arbre pour retenir le style, le rythme et le timbre du pic épeiche. Fraîcheur des sous-bois pour le Rouge-Gorge. Se pénétrer de l’habitat...’) Recall that this was drawn up in 1958, right during the years she was accompanying Messiaen in the field for the composition of *Catalogue d’oiseaux*.

Even within the limited scope of this study, however, there remain open questions. For one, our understanding of Loriod's analytical expertise may necessarily be skewed by the fact that our corpus consists of documents created in response to exceptional moments of psychological duress. Elsewhere, she produced and transcribed analytical insights in her scores, and even published a handful of analyses, which are less easily connected to pragmatic performance concerns (e.g., Loriod-Messiaen 1996; Messiaen and Loriod-Messiaen 2005). If our discussion of analytical memory has largely focussed on her representations of musical structure, this is a reflection of Loriod's own preoccupations with maintaining a sense of orientation; as signalled from the outset, other ramifications of analysis for performance – say, for interpretive expression – are less prominent in these documents.

Nevertheless, Loriod's *pense-bêtes* are a poignant revelation: her great pianistic strength – namely, her prodigious capacity to learn and internalise repertoire of all types – also led to her greatest insecurity – the fear of compromising that reputation through a failure of memory. This corpus, representing but one musician's strategies drawn from one tradition, would benefit from comparison with cognate documents of other performers in future: her example invites the suggestion that other performers' archives, too, may offer a mine of empirical information for those who seek to better understand musicians' cognitive and analytical processes from a variety of individual and cultural perspectives. Practice-based researchers have taken and are taking an important lead in this regard (Chaffin et al. 2002; Soares 2015, Farré Rozada in progress). Historical case studies, however, have the potential to complement existing approaches, adding depth and candour to our understanding of the role and greater utility of analysis to interpreters' work, while also allowing music analysts and historians – in particular those who advocate greater inclusion of performance-oriented perspectives within musicology – to glean analytical insights from performers' working processes. Furthermore, music analysts who teach budding performers might draw on our readings of Loriod's *pense-bêtes* to stimulate reflection on the uses of analysis – whether internalised and 'non-discursive', or externalised in writing – in the preparation of performance. If we invited performance students to devise their own miniature *aide-mémoires*, what might these look like, and what insights might they yield? Such an exercise would serve to reaffirm that analysis can be deeply personal – shaped to suit one's own needs, circumstances, and predilections.

Yvonne Loriod's reputation as one of the greatest musical memorisers of the twentieth century was assured by a combination of spontaneous ability (for which she was widely recognised) and deliberately developed strategies (far less visible, but no less integral to her success). The education to which she attributed her ability to learn and memorise music quickly (quoted in this article's epigraph) consisted of rigorous training in harmony, counterpoint, and formal analysis – although examination of her *pense-bêtes* shows the extent to which she freely adapted and refocussed conventional analytical principles over time in response to specific challenges and constraints she faced as a performer of classical and new music, and even to her changing mind and body. The variety of the *pense-bêtes* springs from Loriod's willingness to represent and re-represent the score to suit herself at different moments in her life and speaks to the contingency and open-endedness of all acts of music analysis.