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Citation for this version:

Lorch, M. and Barrière, I. (2003) The history of written language disorders: Reexamining Pitres' case (1884) of pure agraphia. *London: Birkbeck ePrints*. Available at: <http://eprints.bbk.ac.uk/archive/00000337>

Citation for the publisher's version:

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Brain and Language (2003) 85: 271-279.

**The History of Written Language Disorders:
Reexamining Pitres' case (1884) of pure agraphia
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Running Head: History of Pure Agraphia

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Abstract

The first clinical description of pure agraphia was reported by the French neurologist Pitres in 1884. Pitres used the case study evidence to argue for modality-specific memory representations and the localization of writing. This article reviews Pitres's contribution to the study of acquired writing disorders, the components of writing models and the cerebral localization which subserve writing, in light of the views entertained by his contemporaries and current authors. Although numerous cases have been reported throughout this century, the view that writing can be impaired while other language functions and motor activities remain intact is still challenged.

Keywords: agraphia, writing, history of medicine, localization, pure disorders

Introduction

In 1861, Broca made persuasive arguments regarding the localization of language in the brain. Over the next three decades, clinicians throughout Europe and North America actively investigated the clinico-pathological correlations in aphasic disorders. Many of these descriptions included the assumption that written language paralleled spoken language, and that agraphia was not a significant theoretical entity requiring separate consideration. Notably, in their writings of the 1860's, both Trousseau (1864) and Hughlings Jackson (1866) assumed that aphasics' writing was as defective as their speech. Hughlings Jackson considered impairments of writing to reflect the same linguistic deficiency as speech and reading, and always to be impaired to some extent in cases of aphasia.

Five years before Broca's influential paper, Marcé (1856) had described a number of cases where spoken and written language disorders were not parallel. Similar observations were published by Ogle (1867) including one case of aphasia without agraphia. This case was taken by Ogle as evidence "that the faculty of speech and the faculty of writing are not subserved by one and the same portion of cerebral substance"(1867, 106).

It was almost 20 years before a case of isolated disorder of writing was described in detail. In 1884, Albert Pitres (1848-1928) published the first detailed clinical case study of pure agraphia (see Barrière and Lorch, in press for an English translation of Pitres, 1884). Ten years after Pitres published his paper on pure agraphia, he delivered an address to the *Congrès français de Médecine interne* at Lyon. At this meeting, Pitres (1894) took the opportunity to launch a detailed and eloquent attack on the Holists such as Marie and Bernheim who questioned the existence of focal disorders. Much of his argumentation was supported by reference to his (1884) case of pure agraphia, *Monsieur L*. Pitres had even gone so far as to bring the patient back to do follow up testing to establish that the pure agraphia persisted ten years post onset. Pitres saw this case as paramount proof of localization of function in the cortex.

Arguments have continued over the past century as to whether there is a cerebral localization for the function of written language production, and whether cases of a pure form of acquired writing disorder do exist. Numerous cases of pure agraphia have been reported subsequent to Pitres' 1884 description, and just as often, the existence of pure agraphia has been called into question.

Albert Pitres is mentioned in the aphasia literature primarily with regard to his 1895 paper on polyglot aphasia "*Étude sur l'aphasie chez les polyglottes*." (See Paradis, 1983 for an English translation). This paper is recognized as the first modern case study on the subject and is cited as the source of Pitres's rule of restitution (see Lorch and Barrière, 2001 for discussion). In this paper, we would like to consider Pitres' work *Considérations sur l'agraphie* (1884) which was the first comprehensively described case of pure unilateral agraphia.

Albert Pitres (1848-1928)

Pitres was born and died in Bordeaux, France but spent many years in Paris at *La Salpêtrière* as the intern, colleague and major collaborator of Jean-Martin Charcot. He was a member of the significant group of doctors in France who initiated the use of clinico-pathological correlation to investigate the functional organization of the cortex. This innovative clinical approach was based on precise observation, diagnosis and treatment of patients used in conjunction with knowledge gained from the experimental study of anatomy and physiology (Bernard, 1865; Hannaway and La Berge, 1998).

Pitres wrote his medical doctoral thesis (Pitres, 1877) under Charcot in Paris and subsequently joined the faculty of the newly formed medical school based at the ancient *Hôpital Saint André* in Bordeaux (Baste, 1992). Although no longer based at the *Salpêtrière* with Charcot, Pitres went on to coauthor clinical and experimental research papers with him that are considered some of the most notable of Charcot's publications. That Pitres' work is so little known these days is somewhat surprising given its status at the time. The fact that his career was so closely linked with Charcot should have secured him a more prominent place in the history of aphasiology. The American neurologist M. Allen Starr (1889) wrote that there were three periods in the development of the field [of aphasiology], the epoch of Broca (1864-1874) the epoch of Wernicke (1874-1883) and the epoch of Charcot (contemporaneous with his writing).

In 1877, Charcot and Pitres had published a series of articles on the determination of the neurophysiology of motor control. They carried out a study of the anatomico-pathological correlations between cortical lesions and type of hemiplegia based on their own series of a total of 108 patients (1877, 1878). In his book *Lésions du Centre Ovale*, Pitres (1877) described a case of aphasia caused by a subcortical lesion located below Broca's area. This early work of Pitres' had great impact on the thinking of the day. The English neurologist David Ferrier (1878) cites this case of Pitres' as definitive evidence in establishing the role of Broca's area as the seat of the language faculty (which was still contested). This original observation of Pitres', that subcortical lesions could lead to the disconnexion of function, was also used to support his stand on the localization of function and in drawing the distinction between the purely motoric disorder seen in anarthria and that of aphasia.

Pitres' research at the *Salpêtrière* led to the production of two major books on the subject of localization of motor control (Charcot and Pitres, 1883, 1895). Pitres' experimental work on anatomy and physiology of the brain, carried out with François-Franck (1883; 1885), was also highly regarded, and a technique of vertical brain sectioning is eponymously termed *le coup de Pitres*. After leaving Paris, Pitres developed a large clinical and teaching practice at *l'Hôpital Saint André*, was Professor of Medicine and Dean of the Medical School in Bordeaux. He was very prolific and wrote on a range of different aspects of neurology, psychiatry and general medicine. In addition to his work on patient series that established neuroanatomical principles, Pitres published numerous clinical case reports that reflected a strong adherence to clinical pathological correlation methodology (e.g. Pitres, 1898). These papers uphold the notions of localization of function, modularity of processes, and

integration of networks. He was a member of the Academy of Medicine and died in 1928 five months short of his 80th birthday.

The first modern case of pure agraphia

Pitres' 1884 publication in *Revue de Médecine*, is the first modern detailed scientific description of pure motor agraphia. The paper begins with reference to the teachings of *son Maître* Charcot. In the previous year, Charcot, who had just been given a chair at the *Salpêtrière*, presented an unprecedented series of Friday morning lectures on the topic of aphasia. These lectures were based on clinical demonstrations of patients with particular symptoms. One of these cases of aphasia with agraphia is referred to by Pitres in his introduction to pure agraphia.

Pitres also initially relied on Charcot's definition of agraphia as "*aphasie de la main*" (aphasia of the hand). Pitres stated that aphasia and agraphia are functional disorders of the same nature with different localizations. In giving a detailed historical review, Pitres credited Ogle (1867) as the inventor of the term (in English, however Benedikt (1865) used the term *agraphie* two years earlier in German). Pitres cites a little known paper by Louis Victor Marcé (1856) as the first to describe the disorder and the possible dissociation of agraphia from aphasia. Marcé stated explicitly that agraphia can exist in instances with unimpaired motor control of the hand, thus distinguishing it from paralysis. Marcé saw difficulty with writing as an impairment of the memory of written signs (symbols) and their representational value as words. Although all of Marcé's cases had impairments in speech and writing, Marcé did insist, on theoretical grounds, that these two forms of production should dissociate. Pitres criticized the 12 cases presented as evidence by Marcé for being too complex (i.e. in having multiple impairments) to allow for clear interpretation. Pitres nevertheless found it regrettable that the insights offered by Marcé's 1856 paper had been lost.

Before the publication of Marcé (1856), Bouillaud (1825), student of Gall, had proposed that the brain is responsible for two elementary actions, namely the generation of internal words which stand for concepts and which form the basis for the memory of words on the one hand, and the production of exterior words on the other hand. The former, i.e. internal words, were thought to be affected by aphasia. Subsequently, in the ensuing decades and contemporaneous with Pitres' paper, the prevailing view of aphasia was that it arose from verbal amnesia—a basic disturbance of the faculty of memory for the symbolic value of the signs (Kant) which represent thought. This is reflected in the position expressed by Hughlings Jackson (1866) who was seemingly unaware of the cases reported by Marcé over a decade earlier. Jackson asserted that speech and writing will always be disturbed in tandem: "As a rule, when speech is quite lost, power to write is quite lost too; and when it is impaired there is usually difficulty in writing." (1866, 327). Jackson goes on to explain that the various difficulties with forms of expression can be categorized in terms of the motor organization of these different systems of expression, e.g., paralysis of the tongue and palate, ataxy of articulation, aphemia, etc. in which written expression might be preserved. Hughlings Jackson's complex and subtle analysis of control of expression derived from his clinical observations is in contrast with those of Wernicke (1874) and Trousseau (1877) whose arguments were based on theoretical assumptions. Both insisted that there would be no dissociation between speech and writing. Trousseau

(1877) stated: “Typically, the aphasic patient is no more competent in expressing his thoughts in speech than he is in writing. Even if the patient retains motor control of his hands and even if his previous intelligence level is sustained he is just as powerless in writing a word with the pen as he is in speech.” (translated in Marcie, 1983, p 399)

Pitres insisted on a more modular view based on the representation of memory rather than motor control which was, he felt, demonstrated and verified by these dissociations of expressive disorders. Pitres’ localizationist orientation, in opposition to that of Hughlings Jackson, was more similar to his colleague at the National Hospital for Epilepsy and Paralysis at Queen Square, Henry Charlton Bastian (1880). Memory, in Pitres’ view, was not an indivisible faculty but rather modality specific. This approach to memory was grounded in the work of Ribot (1881) presented in his book *Les Maladies de la Mémoire* (English translation, *Diseases of Memory*, 1882).

Pitres identified three types of linguistically based memory relevant to reading and writing: 1) visual memory for letters and their association in syllables and words, 2) auditory memory for linguistic sounds and their phonetic value, and 3) motor memory for the production of written letters. Each of these memories could be lost in isolation. Loss of the visual memory would give rise to complete loss of reading ability. Alexia without agraphia, in a case observed by Trousseau (1864), was used to illustrate the dissociation between the visual and motor memories. Pitres includes Trousseau’s often repeated observation by Mussy that such patients write equally well with their eyes shut. This is contrasted with Charcot’s patient who could read only after tracing the words with his fingers but not by simply looking at them. “He reads only in the act of writing.”(Charcot 1889, p. 139).

The numerous cases of pure word deafness reviewed by Pitres are seen as demonstrations of the preserved ability to read, to produce written language and to copy, but not to write to dictation because of the impairment of auditory verbal memory. The visual memory for written language was also hypothesized by Pitres to be composed of separable components. Pitres cites a case by Grasset of an aphasic who could no longer read or write but could transcribe music and sing from musical notation. He argued that printed letters, cursive letters, numbers or musical notation were acquired successively so they could be lost selectively. This interpretation echoes Ribot’s (1881) law of regression in the theory of dissolution of memory (discussed below).

Pitres reviews a case of polyglot agraphia described by Charcot. Charcot had presented the case as an illustration of Ribot’s law which stated that the memories which are most recent are the most fragile and are the first to be impaired from cerebral lesions. Ribot’s theory of memory dissolution was stated as the “law of regression”:

“We then demonstrated that dissolution of memory followed a law. ...we have arrived at the following conclusions...[that in all instances] the destructive process is identical. It is a regression from the new to the old, from the complex to the simple, from the voluntary to the automatic, from the least organized to the best organized.” (Ribot, 1881; English translation, 1882, p. 203)

Ribot's work was bound to indirectly influence Pitres by rights of his high standing in the academic community, but also more directly through the close personal relationship Ribot had with Charcot (Nicholas and Murray, 1999). Ribot's theories on the non-unitary nature of memory were directly informed by his readings of the English authors Spencer and Hartley whose original background was in philosophy but who are recognized as the founders of physiological psychology and (more interestingly in light of major differences) by Hughlings Jackson (Gasser, 1995).

Charcot had described a 52 year old Russian soldier who also spoke French and German fluently prior to his illness. After his illness the man only produced speech in his mother tongue Russian. He could not respond in French or German though comprehension of those languages was good. Over a period of time the patient's spoken French recovered but his most recent and least well-known language, German, remained impaired. This patient was totally unable to produce written language in any of his 3 languages while he was able to read in all of them. Interestingly, this very same trilingual agraphic patient, first referred to in Pitres's 1884 paper on agraphia, is cited again eleven years later in Pitres paper on polyglot aphasia (1895).

After this lengthy introduction in which Pitres sets out his own conceptualization of the memory representations of dissociable language modalities, supported by numerous case studies cited from the literature, he pursues the topic of pure motor agraphia in more detail. Pitres states that not one properly described case study of pure motor agraphia exists in the literature.

Pitres's own case is of *Monsieur L*, a 31 year old wine merchant, who had shown signs of suffering from syphilis for 10 years. He demonstrated complete loss of ability to write with the right hand. (There was rigidity of the right leg and a right hemianopia.) Mr. L could read and spell and he could write with his left hand, but could only produce written copies with his right hand. He could not transcode from print to script with the right hand. However, through careful assessment and observation Pitres noted that the patient could transcode with the left hand and then could copy the results with the right hand.

Pitres defines pure motor agraphia as being constituted by the isolated loss of memory for the complex motor synergies that regulate movements of the hand and the forearm in the act of writing, without disorder of intelligence, auditory comprehension, reading silently or aloud, and without limb paralysis. Pure motor agraphics are unable to produce written characters because they have lost the memory of coordinated movements necessary for writing. This formulation contains subtle distinctions that go beyond Charcot's initial definition of agraphia as aphasia of the hand and owes much to Hughlings Jackson. Indeed, Gasser (1995) asserts that "*la loi de Ribot*" was in fact inspired by Hughlings Jackson.

Pitres' Model of Writing

Pitres refers directly to Ribot's theories of memory in the introduction to his own model of reading and writing:

"Modern psycho-physiologists accept that the link which joins together the superior psychological faculties to the various types of expressions of thought is mainly represented by memory (for more on this subject see the

most interesting book by M. Ribot, Diseases of Memory).” (Pitres, 1884, p859; translation IB and ML)

Pitres hypothesized that there were three types of “partial memories” any one of which can be affected without the others being affected: “...memory is not an indivisible faculty, it applies to different objects and draws on various sources for the elements of its activity”. With respect to reading and writing, several partial memories are involved. These are:

1. Visual memory which gives us the memory of the shape of the letters and their relative status in their innumerable combinations in syllables and in words
2. Auditory memory which gives us the memory of the sounds and of their status in the phonetic language
3. Motor memory which gives us the memory of the efforts and muscle synergies required to correctly trace written letters.

Each of these partial memories can be lost in isolation while the activities of the others remain intact. The loss of visual memory constitutes word blindness; the loss of auditory memory constitutes word deafness; the loss of graphic memory constitutes motor agraphia. (Pitres 1884, 859; English translation see Barrière and Lorch, in press). Although Pitres (1884) does not explicitly discuss breakdown of speech production in this section of his article, his earlier comments on Marcé (1856) indicate that he conceptualized cases of aphasia in which the patient’s spoken production is impaired as stemming from a fourth memory which would store the articulatory movements required in speech, and which would parallel that which controls the muscles coordination required in writing.

Pitres argued that agraphia can be produced by impairment of any one of the three partial memories described above with respect to written language. Agraphia due to word blindness: a patient can write down his own thoughts and write to dictation but can not read what he has written (i.e. alexia without agraphia) and can not write from any example (i.e. copy). Agraphia due to word deafness: a patient can write from his own thoughts and copy but can not write to dictation, reading is preserved. Agraphia due to loss of motor memory: a patient is unable to write his own thoughts, write from dictation or copy but he may be able to make a labourious copy as if he were drawing. Pitres urged that clinical examinations include all three tasks of spontaneous writing, dictation and copy in order to identify which aspects of partial memory are impaired.

Pitres’ Conclusions

Pitres acknowledges that very close analogies exist between the physiological mechanisms which control the production of speech and writing, and that there are great similarities between the pathological disorders which can alter their functioning. Agraphias can be classified according to three types, which correspond to the three classic forms of aphasia. They are:

- a. *Agraphia by word blindness* in which the patient can no longer copy but can write spontaneously and to dictation.

- b. *Agraphia by word deafness* in which the patient cannot write to dictation, can write spontaneously or to copy.
- c. *Motor agraphia or 'graphoplegia'* in which the patient can no longer write at all.

Pitres theoretically posits that each of these forms of agraphia can be observed in isolation in patients with intact intellect and movement. He points out that very precise observations of agraphia by word blindness and word deafness have already been reported in the literature. Pitres offers his observations on Mr. L (and the case of Charcot) of pure motor agraphia as evidence for the third type of agraphia.

Pitres admits that in most pathological cases agraphia is associated with that of hemiplegia and aphasia. However Pitres insists that in these complex cases, the various symptoms which co-occur in the same patient must be considered as independent of each other and unrelated. He attributes these different co-occurrences to the variable topography of individual brains and the greater or lesser extent of their lesions.

Pitres' 1884 paper was seen as a significant contribution to the literature at the time, and was accordingly translated and discussed by the international medical community (e.g., Gibson and Russell, 1885). Bateman (1890) singled out Pitres's agraphia case, stating that it "presents so many features of interest in reference to agraphia, that I add a condensed account of it...it furnishes a typical example of the uncomplicated form of the disorder..." (Bateman, 1890, p 207).

However, with Charcot's untimely death in 1893, Pitres lost the powerful influence of his mentor, and French medicine as a whole suffered a sea change. The conceptual "holists" who had been evolving a reactionary position to Charcot gained political ascendancy in France toward the end of the century. The most notable of these holists was of course Pierre Marie, one of Charcot's own students. Ten years after Pitres had published his paper on pure agraphia, he delivered an address to the *Congrès français de Médecine interne* at Lyon (1894). At this meeting Pitres launched a detailed and eloquent attack on the holists. Much of his argumentation was supported by his case of pure agraphia, which Pitres saw as paramount proof of localization of function.

The next year, in his paper on polyglot aphasia (1895) Pitres again refers to modality specific representations ("partial memories") which have distinct neurophysiological centers. Pitres theorized that the disturbance of these partial memories, after neurological insult, would result in functional inertia (i.e. inhibition) and would be followed by restitution (i.e. recovery from diaschisis) with the most familiar language memories reappearing first. Pitres explained that: "the most familiar to the patient (usually, but not always, the mother tongue)...reappears first because it is the one that uses the most solidly fixed associations" (Pitres 1895; English translation in Paradis, 1983, p.47)

This notion of strength of associations was also used by Pitres to explain why children learning to talk, and recovering aphasics understand speech before they are able to produce it: "because the verbal hearing center has the earliest and closest links to the language function." (Pitres 1895; English translation in Paradis, 1983 p. 47). In a parallel argument with respect to agraphia, Pitres reasoned that, as writing was

acquired later than speech, it could be selectively disturbed and/or fail to recover from impairment. Pitres subtle refinement of Ribot's law of memory impairment and restitution, which had been based on purely on antecedence, now had the added feature of intensiveness of use. This became known as Pitres' law in the polyglot aphasia literature. (e.g., Albert and Obler, 1978, Paradis, 1977, Lebrun 1995).

The subsequent fate of notions of pure agraphia

Dejerine (1891, 1892, 1914) continued to insist that agraphia could not appear in isolation and when it did appear it reflected either a visuo-graphic impairment which also gave rise to alexia, or a sensory-motor impairment which was associated with aphasia (cited in Marcie, 1983). Gordinier (1899) published a tumour case with pure agraphia. However, Dejerine insisted that the case was not conclusive due to the presence of mild intellectual impairment and ataxia (cited in Macfie Campbell, 1911). Another case appeared in 1903, presented by Carl Wernicke of "isolated agraphia." The validity of this case was also rejected as not being pure enough due to the presence of a slight impairment in speech comprehension, some ataxia of the right hand and sensory impairment (MacFie Campbell, 1911). Wernicke's case was also stridently rejected by Henry Head two decades later with the comment "it is difficult to decide whether the clinical obtuseness or want of theoretical insight is more worthy of wonder." (1920, 397).

The American neurologist, Joseph Collins wrote an extensive attack on the whole notion of pure motor agraphia in 1898. He states: "Pitres, Grasset, Marie [reporting Charcot's case] Brissaud, and others have claimed...that there are cases of pure motor agraphia without aphasia, but the cases they cite to substantiate their position do not stand the test of analytic scrutiny." (Collins, 1898, 135). Collins admits that Pitres' case does fit the requirements in having an isolated difficulty in writing spontaneously and to dictation. However, he rejects the case as an instance of impairment to a special graphic center in the brain. His justification for this is the evidence of hemianopsia and ability to write with the left hand in Pitres' case. Collins argues that this case must be interpreted not as pure motor agraphia but as a sensory agraphia dependent on a unilateral subcortical lesion, with sparing of a grapho-motor center in the right hemisphere. In this line of reasoning, Collins makes it clear that in rejecting this and others' cases of motor agraphia he is in fact rejecting the localization of writing in a center residing in the second frontal convolution of the left hemisphere (i.e. Exner's area (1881)). More than a quarter century after Pitres' (1884) case of pure agraphia, in an article on aphasia for the Encyclopedia Britannica, Todd (1910) begins the section on agraphia thus: "Discussion still rages as to the presence of a special writing centre...It may be that the want of unanimity as to the graphic centre is to be explained by an anatomical relationship so close between the graphic centre and that for the fine movement of the hand that a lesion in this situation which produces agraphia must at the same time cause a paralysis of the hand." (Todd, 1910, 164)

The American neurologist Kinnier Wilson (1926) also examined the evidence on pure agraphia in his book on aphasia. He was convinced: "Some impressive instances of pure dysgraphia from destruction of this area [the eupraxic centre for writing in front of the middle zone of the rolandic region (arm centre)], in the posterior end of the second left frontal gyrus, will be found in the literature; one of the best is that

recorded by MacFie Campbell (1911).” (Kinnier Wilson, 1926, 95). In fact, MacFie Campbell begins his paper by the remark that “von Monakow holds that an absolutely “pure” agraphia only occurs as a hysterical [i.e., functional rather than organic] phenomenon.” (1911, 287). This is directly in accordance with the teachings of Charcot on the purity of hysterical symptoms. The new tumour case presented by MacFie Campbell was argued to be significant not only as evidence of the dissociation of writing from speech, but also the dissociation of agraphia from apraxia. This new issue had been first raised by the case published by Liepmann and Maas (1908) which further elaborated the higher order control of gesture and motor expression.

Further aspects of motor control and its cortical representation were investigated in relation to cases of unilateral (as opposed to pure) agraphia (e.g., Geschwind and Kaplan, 1962, Bogen, 1969; Yamadori et al., 1980; Zesiger and Mayer, 1992). Discussions focused on both the question of hemispheric coordination and connectivity as well as pertaining to the nature and locus of higher order graphomotor representations (for further discussion see Lorch, 1995a; Lorch, 1995b; Rapp and Caramazza, 1997; Hanley and Peters, 2001).

In his text book *Agnosia, Apraxia and Aphasia*, Nielsen (1936) insisted, of the existence of the syndrome of pure agraphia “...there can no longer be any doubt” (p 40). Almost fifty years later, in his review of agraphia, Marcie (1983) cites a number of pure cases reported by Sinico (1926); Morselli (1930); Mahoudeau (1950); Mahoudeau et al (1951); Penfield and Roberts (1959); Dubois et al (1969); Assal et al (1970); Aimard (1975) and Rosati and de Bastiani (1979). Yet in the same passage, Marcie also reports the continued refusal of its existence. He reports Kreindler and Fradis’s (1968) insistence that pure agraphia was “impossible,” and that even Chedru and Geschwind (1972) were “skeptical” of the possibility of pure agraphia due to a focal lesion.

At the end of the twentieth century this assertion and denial of the very existence of pure agraphia has continued (see Roeltgen and Rapsak, 1993 for a recent review of agraphia). In 1988, Rapsak, Arthur and Rubens reported a case of lexical agraphia from focal lesion of the left precentral gyrus. A year later, in their textbook on aphasia, Rosenbeck, LaPointe and Wertz (1989) stated “...‘pure’ or ‘isolated’ agraphia without coexisting aphasia, dementia or confusion, must be rare, because we seldom see it. We leave its description and explanation to those who do.” (p 241).

Conclusion

Albert Pitres is mentioned in the aphasia literature primarily with regard to his 1895 paper “*Etude sur l’aphasie chez les polyglottes*” which was the first modern case study on polyglot aphasia. Perhaps more significantly, Pitres was also the first author to comprehensively describe pure unilateral agraphia. Pitres’ 1884 publication in *Revue de Médecine* entitled “*Considérations sur l’agraphie à propos d’une observation nouvelle d’agraphie motrice pure*” is a singular example of sophistication both in theoretical and clinical research. As in all of Pitres publications, a thorough historical literature review is always provided along with full references of citations. This is the exception rather than the rule in 19th century medical literature. His writings are distinctive for their scientific rigour, avoidance of anecdotal reporting,

clinical insight and theoretical sophistication. Pitres' papers are also notable for their precision in describing the details of assessment and methodological aspects of investigation, clinical management of the patient and courses of treatment and rehabilitation.

Murdoch (1990) admits that: "the rarity of pure agraphia has led some authors to express doubts regarding the existence of this disorder as an autonomous entity." (p. 200). Pure agraphia must be singular in the history of aphasia to be described in detail by esteemed clinicians, and at the same time, be consistently rejected and disbelieved by theoreticians of equal repute. Yet two more cases of pure agraphia have recently been published (Otsuki et al, 1999; Marien et al, 2001). At the time the patient studied by Otsuki et al (1999) still exhibited difficulties in writing, none of the other language functions were impaired and his spelling abilities were also intact. Other aspects of his motricity were tested including toothbrushing, imitation of gestures performed by examiner and of finger patterns which involved the use of either the left or right (dominant) hand and they were shown to be intact. In contrast the execution of both Kanji and Kana were impaired and was associated with a haemorrhage in the left superior parietal lobe. Although Otsuki et al (1999) adopt the terminology 'pure apraxic agraphia' proposed by Baxter & Warrington (1986) it seems that the clinical picture they describe matches the description of 'pure motor agraphia' proposed by Pitres (1884) more than a century ago.

Acknowledgements

This research was made possible in part by a research grant from Birkbeck College awarded to the first author and an IGERT traineeship and a Johns Hopkins fellowship awarded to the second author. An earlier version of this paper was presented at the International Society for the History of Neurosciences meeting in Cologne, 2001. Thanks are due to the many librarians who aided in obtaining this archive material. Particular thanks go to Mrs Marie Davaine, Mlle Guenoun and all the staff of the Library of the Académie Nationale de Médecine, Paris; Mrs Maïté Courbin, University Victor Segalen, Bordeaux; Mrs Veronique Leroux-Hugon of the Charcot Library at the Salpêtrière, Paris; Louise Shepard at the Rockefeller Library, Institute of Neurology, London; all the staff at the Wellcome History of Medicine Library and to Mme Jacqueline Barrière for her constant support. The second author also wishes to thank the members of the Cognitive Neuropsychology laboratory directed by Dr. Rapp, Department of Cognitive Science, for providing a supportive and convivial work environment.

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