FROM MORALITY TO MEDICAL DANGER: ANTI-VIVISECTIONISM IN THE NOVELS OF THREE LATE-VICTORIAN/EARLY 20TH-CENTURY WRITERS[1]

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บทคัดย่อ

นวนิยายอังกฤษสามเรื่อง (แต่งโดย Wilkie Collins, Gertrude Colmore และ Walter Hadwen) ได้ศึกษาทิศทางการเคลื่อนไหวด้านแนวคิดทางวรรณกรรมเกี่ยวกับการต่อต้านการผ่าทดลองสัตว์ และมีทิศทางที่ให้ความสำคัญกับศีลธรรมและตัวละคร แต่ก็มีแนวโน้มเพิ่มมากขึ้นในการใช้วิทยาศาสตร์เปิดโปงการผ่าทดลองสัตว์ในแง่ข้อบกพร่องด้านวิธีปฏิบัติและความผิดพลาดที่เป็นอันตรายต่อผู้ป่วยที่เป็นมนุษย์ การให้ความสำคัญกับอันตรายทางด้านการแพทย์ของการผ่าทดลองสัตว์มาถึงจุดสูงสุดในงานเขียนประวัติศาสน์การแพทย์ของ Hans Ruesch นักเขียนนิยายผู้ปฏิเสธแนวการเขียนนิยายแบบเป็นทางการ แต่ยังคงรักษารูปแบบและเครื่องมือทางวรรณกรรมในการนำเสนอประเด็นเรื่องการผ่าทดลองสัตว์

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Abstract

The trajectory of the ideological-literary anti-vivisection movement is traced across three successive English novels (by Wilkie Collins, Gertrude Colmore, and Walter Hadwen) and shown first to be morality-centred and character-focussed in its directionality, but increasingly moving towards scientific exposure of the practice as methodologically flawed and dangerously misleading for the human patient. This movement of narrowing focus upon the medical perils of vivisection is shown to reach its culmination in the medical historiography of novelist Hans Ruesch, who abjures formal novel-writing but retains rhetorical and literary styles and devices in his presentation of the vivisection issue.

Introduction

In the past two decades, much revealing research has been carried out on the theme of vivisection in Victorian and early 20th-century English literature. Studies have tackled such topics as the symbolic parallelism between the vivisected animal and the vilified female form[3]; the unease felt by Victorians towards their changing world and the symbolic expression of that unease through the pains engendered in

[3]Susan Hamilton perceptively writes: '… in the process of the sexualizing of vivisection, a conflation appears to take place between the act of vivisection itself and the object of vivisection: the vivisected animal body. As the result of this conflation, the vivisected body is simultaneously constructed as 'sexual' and 'obscene' ' Susan Hamilton, ' "Still Lives": Gender and the Literature of the Victorian Vivisection Controversy' in *Victorian Studies Association of Western Canada,* Vol. 17, No. 2 (Winter 1991), p.33.

the vivisection laboratory, and vivisection 'as a metaphor for the human condition' (in the excellent Otis 2007: 47); the subtle re-enactment of a harmless form of vivisection in the 'tickling' of the reader's nerves in anti-vivisectionist 'sensation' literature (Straley 2010); the familiarizing of the non-scientific general public with the reading of scientific journals in the quest to expose the horrors of vivisection (Hamilton 2010); and how literature became used as a vehicle for the mobilisation of an animal-defence agenda (Li 2006).

What has largely gone unexplored, however, is the changing *focus* of the ideological literary struggle against vivisection as that struggle moved from almost total concern with moral issues towards a major critical questioning of the medico-scientific value and justification of the vivisection enterprise as a putative means of understanding the aetiology and treatment of human disease.

The present study seeks to trace the trajectory of literary engagement with vivisection as perceived as first moral and then increasingly medico-scientific aberration, and exemplified in three major anti-vivisection novels by Victorian writers (although two of those authors were writing into the early 20th century), culminating in the renunciation of novel-writing by the late-20th-century novelist, Hans Ruesch, in favour of a wholly medical / scientific, yet rhetorically framed, focus on the vivisection issue.

Our exploration begins with Wilkie Collins, one of the first celebrated Victorian authors to tackle the vivisection question in novel form—in his 'character novel', *Heart and Science.*

Heart and Science: The Predominantly Moral Focus

The plot of Collins's novel may very briefly be outlined as follows: a young, overworked medical doctor named Ovid Vere—soon to leave England for a recuperative stay in Canada—meets and falls in love with a distant relative of his, Carmina Graywell, who comes to stay at the London house of Ovid's scheming and avaricious mother, Mrs. Gallilee. While Ovid is away in Canada, Carmina is treated badly by Mrs. Gallilee, falls ill and is deliberately rendered no genuine medical assistance by a family acquaintance, Dr. Nathan Benjulia—a keen vivisectionist who has been laboring for many years to understand brain disease and who now wishes to observe the progress of Carmina's illness in order to write up in medical journals what he has gleaned from such observation. Finally, getting word from little Zo (Ovid's charming young half-sister), Ovid returns to England with a cure for Carmina's illness which he has discovered in Canada without resorting to vivisectionist means. Dr. Benjulia, disenchanted, releases his laboratory animals and commits suicide. Ovid and Carmina marry.

Collins's subtitle for his anti-vivisection novel runs: 'A Story of the Present Time'. His work implicitly seeks to take a snapshot of what was occurring and being discussed in relation to vivisection at the time of his novel's composition (1882/1883). It is indeed symptomatic of that time that very little, if anything, was said of the dangers for *human* physical health consequent upon the vivisection methodology as a tool in medical research. Strictures against vivisection as a collection of scientifically aberrant and potentially misleading medical

investigative processes were to come later –and in incremental increase—in anti-vivisection literature, as shall be shown.

Collins's bi-partite 'Preface' divides itself neatly first into moral and then scientific concerns (the 'Heart' and 'Science' of the title). 'Readers in general' are told that the pre-eminent characteristics of novels which find favour with the readership are those centring upon character and humour, and which 'enlarge the circle of [the reader's] friends' (Collins 1996: 37). This is significant, as it indicates that within Collins's moral purview, even so dark a character as his creation, the vivisector, Dr. Nathan Benjulia, should not be excluded from the circle of the reader's 'friends': even such an animal experimenter is (or should be) within the pale of the reader's compassion, and should not be placed in a realm beyond moral redemption.

The Preface then quotes Walter Scott (echoing Shakespeare's *Cymbeline*) on the 'hardening of the heart' that can ensue from extreme scientific practice, and further quotes Faraday on the need for man to display humility in the exercising of his judgement. Both commentaries focus on the *moral* dimension of man's engagement with the world, rather than on the scientific efficacy of any techniques man might employ. This moral focus sets the predominant tone for the whole of *Heart and Science* in relation to the subject of vivisection.

It might be germane to advert briefly to the ideological context in which Collins was writing: for some years, the feminist, Frances Power Cobbe (with whom Collins communicated on the vivisection question), had been Britain's leading anti-vivisection campaigner, calling for the total abolition of the practice. She did not base her opposition to vivisection on any claims of its unscientific nature, but on its cruelty, and the immorality and injustice it represented in man's striving for improved health at the expense of suffering animals. In 1891 she deploringly wrote:

> The most portentous fact concerning Vivisection is not that it is a cruel practice; but that it is a *justified* cruelty … To contend against Vivisection is, then, to contend … against those besetting sins of the age of which it is the outcome—selfishness, and cowardice …' (Cobbe 2004: 369 and 371).

It is in keeping with this prevailing tenor of moral opposition to vivisection that Collins's novel has little to say on the medical inutility of the practice. When he does address the scientific aspect in his Preface (directed now at 'readers in particular'), it is only to reassure his more sceptical readership that his information derives from scientific sources and is not the wilful product of his own imagination. He also mentions the ambiguity that can accompany certain vivisectional findings in regard to the causes and results of brain lesions, for instance—but this is little more than a passing remark by Collins and is not expanded upon either in the Preface or substantially in the novel itself. Collins's chief novelistic concern remains the delineation of *character* in relation to natural morality.

The novel itself is launched with the recurrent motifs of malady, malaise (physical, mental and moral) and abuse of nature: not only is the protagonist, Ovid Vere, one who has 'cruelly wearied' his brain (Collins 1996: 45), one who has

'overwrought Nature' (ibid) and now stands in need of inner restoration; not only is his restive mother, Mrs. Gallilee, 'in a state of indescribable agitation' (Collins 1996: 47), but the very century itself is described as 'weary' and 'old' (Collins 1996: 45). The impression is generated of a people and time enfeebled and in a state of enervated disharmony with nature.

A subtle imagistic link is also established between Ovid Vere, the seemingly moral and blameless hero of the novel, and the later 'villain', Dr. Nathan Benjulia: both abuse brains—the one his own 'cruelly wearied' brain, the other those of animals. Both are in revolt against nature, and both transgress against a code of natural morality, wisdom and health which owes an unstated spiritual debt to Wordsworthian conceptions of the natural world and harmonious human interactions with it: nature, manifesting through plants, animals and young children (cats, dogs, birds, the gentle fluttering of leaves on trees—and young Zo, Ovid's spontaneous and unaffected little sister), can be a source of wisdom, tranquility, and healthful tutelage. Wordsworth in his 'The Tables Turned' of 1798 speaks of 'Spontaneous wisdom breathed by health, Truth breathed by cheerfulness' (Wordsworth 2014: 107)—a cheerfulness, natural good health and innate wisdom markedly displayed in this novel by little Zo. Speaking of children, Teresa, Carmina's travelling companion, rhetorically asks: 'But what is a child—especially when that beastly governess has muddled her unfortunate little head with learning?' (Collins 1996: 106). We almost hear Wordsworth fulminating:

> Books! 'tis a dull and endless strife:
> Come, hear the woodland linnet,
> How sweet his music! on my life,
> There's more of wisdom in it.
> (Wordsworth 2014: 107)

Animals can further teach the avoidance of excessive, debilitating labour, and the resultant happiness. As Ovid's friend and colleague, Sir Richard, comments, echoing Wordsworth's dictum of 'Let nature be your teacher' (Wordsworth 2014: 107): 'Look at my wise dog here, on the front seat, and learn from him to be idle and happy.' (Collins 1996: 47). Man has to learn to open his heart to the lessons and liberty of nature, just as Benjulia, in a break-through moment of moral lucidity, will finally open up the cages of his laboratory animals and let them regain their natural freedom and therewith secure his own moral release and redemption.

Unlike Dr. Benjulia, who is possessed of a tragic grandeur, Mrs. Gallilee, the true villainess of the story, undergoes no epiphany in her life, and ends the entire tale as morally petty and purblind as she began it. For her, a signal token of intellectual progress through life is the dissection of the nervous system of the bee (Collins 1996: 71). She regards such activities as proof of her and science's advance; but the narratorial tenor of the novel suggests instead sympathy with Wordsworth's disapprobation of 'Our meddling intellect' and with his trenchant *apercu* that 'We murder to dissect' (Wordsworth 2014: 107). It might perhaps be argued that linking Collins's novel to Wordsworth's conception of nature and natural morality is to simplify the former's work: this need not be the case, however, since it provides a framework for understanding which, while not all-encompassing and could be viewed as somewhat sentimentalized, certainly is in harmony with central aspects of Collins's vision.

I have said that Collins's chief concern in this novel is character allied to natural morality. That morality extends into the sphere of etiquette—even towards animals. Since animals are depicted in this story as very much *sentient* beings, capable of thought, sensitivity, pleasure and pain, it follows that one should observe basic courtesy and consideration towards them, and that failure to do so entails a moral lapse. When Mrs. Gallilee's little terrier dog is ignored by Ovid on one occasion, the narrator makes it clear that the dog feels slighted and hurt: 'The dog's eyes and ears expressed reproachful surprise. His friend Ovid had treated him rudely for the first time in his life.' (Collins 1996: 78). Here again there is a subtle link between Ovid and Dr. Benjulia: whereas Benjulia hurts animals' bodies, Ovid is, on this occasion at least, not above hurting their feelings. In the universe of discourse of this novel, even the sensitivities of a dog count and are not to be brushed aside as of no consequence.

The implicit moral prohibition on rending the bodies and feelings of representatives of nature goes even further. In an insightful article, Jessica Straley perceptively comments on how Collins uses the image of 'mutilation' and 'cutting' in his Preface in reference to the vivisectionist writings he has consulted (Straley 2010: 371). Once again we see the activated sensitivity of the novelist, who has become sensitized (even in humorous mode) to the vocabulary of pain and suffering in spheres seemingly removed from those of the vivisection laboratory: and yet the subterranean, verbal links remain. For Collins, hurting animals and even cutting into the pages derived from nature (paper that issues from trees) gives pause for moral thought.

Although on the occasion cited Ovid displays himself as not exempt from insensitivity towards animals (and thus the reader is enabled to see that 'cruelty' to animals is a matter of degree, rather than of kind—Ovid and Dr. Benjulia stand on a moral continuum, rather than in wholly different worlds), his solecism vis-à-vis the terrier dog is overwhelmingly offset by his general kindliness and compassion towards animals more generally. His rescue of a neglected female black cat, for instance, wins him the eternal gratitude of that animal (Collins 1996: 82-83) and early singles Ovid out as a man of general moral rectitude.

What of Benjulia? Far from being the two-dimensional villain of some 19th-century melodrama, he is a multi-faceted and 'round' character (in Forsterian terms)—a 'remarkable man', as the narrator calls him (Collins 1996: 94). Certainly from the moral perspective of the novel, he is a tragically flawed individual, prepared to inflict pain and torment upon animals in order to wrest neurological and encephalogical secrets from their prostrate bodies. This is done less to advance human knowledge (knowledge is for him merely a means to an ambitious end), but far more to bring him fame and lasting glory in the annals of medical history. In his quest for medical celebrity, he is even prepared to let Carmina's neurological illness go unchecked, so that he can study its progress and potentially publish the results of what he has discovered. Thus the animal vivisector ends up being a kind of human vivisector or abuser. This corruption of basic human decency in the physiological experimenter is the moral message of the novel, and is typical of concerns of those late Victorian years. Lewis Carroll, for example, sees vivisection's most salient harm as lying in

the vitiation of moral character which it effects within the perpetrator, declaring in his anti-vivisection article, 'Some Popular Fallacies about Vivisection': '…[t]hat the chief evil of the practice of vivisection consists in its effect on the moral character of the operator; and that this effect is distinctly demoralising and brutalising' (Carroll 1875: 853).

Yet despite his more than dubious morality and distinct sadism (additionally illustrated by his cruel treatment of his cook, highlighted in one semi-comical episode of the novel), Benjulia is invariably 'scrupulously polite' (Collins, 1996: 99), indeed has the 'manners of a prince' (Collins 1996: 97), and is possessed of a tender physical touch which belies the savage use to which he daily puts his hands. The narrator comments on his soft fingertips: 'Those tips felt like satin when they touched you. When he wished to be careful, he could handle the frailest objects with the most exquisite delicacy' (Collins 1996: 95). The reader at this stage of the narrative is unaware of the nature of Benjulia's work, so that the subsequent revelation that he is a vivisector comes with an amplified shock-effect.

Adding to this picture of a complex, seemingly self-contradictory character is the fact that Benjulia is to some degree a man of honour: once he realizes that he has wronged the good name of Carmina by implying that she was born as an 'illegitimate' child (an erroneous view deriving from misinformation supplied him), he seeks to make good his error by passing on to Mrs. Gallilee (the novel's true villain) some legal documents which rectify his mistake. He admits quite candidly that the slander spoken by Mrs. Gallilee (namely, that Carmina is a bastard) takes its origin from himself: he is to blame. As he tells the good and kindly Mr. Gallilee (an exemplar of gentle, caring humanity in the novel): ' "Can you take these papers to your wife? … I called here this evening – being the person to blame— to set the matter right" ' (Collins, 1996: 254). He is thus a man who can acknowledge his own errors and attempt to make good the harm he has caused others (this arguably prefigures his renunciation of vivisection at the end of the novel). Furthermore, he has quite literally a 'soft spot' for little Zo – a child of nature and a link to the realm of pure, unadulterated love. He takes pleasure in tickling her spine. While the child herself displays an unwilling submission to this (and this could be viewed as an unsettling sign of power-abuse on the part of the vivisector), the little girl yet does not actively dislike Dr. Benjulia, indeed she is not quite sure what she feels about him. He is for her, as for others, a mystery (Collins 1996: 97).

Coral Lansbury sees a hidden and disturbing significance in Benjulia's tickling of Zo: he is sexually molesting the little girl and is in truth a paedophile! Lansbury further views the stick which Benjulia habitually carries, and with which little Zo likes to play, as a phallic symbol (Lansbury 1985: 140). Both of these claims are arguable (utilizing a depth-psychological, Freudian approach), and yet they strike me as perhaps somewhat extreme and ultimately without powerful evidentiary or ancillary substantiation from the novel itself. I agree with Jessica Straley, when she writes: '… the tickling shared by Benjulia and Zo should not be so quickly characterized as the antithesis of proper feeling' (Straley 2010: 368). Rather than piling on the horrors relating to Benjulia's character, Collins is attempting here to be balanced and just -

to show that even such a seemingly callous individual as the animal experimenter can be 'touched' by natural innocence and made to open up his heart, to whatever small degree, to the ingress of human affection, even love. He might be an 'ugly beast' (Collins 1996: 95), but as a 'beast' he is still linked in to the sphere of nature – he is not utterly divorced from it. He feels a subliminal connectedness to the very human in this novel who most embodies uncorrupted naturalness. It is for this reason that Benjulia leaves all of his earthly possessions indeed to little Zo in his final will and testament: she alone has been able to reach into a heart that has been hardened by the practice of vivisection and kindle there a small flame of human sympathy and relatedness.

The most marked advance in the moral progress of Benjulia's character comes indeed at the very close of his life—when he realises that another researcher has pre-empted him in the understanding of brain disease (and has done so without resorting to vivisection) and consequently decides that his own life needs to be terminated in a holocaust of the very laboratory where he has laboured for so many years without success. Significantly, Benjulia swiftly puts to death those animals too grievously maimed by his experiments to survive (in a sense, he bestows upon them a merciful 'coup de grâce'), and he releases all the other animals strong enough for such freedom before poisoning himself and setting fire to the lab. This act of animal liberation (the adjective, 'liberated', is pointedly used by the narrator) is not the action of a monster; rather, it is the last gesture this side of death of a man who has seen the error of his ways and wishes to free his laboratory creatures from the incarceration and torment he has so long inflicted upon them. He could have left them all to die a gruesome and fiery death – but he does not do so. Even the large, limping dog which tries to fawn on Benjulia as it emerges from the lab is sent away after its fellows (Collins 1996: 323): if it had remained in the proximity of the experimenter, it would run the risk of being burnt in the inferno which Benjulia is about to ignite. Benjulia's suicide is a self-sacrifice by one who has for too long been prepared to sacrifice the lives of others but who now wishes to save them from protracted pain and immolation. It is this desperate, despairing and yet morally redeeming final act by Benjulia that allows his creator, Wilkie Collins, to bestow on him (an implied Jew), as he does in the final pages of the novel, a 'Christian burial' (Collins 1996: 324). While there is a definite deployment of irony here, this authorial decision nevertheless represents the writer's magnanimous gesture of respect towards a man who has finally abjured vivisection and its malefic works.

One might query whether Benjulia truly has taken a step forward into greater humanity at the end of the novel; yet it remains difficult to account for his liberative act towards the lab animals except in terms of a nascent stirring within him of a sense of compassion and caring—no matter how late and how minimal that stirring might be. In fact, Benjulia would appear to be the first animal experimenter in the work of a major Victorian novelist to pace from the role of daily animal torturer to active animal liberator, and thus anticipate the 'animal liberation' movement that was to burst upon the world with powerful effect in the second half of the 20th century (one thinks of Professor Pietro Croce's turning away from decades of vivisectional experiments to a subsequent commitment to scientific anti-vivisectionism and animal liberation –

see Croce 1991). There is no functional or practical reason (from a self-orientated viewpoint) for Benjulia to free his animals. Yet he performs this act—and this saving deed of pity and compassion would seem to hint at a degree of moral regeneration. For Collins, the vivisector might be an 'ugly beast' or animal—but precisely for this reason is not to be viewed as irredeemably and immutably excluded from the circle of nature. 'Beasts' are very much a part of nature. Thus, Benjulia is potentially connected in to nature and can even become empowered to function as its liberator. There is, of course, more than a degree of irony in this unexpected turn of events which all but brings the novel to its close.

Priests of Progress: Scientific Anti-Vivisectionism Puts in a Tentative Appearance

As we move forward to the next major anti-vivisection novel of our study—Gertrude Colmore's *Priests of Progress*—we enter an expanded world of anti-vivisection debate. Her novel is not a 'sensation novel' – a category to which Collins's work indubitably belongs – but operates from a more spiritually-centred focus upon the lives of several medical students and the varying paths they tread in the course of their careers. The novel portrays practising vivisectors and equally convinced anti-vivisectionists (both lay and medical), with the latter group highlighting the moral and spiritual reasons for a rejection of vivisection chiefly (but not exclusively) on moral grounds, and with scientific objections now beginning to break the surface of ideological discussion.

Gertrude Colmore's 1908 anti-vivisection novel, *Priests of Progress*, does indeed represent a thematic advance on Wilkie Collins's almost exclusively moral and 'characterological' engagement with the vivisection question. While Colmore is still wedded to an overwhelmingly ethical objection to experimentation on living animals, she propels the debate forward by giving greater prominence to two aspects that Collins had scarcely touched upon: 1) the risk of active, non-consensual *human* experimentation in hospital settings, stemming from the callousness that the vivisection process brings about in the medical researcher and clinician; and 2) the scientific dubiousness of the vivisectional methodology, on account of cross-species variations, which also problematises any attempts at reliably extrapolating (physiologically and therapeutically) from animal to man.

Whereas Collins had at most allowed his vivisector, Benjulia, to practise a form of 'passive' human vivisection on the ailing Carmina (by wilfully conniving at the physician Mr. Null's ineffective treatment regimen), Colmore goes a step further and has her characters speak of surgical interventions upon patients carried out solely for the purpose of gaining or demonstrating knowledge, rather than for the therapeutic benefit of the patient involved. The anti-vivisectionist and non-conformist, John Cameron, comments: '… in Vienna … women in the hospitals, pregnant women, and babies, new-born and unborn, form subjects for experiment … [and] in America … experiments are performed on the inmates of the hospitals, the asylums and the prisons …' (Colmore 1908: 46). Colmore details and personalises one such example of human experimentation carried out in a British hospital: the wholly unnecessary excision of the 'superior maxilla' from the impoverished Sarah Jennings' jaw and the

resultant needless disfiguring of that human victim's face (Colmore 2008: 40-44, and 331).

The fear that animal vivisectors would so morally degenerate as to become *human* vivisectors is one that had already been expressed by a number of writers of this period, including Lewis Carroll, who in his 1875 essay, 'Some Popular Fallacies About Vivisection', foresees

> … a day when anatomy shall claim as legitimate subjects for experiment, first, our condemned criminals – next, perhaps, the inmates of our refuges for incurables – then the hopeless lunatic, the pauper hospital-patient, and generally "him that hath no helper" ' (quoted in the fine article by Mayer 2009: 440).

As regards specifically *animal* experimentation, Colmore (like Collins before her) regards vivisection as a manifestation of the most immoral cruelty. Her AV (anti-vivisectionist) heroine, David Lowther, puts it succinctly: ' "It is simply that I am persuaded that vivisection is cruel, and persuaded also that of all immorality cruelty is the most immoral" ' (Colmore 1908: 306). It is such moral objection to vivisection's cruelty which predominantly shapes and directs Colmore's attack upon the practice. This sense of moral horror at wanton cruelty towards animals had become commonplace amongst numerous British writers ever since the 17th century. Writing most informatively on literary responses to vivisection in 17th and 18th-century Britain, Andreas-Holger Maehle traces the movement from its initial satirical mocking of science and scientists to a growing sense of moral outrage over animal cruelty inflicted in the course of vivisectional experimentation. He writes: 'Seen as a whole, a remarkable shift had taken place. Ridicule against any and all scientific undertakings, which naturally included animal experimentation, had been replaced by the moral argument precisely against this practice' (Maehle 1990: 51).

Another 'remarkable shift' was now underway in the literary treatment of vivisection—from an almost total focus upon the moral dimension of vivisection's evils to a burgeoning awareness of vivisection as a dubious scientific methodology. This theme is first sounded by the novel's long-standing female anti-vivisectionist, Judith Home, who discusses the difficulties inherent in trying to apply animal data to the human patient. In quest of a cure for a given malady, a vivisector might perhaps have performed hundreds of experiments upon various animals. The problem, however, remains the following:

> The experiments yielded varying results. That the effect of certain processes, certain drugs, should be different in a guinea-pig from what it is in a dog, may not appear surprising; that it might be different, again, in a human being would seem presumable… Having vivisected some hundreds of animals in vain, he did not reason that no certain result was in that way to be attained … (Colmore 1908: 177-178)

This slightly tentative statement of the problem receives more forcible enunciation from the lips of human-experimentation advocate, Dr. Giraud, when he declares:

> It is a fact that there is an unbridgeable gulf between the animal and human kingdoms, and results ascertained in the one remain problematical in the other. The inadequacy of experiments upon animals only is indisputable when you consider that there are certain maladies peculiar to man alone, and that some of them cannot be reproduced in animals (Colmore 1908: 238).

A specific example of such a malady to which the novel indirectly refers is syphilis—a human ailment that initially was not able to be modelled in animals.

A further element of complication in the vivisection methodology is raised by Judith in her address to an audience of medical students when she points out that physiological investigations upon animals are always carried out 'under abnormal conditions' (Colmore 1908: 313), which do not mimic everyday life-conditions in man. The artificially diseased and artificially caged laboratory animal is not comparable to a spontaneously and differently 'environmented' human patient.

These critiques of vivisection, not as a morally reprehensible practice alone, but also as a scientifically questionable one, constitute a major strategic step forward in the literary assault upon the citadel of animal experimentation in the early years of the 20th century. Yet Colmore's central focus remains fixed upon the moral unacceptability of hurting animals in the name of human advantage. On a number of occasions, she slips words onto the lips of her characters and even into the motto of her novel which indicate that her personal belief that vivisection possessed no utility was not as secure and unshakeable as her moral objection to the practice on grounds of its cruelty. One registers the sense that the author resorts to certain key elements of 'scientific anti-vivisectionism' largely as a propaganda expedient to turn the reader against animal experimentation, rather than such a view stemming from deep-seated and exhaustively considered conviction—as will be seen to be the case with Dr. Hadwen, and especially Hans Ruesch much later on.

Illustrative of this ambivalence towards, or vacillation of attitude regarding, vivisection's potential for human utility and benefit, the following statements from different characters, significantly placed in the run-up towards the novel's conclusion, jump out of the page and almost unconsciously prompt a grudging acceptance in the reader that animal experimentation *can* be of value in the quest for knowledge and the banishing of disease:

> There is something more precious … than knowledge, even accurate knowledge; more precious than physical gain, even assured gain; the spiritual progress of man. Any method of acquiring anything, whether it be knowledge or ease, material advantage or mental power, any method which inflicts pain upon any sentient creature, save for the creature's benefit, is against that progress. Vivisection appeals to the two basest instincts of humanity – selfishness and cowardice; instincts which delay man's march, and degrade his nobility. Shall man take knowledge of his body, comfort of his body, in exchange for his soul? (Colmore 1908: 262)

These words, spoken by John Cameron, articulate a clear distinction between the spheres of physical gain (which here means knowledge of human health and sickness, and deliverance from the pains of physical malady) and spiritual progress. The implicit assumption is that vivisection *can* deliver knowledge ('even accurate knowledge') and *can* bring relief for man from human physical ailments—but that we should reject such gains. The final words are, of course, a re-casting of the famous *aperçu* by Christ (to which we shall return) and place the moral focus squarely upon the realm of vivisectionally derived knowledge and ease relating to man's *physical* being.

After having secretly witnessed her husband perform a vivisection experiment, the heroine of the novel, David Cranley-Chance (*née* Lowther), rejects animal experimentation, even though she implicitly concedes that it could bring benefit to humanity: '… there is something in me which would rather suffer pain than benefit by doing to an animal what you—what was done yesterday' (Colmore 1908: 268), she tells her husband. She becomes even more explicit in her view that, yes, vivisection *can* deliver human beings from the pains of sickness, but that such a price is too high to pay. Speaking of her little, afflicted daughter (significantly named 'Vi'—reminiscent of the term '*vi*visection' and the suffering with which it is linked), she passionately asserts:

> You know what it means to me to see Vi suffer; or it hurts, perhaps, more than you know. But there are prices that one can't pay, however much one may want *what they would buy*; things one can't do. This *scientific* way of trying to escape from suffering is one of them (Colmore 1908: 269; emphases added).

There is no condemnation of vivisection as an *un*-scientific methodology here; rather, there is acceptance of it as a valid pathway to valuable, therapeutic knowledge. There is only rejection of it on purely *moral* grounds.

A little later, David, after reading a particularly unpleasant vivisectionist tract and with the evident approval of the narrator, reflects that not all vivisectors are cruel or engaged upon trivial research. Some do actually secure worthwhile attainments which are not vitiated by excessive amounts of animal suffering:

> That all vivisectors were not like the author of the book, she was well aware; even in the reaction of her present attitude she preserved a sufficient impartiality of judgment to remember that there were men marching under the same flag as that author, whose motives seemed to themselves humane, whose methods were not wilfully barbarous, whose scientific achievements were not grotesquely out of proportion to the [animal] suffering they entailed (Colmore 1908: 273-274).

David then muses that the type of human progress which truly matters does not pertain to the physical body, but solely to the moral or spiritual sphere:

> And she realized, reading and thinking during those strange days, that there is in man something more important than

> the desire for material … knowledge; that there is for man a higher destiny than the conquest of pain, or even the conquest of Nature. Vaguely, to be sure, and slowly, the realisation dawned in her consciousness that the spirit of man is a reality and not a theological conception, and that the development of that spirit means the only real advance of humanity (Colmore 1908: 274).

It is difficult to escape from the impression that vivisection is here viewed as an efficacious tool in the fight against human *physical* suffering, but that man should nevertheless set such gain aside and leap up to a more exalted *spiritual* vantage-point and forego the benefits that vivisection can bring.

Deeper into the novel, David's much-admired anti-vivisection friend, Judy, claims—astonishingly in view of the earlier *scientific* doubts regarding vivisection which had been mooted – that: 'There is primarily no medical or scientific aspect of this question … The question is fundamentally a moral one' (Colmore 1908: 314). Less than thirty pages before the novel's close, one of its leading anti-vivisection 'heroes', Dr. Sidney Gale, is able to ponder in the following manner on the potential human health benefits acquired through vivisection and yet to abjure those benefits due to the immorality of the practice:

> *Was the gain worth the price*? Did the end commend the means? Would man, trampling on those weaker than himself, denying his higher intuitions, abjuring the immortal to *put on an added mortality*; would man gain much? Gale, questioning, formulated his answer in yet another question: 'What shall it profit a man *if he gain the whole world* and lose his own soul?'(Colmore 1908: 351; emphases added).

The spiritual, moral and transcendental aspects of man's being are here accorded far higher value than any upgrading, as it were, of his corporeal condition. Yet that the physical side of man *can* be enhanced and its longevity extended through animal research is clearly suggested here.

The final Christ-quote—which had earlier in the novel been encountered in paraphrased form upon the lips of John Cameron—powerfully implies in its context that vivisection can indeed bestow upon humanity 'the whole world', but that it would be wrong to take possession of such a global benefit when it has been gained via unethical channels. That this doubly-presented dictum of vivisection's potential benefits for mankind in the war against disease, despite its moral repugnance and unacceptability, represents the final and considered view of Gertrude Colmore is rendered incontestable by the author's selection of precisely this quote as the motto of her entire novel. For Colmore, there are incipient, but not yet deeply imbedded, doubts about the *scientific* utility of vivisection, but these are overshadowed and overpowered by the much greater inner certitude that vivisection is a *moral* and *spiritual* evil.

When we come to Dr. Walter Hadwen's anti-vivisection novel, *The Difficulties of Dr. Deguerre*, no such medical / scientific doubts or ambivalences remain: there is solid certainty that vivisection is from its very inception and in its potential

therapeutic products ill-conceived, unscientific and possibly dangerous.

The Difficulties of Dr. Deguerre: Scientific Anti-Vivisectionism Takes a Firm Stand

Hadwen's story can only loosely and generously be termed a novel, as it is far more of a compendium of discussions held by the main characters of his story on the theme of vivisection. The eponymous hero of the tale, Dr. Deguerre, sets out as a believer in the efficacy of vivisection, but by the close of the novel has become convinced by the informed scientific arguments of his friend, Mr. Vigor, that vivisection is a medically useless and potentially dangerous practice for the human patient.

With this incursion of the medical doctor, Walter R. Hadwen, into the territory of literary anti-vivisectionism, a sharp turn is taken away from chiefly moral arguments against the practice of live animal experimentation towards a full-frontal attack from a mainly medical and scientific quarter.

Hadwen wrote his 'story' (as he correctly terms it) in 1913, and it was published in instalments between the years 1913 and 1918 in the British anti-vivisection journal, *The Abolitionist* (Hadwen 1926: 7). It was then published in full as a bound volume in 1926, effectively as a putative novel. As indicated, in outer form it is construable as a novel; yet it does not display the primary interests of the traditional novel, namely character and incident. It might more appropriately (and still generously) be described as a serialised *dialogue* novel structured around a number of debates on vivisection held by members of a certain 'Argumentative Club'.

As indicated above, *The Difficulties of Dr. Deguerre* diverges markedly in tone, emphasis and subject-matter from the anti-vivisection novels which preceded it. Whereas Collin's *Heart and Science* focusses primarily upon character and plot, and Colmore's *Priests of Progress* powerfully engages the moral and spiritual dimensions of live-animal experimentation, and a novel such as *The Healers* (Maartens, 1906) sees the vivisection issue as an opportunity for humour, satire and persiflage (and in this regard revives a tradition of vivisctional mocking prevalent in the 17th and 18th centuries[4]), Hadwen's novel (according to its own lights) attempts to overturn the medico-scientific arguments that underpin vivisection as an allegedly valid methodology in scientific and therapeutic research.

Hadwen launches a putatively scientific assault not only upon such practices as vivisection, but also upon vaccination and the very germ theory of disease which often underlies them. Hadwen stands firmly in the 'miasma camp' as to the aetiology of disease, refusing to endorse the relatively recent opinion (from Hadwen's standpoint) that germs are bearers of disease. The fact that his scientific views are now seen by most medical researchers today as outmoded is

[4] For the predominantly satirical and mocking tone of 17th-and 18th-century British literary expressions of anti-vivisectionism, see the excellent article by Andreas-Holger Maehle, 'Literary Responses to Animal Experimentation in Seventeenth- and Eighteenth-Century Britain' in *Medical History*, 1990, 34: 27-51.

not relevant to the present article, since it is Hadwen's marshalling of (what he deemed) scientific and medical evidence to oppose vivisection which is of central concern to this study.

Statistics are called upon, statements from vivisectors and anti-vivisectors before the Victorian Royal Commission on vivisection are cited, and logic is adduced to show that attempting to extrapolate physiological information from animals to man constitutes an essentially unscientific *modus operandi*, since the physiology and anatomy of animals and humans vary to such a marked and unpredictable degree that no dependable correlation between the two categories of living beings can be drawn. Numerous examples of 'species differences' as between man and the 'lower animals' are invoked (as, for example, the fact that lemon juice, a health drink for humans, proves to be a fatal poison to cats and rabbits), and the novel's initially pro-vivisectionist medical doctor, Deguerre, finally comes to the following realisation of vivisection's inherent uncertainty as regards the results it delivers, particularly in the field of pharmacological testing:

> The point is, that experiment with drugs on animals is not *scientific* investigation; you cannot be *sure* when you have obtained a certain result in an animal, that you will get a corresponding effect in a man (Hadwen 1926: 557-558).

This is the diametrical opposite of the dictum of vivisection's most celebrated (and, in other quarters, most execrated) founding father, Claude Bernard, who apodeictically declared that '… results obtained on animals are perfectly conclusive for man' (quoted in Ruesch 1983: 269). Such a stance betrays a perverse form of anthropomorphism—a casting of the animal body and physiology into the likeness of man. Ironically, the charge of anthropomorphism was, and frequently still is, leveled against anti-vivisectionists; it is regarded as the actuating force behind their opposition to the practice. Maehle all but concludes his otherwise excellent article with the following claim: 'True anti-vivisectionism emerged only with the anthropomorphism of the Victorian age' (Maehle 1990: 51). Dr. Hadwen was a Victorian, by birth and culture. Yet his approach to anti-vivisection was to highlight the *differences* between animals and humans, rather than dwell on their likeness. Indeed, it can justly be claimed that Hadwen's AV stance was overwhelmingly *anti*-anthropomorphic, as the following anatomical and physiological reflections by the young naval surgeon in his novel, Dr. Drew, indicate:

> 'We all have four limbs – just the same ground plan in man, in dog, in bird, or in the denizen of the water, but the developments are so different and the functions of each so distinct, that whilst all need organs to breathe with, mouths to receive food, stomachs and intestines to digest it, and kidneys and livers and other organs for secretion and excretion, yet each of these organs has been modified to the condition of life belonging to each particular creature and its habits, until its physical and physiological economy have become part and parcel of its own order or genus or species, and can constitute no guide whatever to the economy of the order or genus

> or species of another kind' (Hadwen 1926: 375).

Hence, as Dr. Drew also remarks, '… the processes of physiology in an animal body are apt to be misleading [vis-à-vis man] and are never conclusive' (Hadwen, 1926: 374). Drew further rejects any form of reactive parallelism not only between laboratory animals and man, but also between the varying animal species themselves in their response to treatment, observing:

> 'When you come to treat any of these animals for the disease you are supposed to have induced, you will probably find that a dog will react quite differently from a cat, and a guinea-pig will react in an altogether contrary way from a rabbit, and the whole of them differently from a human being. At least, that is the conclusion I have come to ...' (Hadwen 1926: 374).

This is a stance that is radically different from that embodied in some of the anti-vivisection comments provided by the Victorian writer, Robert Lewis Stevenson, whose vivisectionally hued 1885 novella, *The Strange Case of Dr. Jekyll and Mr. Hyde*, and even more so his short story, *The Scientific Ape,* not only closely link the animal to man, but man to the animal. As Chris Danta rightly points out: 'Stevenson likens humans and animal not just physically but metaphysically. In so doing, he raises the question of the animality of human beings' (Danta 2010: 58). Hadwen, by contrast, does the precise opposite and emphasises the *differences* between animals and humans in an effort to highlight the physical, indeed physiological, split between man and the 'lower' animals.

Yet it would be inaccurate to claim that Hadwen totally rejects all *moral* opposition to vivisection. He does not. He simply believes that as a campaigning strategy the moral aspects should be relegated to a subservient position in the struggle for vivisection's abolition. When his novel's kindly bishop urges that AV activists should appeal to the moral conscience of the public in their agitation against animal experimentation, the novel's chief AV proponent, Mr. Vigor, counter-balances this with the need to point out the scientific failings of the vivisection practice, saying:

> '… you are never going to win your battle solely on those [moral] lines, if you fight till the crack of doom … You will have to fight the question on the scientific side, if you are going to win. You will have to prove to the public that vivisection is an unscientific practice, that it is misleading in its results, that it is useless, that the erroneous conclusions deduced from experiments on animals have, again and again, led to seriously prejudicial consequences. You must show that it has never assisted in the slightest degree in the amelioration or cure of any human disease …' (Hadwen 1926: 586).

The eponymous hero of the novel, Dr. Deguerre, concurs and concludes the entire debate with a statement that sees the moral question embraced into the equation, but with greater emphasis accorded to the scientific side:

> 'From my experience among medical men, I am fully convinced that, if ever the anti-vivisection cause is to succeed, anti-vivisectionists must be prepared to answer the stock medical arguments advanced on behalf of experiments on animals, and they must be prepared to weigh the subject historically and scientifically in all its bearings, and the man or woman who fails to do that must expect defeat … anti-vivisectionists, to be successful, will have to wield the double-edged sword that not only presents the immorality of the practice, but also its stupidity and danger. The moral conscience is reached sooner by fear and ridicule than by high ideals unsupported by scientific facts' (Hadwen 1926: 591).

Vigor had pointed to the 'seriously prejudicial consequences' of the vivisection methodology, and Deguerre now explicitly speaks of the medical *danger* of vivisection for the human patient. In entering this conceptual territory of what might be termed medico-critical alarmism (basing itself on vivisection's dangerously misleading results when transferred to the human clinical sphere)—territory barely trodden by Collins, Colmore and their contemporaries[5] - , and through the chiefly scientific thrust of his story, Hadwen is paving the way for literary vivisection to move entirely away from the expressive but fictional format of the novel and into that of a discursive, yet eloquently articulated, indictment of vivisection, based upon an array of factual, medical and scientific documentation. This reaches its culmination in the figure of Hans Ruesch, celebrated Swiss novelist who turned his back on fiction entirely to expose in largely scientific, historical and psychological terms the very real dangers he saw in the vivisection methodology for the human patient.

Slaughter of the Innocent: The Seminal High-Point of Scientific Anti-Vivisectionism

Walter Hadwen and Hans Ruesch can justly be viewed as the two progenitors of the modern 'scientific anti-vivisection' movement. Additionally, they were responsible for shifting anti-vivisection literature away from the traditionally constituted novel as a suitable literary vehicle for anti-vivisection argument towards a more discursive non-literary form. Hadwen's *Difficulties of Dr. Deguerre* is a novel in outer form only and teeters on the brink of being undiluted polemical discourse, not centrally concerned with the delineation of human character at all (although, of course, a variety of characters and character traits are presented to the reader).

Hadwen had long been dead when Ruesch entered the anti-vivisection arena, and the English doctor's name had all but been forgotten (although was not entirely unknown to Ruesch). Yet Ruesch, through his own multi-lingual researches into medical and scientific journals, arrived

[5] In this regard, contrast with Hadwen's scientific approach the almost exclusively moral, anti-torture stance regarding vivisection evinced by AV novelists such as Berdoe, Cassidy, Corelli, Daal, Graham, Huntly, Macdonald, Marston, Maxwell, Melena (in whose novella vivisectionists are also Satanists), as well as H.G. Wells.

independently at the Hadwenite view that vivisection was a medical aberration and should be attacked chiefly along scientific lines.

Paradoxically, whereas Hadwen—a physician and not a professional writer—turned, at least superficially, to the novel format to give expression to his anti-vivisection views, Hans Ruesch, a professional novelist of considerable standing and popular acclaim, did the precise reverse, renouncing fiction-writing for good, in order to devote himself to a medical and scientific exposé of vivisection's fraudulent, pseudo-scientific underpinnings (as he declared them to be). He did this, however, with the skilful and impassioned eloquence of an accomplished novelist.

Slaughter of the Innocent (first published in 1978) is a history of the advent and growth of vivisection in anatomical and medical research, and a refutation of its alleged scientific and medical benefits. The book is, in fact, a species of medical historiography and further seeks to achieve its goal of disproving vivisection's viability by marshalling a wide range of statements from doctors and scientists on vivisection's unreliability as a scientific methodology. The books was later followed by the similarly-themed *Naked Empress* (1986) and *1,000 Doctors against Vivisection* (1989).

For the first time in a factual work on animal research, Ruesch not only rehearses the familiar moral arguments against vivisection, but reveals the great harm to human health for which he indicts the practice. The title, 'Slaughter of the Innocent', thus refers not only to the slaughtered animals of the vivisection laboratories, but equally to human patients who have been harmed and killed by a dangerously misleading medical investigative methodology. In this, he goes beyond Dr. Hadwen, although in principle following the cue Hadwen had supplied.

Towards the end of his seminal work,[6] Ruesch states:

> Vivisection has proved far worse than merely futile; it has proved directly responsible for damages to public health that are increasing and proliferating in geometrical progression … (Ruesch 1983: 346).

A brief example of such damage to human health might be apposite at this juncture. The most notorious case cited by Ruesch is the morning-sickness drug, Thalidomide. This was extensively tested on a variety of animal species and found to be damaging to 'neither mother nor child' (Ruesch 1983: 360). Yet in humans it wrought major malformations in the developing foetus (the 'teratogenic' effect –literally, 'monster-making' effect): some 10,000 humans were born with what is medically termed phocomelic limbs (foreshortened, malformed arms and legs). A public outcry erupted and the manufacturer of the drug, the German pharmaceutical company Chemie Grünenthal, was arraigned. Hans Ruesch comments:

[6] *Slaughter of the Innocent* directly inspired scientifically orientated manifestations of anti-vivisectionism such as Pietro Croce's *Vivisection or Science: A Choice to Make*; R. and J. Greek's *Sacred Cows and Golden Geese: The Human Cost of Experiments on Animals*, and the present author's *Vivisection Unveiled: An Exposé of the Medical Futility of Animal Experimentation*.

> The discovery of the drug's effects on man had required years. While the first birth defects in human beings were becoming increasingly evident, the resumption of animal tests just didn't confirm the suspicions, no matter how high the concentration given—thus confirming for another long, fatal period the assumption of the drug's harmlessness, and so the manufacturers saw no reason to withdraw it. Until the evidence became overwhelming: Although harmless to animals, Thalidomide caused malformations in man, and Chemie Grünenthal was incriminated for having marketed a harmful drug (Ruesch 1983: 361).

It was eventually found that with experiments on the white New Zealand rabbit, teratogenic effects were indeed obtainable, as also from a few monkeys. Ruesch remarks, however, that this was:

> … after years of tests, hundreds of different strains and millions of animals used. But researchers immediately pointed out that malformations, like cancer, could be obtained by administration of practically any substance in high concentration, including sugar and salt … (Ruesch 1983: 361).

Chemie Grünenthal was finally acquitted of malpractice after expert upon expert declared that a pharmaceutical company could not be blamed for the large-scale non-transferability of animal test data to man. Even Professor Widukind Lenz, who had managed to obtain some teratogenicity in monkey offspring, testified at the trial that 'there is no animal test capable of indicating beforehand that human beings, subjected to similar experimental conditions, will react in similar or identical fashion' (Ruesch 1983: 362).

With Ruesch, anti-vivisection literature moves away from the formal structures of the novel, but retains the eloquence and passion often associated with that literary form. A typical example of Rueschian prose might be the following, taken from the first pages of his work:

> Every day of the year, at the hands of white-robed individuals recognized as medical authorities, or bent on getting such recognition, or a degree, or at least a lucrative job, millions of animals—mainly mice, rats, guinea-pigs, hamsters, dogs, cats, rabbits, monkeys, pigs, turtles; but also horses, donkeys, goats, birds and fishes – are slowly blinded by acids, submitted to repeated shocks or intermittent submersion, poisoned, inoculated with deadly diseases, disemboweled, frozen to be revived and refrozen, starved or left to die of thirst, in many cases after various glands have been entirely or partially extirpated or the spinal cord has been cut.
>
> The victims' reactions are then meticulously recorded, except during the long weekends, when the animals are left unattended to meditate about their sufferings; which may last weeks, months, years, before death puts an end to their ordeal – death being the only effective anesthesia most of the victims get to know … (Ruesch 1983: 1-2).

This has all the evocative power of a popular 'sensationalist' novel and employs the literary devices of alliteration, consonance, anthropomorphism, repetition, verbal agglomeration and climactic intensification for the purposes of bringing home to the reader the horror of the practices performed in the experimental laboratories. Thus while Ruesch has abandoned the novel as a structural form, he has retained literary and rhetorical techniques that can be found embedded within it. In a sense, one could argue that the medical facts and histories favoured by Ruesch are embedded in a literary style that brings him close to the 'sensation literature' of Wilkie Collins. This does not diminish Ruesch, but merely indicates his awareness of the value of literary techniques and devices in the spearheading of an ideological campaign.

To the very end of his life, Hans Ruesch refused to revert to novel-writing while vivisection continued unabated; yet in his discursive writings he made use of rhetorical strategies and his considerable literary skill in the dissemination of what he saw as the scientific truths regarding the medical fraudulence of the vivisection enterprise.

In his final two years of life, Ruesch planned to republish a compact booklet, *CIVIS Answers Questions on Vivisection* (the distilled essence of *Slaughter of the Innocent*), which he had written some years earlier for his anti-vivisection organisation, CIVIS, on the medical dangers of vivisection. This booklet eschewed moral arguments against animal experimentation altogether. In one of his final letters, Ruesch wrote: 'I am almost blind, close to 93 and ready to go. But I am still fighting with what little strength remains …'[7]

Although his expressive writings failed to bring about the abolition of vivisection for which he was calling, Ruesch's bold views on the wrong turning which he deemed medical science to have taken by entering vivisectional territory influenced subsequent writing and campaigning against animal experiments. In a 2010 scholarly volume on *Arguments about Animal Ethics*, for instance, the authors do not frame the vivisection debate in reference to its moral or ethical parameters (as one might expect), but focus on its scientific/ medical unreliability and dangers, writing:

> … modern vivisection does not accurately predict human outcomes because of the complexities of genetics and molecular biology, a problem that sometimes produces fatal results in human consumers … animal experiments fail to predict human outcomes more than 95 percent of the time (Goodale and Black 2010: 129 and 145).

This medico-scientific stance towards vivisection traces its ideological lineage back to Hans Ruesch's *Slaughter of the Innocent*. Ruesch's focus on the inutility and positive dangers of the vivisectionist methodology for human pharmaceutical consumers additionally gained him entry into a university textbook on literary, artistic and scientific ideas which have markedly impacted upon the contemporary world. In a section entitled, 'The Natural World', the authors of *Past to Present:*

[7] Personal communication to the author, 12 March 2006.

Ideas that Changed Our World (Hirschberg 2002) include Hans Ruesch as a significant figure. Fourteen pages of excerpts from *Slaughter of the Innocent* are provided. Ruesch here finds himself in illustrious company, since amongst the other luminaries cited and lauded in 'The Natural World' are naturalist Charles Darwin, novelist and essayist Mark Twain, and ethologist Konrad Lorenz.

Conclusion

It has been shown that it is possible to trace within the trajectory of anti-vivisection literature a movement extending from the sphere of the traditional novel (with its chief focus on character and morality), into that of a retention of the outer novel form (while abandoning most of the inner content and character concerns of the novel), to a historico-scientific popular presentation of anti-vivisectionism written with a novelist's literary skill, keen eye and verbal facility—culminating in a scholarly work celebrating seminal ideas (including those of anti-vivisection) emerging from the artistic, literary and rhetorical arenas.

In literary discourse on the vivisection debate, fiction in the guise of the novel moved increasingly towards fact and eventually relinquished the overt and formal novel structure altogether. One might say that the trajectory of the animal-experimentation debate followed a movement in fictional format from predominant engagement with the medical immorality of the practice to a marked reduction in moral polemic and a heightened focus upon the therapeutic inutility and dangers of biomedical animal research—this in the form of factual but eloquently articulated medical historiography. It remains to be seen into what expressive forms the advancing decades of the 21st century will take discussion of the vivisection issue in its struggle for a final resolution.

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