

Growing Sympathy for the "zoological aspect": Biology and Ideology in New Zealand Primary School Nature Study, c. 1905-1960

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Abstract

Biological ideas shaped cultural attitudes to animals in the first half of the twentieth century, and New Zealand's primary school nature study programmes prior to 1960 provide insight into this. It is argued here that nature study reflected not only moral and religious rationale, but the "new natural history" and "new biology" of this era. Significantly, biological ideas enabled the rationalisation and integration of sympathetic and utilitarian perspectives, especially as regards farmed animals. This paper concludes that nature study reflected, and helped to foster, a fundamental appreciation of human-animal kinship, and support for ethical animal husbandry and the fledgling animal welfare movement.

Introduction

New Zealand's state primary schools were particularly influential in pre-WWII generations when, in 1939 for instance, only 25 percent of 12-18 year olds went on to post-primary education.¹ Nature study, instigated within the primary school syllabus in 1905 under the progressive leadership of George Hogben, the Department of Education's Inspector-General of Schools from 1899-1915, drew predominantly upon Anglo-American models. Many internationally-influential proponents of nature study mirrored the sentiments of American biologist Liberty Hyde Bailey, who acknowledged the importance of nature study for agricultural education but stressed that its primary objective was to instil a fundamental "sympathy"—a sense of connection—with the natural world.²

This study set out to examine if, in New Zealand nature study, this stance extended to animals. If so, how was this negotiated within this era of agricultural intensification and objective "scientific farming"?³ Are sympathetic approaches in this period best attributed to moral and religious sentiment, and why was this position advocated by biologists? How did evolutionary rationale feed into this? And finally, is there evidence that this approach had any discernible, broader impact?

Animals, and cultural attitudes to them, have not been the focus of New Zealand nature study scholarship to date. American historian Sally Kohlstedt, tracing the origins of the Australasian movement, observed that, although it was variably conceived and implemented, nature study broadly aimed to convey "the unity of life" through observation of living plants and animals, and to inculcate moral, aesthetic, and spiritual values, as well as fundamental science skills. She remarked that advocacy for nature was an important but complicated element, and noted tension between moral, spiritual, and agricultural approaches.⁴ In *Going Bush: New Zealanders and Nature in the Twentieth Century*, Kirstie Ross correctly highlighted the relationship between nature study and school gardening, and its importance as the seedbed (pun intended) of a popular love for the "great outdoors" and a conservation ethos. Both Kohlstedt and Ross noted enthusiasm for native birds within nature study, with Kohlstedt querying if the association of wildlife with national identity underpinned support for the reinvigorated post-WWII programme. Kohlstedt's examination of United States (US) nature

study programmes and of the role of women teachers documented some attention to animals and school liaison with the Society for the Prevention of Cruelty to Animals (SPCA).⁵

Scholarship on New Zealand human-animal relations (HAR) in general has also been limited, although studies have emerged over the last decade. Within historiography, the ideological basis of the nation's HAR has been a relatively neglected subject, although religious and moral views have been discussed.⁶ Historians James Beattie and John Stenhouse in 2005, for example, challenged historians to nuance images of rapacious utilitarianism, observing within the writings of Scottish settlers an ethos of Christian stewardship for nature, including animals.⁷ Nancy Swarbrick's history of New Zealand pet-keeping, *Creature Comforts*, elucidates the nineteenth-century origins and growth of the animal welfare movement and humane perspectives in school agricultural clubs, with brief mention of school moral instruction.⁸ Scholars have granted little consideration, however, to biology as an ideological factor influencing HAR of this period. Historians have considered biological ideas in relation to Social Darwinist, eugenic, and health discourses, but the impact on attitudes to animals has been overlooked.⁹

This study thus departs from existing scholarship in seeking to unpick how biology, interwoven with other ideological elements, informed sympathetic approaches. It presents nature study as a formative space in which these cultural ideas coalesced. The purpose and scope of New Zealand nature study, and broader scientific contexts and trends, are firstly outlined. This paper then proceeds chronologically, examining pre-WWII, and then post-WWII nature study, before concluding with reflections upon cultural legacies.

The Purpose and Scope of Nature Study

Nature study was always intended, at least in part, as a nursery for science and agriculture. In New Zealand's rural schools, especially within the first two decades of the twentieth century, nature study was primarily approached as a preliminary to senior agricultural science, and some manuals conflated the two.¹⁰ However, reformists and teachers were influenced by international manuals that stressed the role of nature study within a liberal education, and as shapers of worldviews and guardians of national character they sought to inculcate a broader view of the natural world, beyond the utilitarian.¹¹ Despite a strengthened utilitarian agenda within education after WWI, educationists opposed the teaching of agriculture in both primary and secondary schools at a conference in 1919.¹² Hogben's successor as the Director of Education from 1915-1921, William John Anderson, explained that teachers did not wish to be wedded to the term "agriculture" in schools, as they approached this subject as a "nature study trainer." He and the conference sub-committee on primary schools concluded that nature study was "not an exact science ... [but] a means of bringing children into sympathetic and harmonious relations with their environment and ... assisting the development of a higher nature by inculcating ideas of truth, love of the beautiful, kindness to animals" and by "stimulating intelligent thought."¹³ Likewise, a 1925 Government review of agricultural education recommended student instruction in scientific observation and the scientific method, but added that the key objective – to stimulate interest in plant and animal life – was not to be lost sight of. Supplementary instruction through extracurricular agricultural clubs was to be subordinate to the "general cultural aspects" of education.¹⁴

From Hogben's initial syllabus onwards, nature study was correlated with other subjects, including English literature and language, moral instruction, the manual arts, as well as senior science subjects such as geography, hygiene and health, elementary science, and agriculture. The 1914 syllabus, for example, explained that direct nature observation should be followed by stories, poems, songs, writing, and drawing or modelling exercises. This integrated approach was designed to encourage a unified view of the natural world, enhance emotional engagement, aid observation and reinforce learning.¹⁵

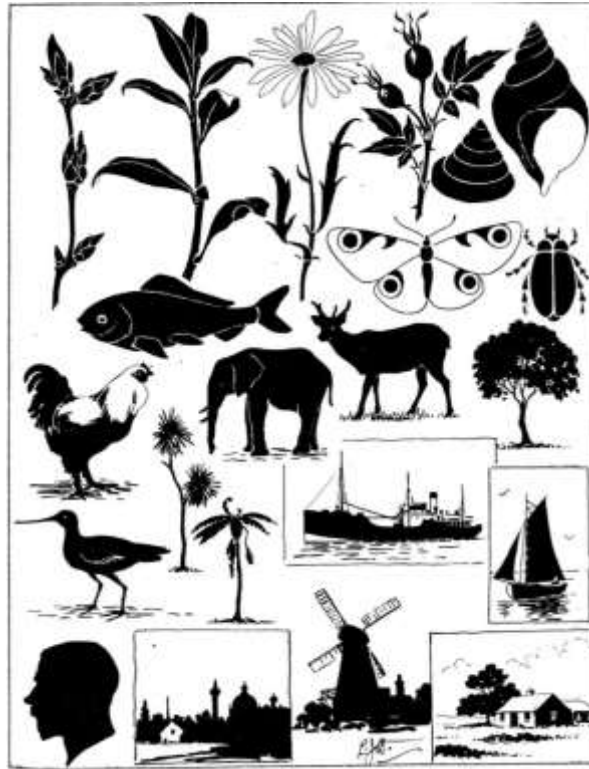


Fig. 1. Len J. Watkin of the Wellington Training College recommended natural subjects for drawing exercises in “Notes on the Teaching of Free Drawing,” *Education Gazette*, 2 August, 1926, 124-25.

While those in the predominantly female teaching pool were au fait with cultural approaches, most lacked specialist biology qualifications and the confidence to plan scientifically-orientated programmes to integrate nature study with senior level science classes. This lack of training continued to be noted by agriculture instructors, especially prior to WWII.¹⁶ The nature study syllabi prior to its 1948 revision were intentionally non-prescriptive, permitting flexibility to teacher enthusiasms, and to pupils’ daily lives and local environments. A focus on the latter meant that, while international literature provided useful discussion of general approaches and biology, local nature study manuals, teachers’ journals and naturalist newspaper columns were important resources.¹⁷

One early manual by Auckland school inspector E. K. Mulgan, *The New Zealand Nature Study Book* (1905), detailed the functional anatomy and “habits” (behaviour and general “character”) of familiar wild and domestic animals, including the frog, rabbit, native birds, and the cat, horse, cow, sheep, and pig. Mulgan wrote for both urban and rural children. Even those who lived on farms, he observed, knew little about their animals.¹⁸ Cantabrian M. E. Joyce’s *Suggestions for Nature Study in New Zealand Schools* (1925), which ran into several editions, detailed numerous animal projects, from glass-sided beehives or wormeries to farm excursions and school pet-keeping. Most teachers, Joyce claimed, understood that nature study involved the study of life histories through daily observation of animals or plants, the keeping of pictorial and written records, and “excursions to fields, bush, museums [and] zoological and botanical gardens.”¹⁹ However, Joyce noted that “Nature study in schools [whether due to practical difficulties or an evasion of “creeping things”] has been confined almost wholly to the study of plant life.” The “modern teacher,” she pleaded, must encourage an equal interest in the “zoological aspect.”²⁰

Mulgan's descriptions of familiar animals and many of Joyce's activities encouraged the continuation of nature study within pupils' home environments. Joyce's classroom suggestions were an attempt to remediate the impracticality of constant excursions and of large classes observing many birds and animals. Similarly, the 1948 nature study syllabus and associated guides, to which we shall return towards the end of this paper, encouraged nature study in the pupil's free time, in nature study-orientated agricultural clubs, and with the use of vivarium (reconstructed habitats) in classrooms where field work was impractical. The 1948 syllabus affirmed the study of different types of animals (familiar mammals, including farm animals, birds, insects and other small animals) within a compulsory "common core," and was extended into senior primary school classes until the biology (and animal) component was reduced within syllabus changes finalised between 1965 and 1967.²¹

Scientific Contexts: The New Natural History and New Biology

International and local proponents of nature study were informed by two anti-reductionist trends within professional biology that shaped unified perspectives on living things within public discourse and education. Firstly, as American science historian Lynn Nyhart has explained, from the late nineteenth century, the new natural history underpinned Western civic education in museums, zoos and schools. This reaffirmed "whole organism," field-based, naturalist approaches, refreshing the "old" natural history with emerging ecological ideas and placing greater emphasis on the scientific method. Secondly, from around the turn of the century influential Western biologists (including Bailey), promoted the new (or "general") biology within public media and as a subject within university and secondary schools. This was part of the evangelistic drive to articulate basic principles – evolutionary concepts about the "unity of life" and an appreciation of "man the animal." It also countered the narrow, reductionist perspectives of an increasing number of specialist fields, and was intended as a "rebranding" of sorts. Biologists were aware that the focus on dead specimens and dissection within school education was negatively affecting professional credibility and recruitment. General biology was offered in New Zealand universities from 1890, and was better supported in secondary schools, as is later touched on, following the secondary school curriculum review during WWII.²²

Evolutionary Ideas in Pre-WWII Nature Study

From their inception, New Zealand nature study programmes encouraged the comparison and contrast of animals and human animals and emphasised fundamental biological needs. This aided a sense of connectedness between human and non-human animals and the rest of the living world. Syllabi and texts recommended, for example, that children in the primers observe the cycles and rhythms of nature – the seasonal activities of animals, their "provision of food, clothing and shelter," and the principle of growth from a "baby seed" (commonly via comparisons of plants, chicken eggs, and tadpoles).²³ The 1914 syllabus specified that in junior standards, pupils should learn the "simpler facts of animal and plant life", as applicable to "Man, rabbit, sheep, cow, horse, pig, dog, cat ... blackbird ... crab ... bean ... [and] cabbage."²⁴ In senior science classes, teachers were encouraged to directly refer to general "principles" and "laws." Classroom plant experiments tested physiological principles such as energy conversion and waste, and the fundamental need for air, food, water, sun, warmth, space for growth, and rest.²⁵ This built on earlier nature study, including school gardening, which enabled practical observation of these "laws of health."²⁶ Thus, a graded, iterative, teaching process, referred to in interwar syllabi as "the spiral principle," encouraged pupils, year by year, to explore the same topics in increasing complexity. This was said to mirror children's biological "instinct" to investigate the "organic whole" (that is, plants and animals within their

environments and holistic perspectives on the organism itself), before progressing to more detailed views and generalizable knowledge.²⁷

Although the 1928 (and identical 1937) nature study syllabus advised that senior pupils learn “the principle of evolution,” and study the “great nature-lovers” of modern science, including Charles Darwin, the notion of evolutionary descent was inherent, without the necessity for explicit reference to theory.²⁸ Public objectors to the 1928 syllabus rightly noted that “the principle of evolution” was vague. Permitting flexibility in instruction was wise at this time as, although there had been no public resistance to muted evolutionary ideas in the syllabi and school texts up until this time, the American Scopes trial and eugenic sterilization debates were heightening concerns about socio-biology. Debate over the mechanism of evolution (natural selection), had also been only recently resolved within scientific circles.²⁹

Evolutionary Psychology

Nature study inculcated the general notion of shared physical needs (a plant-animal-human continuum), but it also developed awareness of fundamental psychology through observation of animal habits. Mulgan’s early text, for example, described the “gregarious” natures of sheep, and how a cow’s tail indicates anger or fear.³⁰ The common fowl was described as:

... a ground bird, [and] a social bird, preferring to live with a number of its own kind. It spends most of its time scratching up the ground in search of food.... Its feet are specially adapted [...] At night the bird roosts on a perch, which is firmly grasped by the toes. If not trained to go to the nest prepared for her, the hen lays in a nest of her own making in some sheltered spot. [...] When she has a brood of chickens, the hen is particularly fearless, being ready to defend them with great courage. She is able to call them with a particular clucking cry, the sound being capable of much variation. The chickens readily understand the meaning of the different sounds. A note of invitation when she has found some dainty morsel is quickly responded to.³¹

Such observation illustrated the inter-relationship between adapted physical form and function and psychological factors, including emotional experience, animal “families,” cognition, and “language.” Mulgan minimised overly-anthropomorphic interpretation and generally highlighted emotional experience rather than elaborating on cognitive intelligence or highlighting individual variation within species.

This measured acknowledgement of animal psychology was significant in this period of popular debate about animal consciousness and intelligence—a debate associated with the field of evolutionary (or “comparative”) psychology. This debate was ongoing but heightened from the late-nineteenth century up until WWI when Darwinian naturalist views on the evolution of mind clashed with reductionist perspectives. At the turn of the century “Morgan’s Law” underpinned the growing field of experimental behavioural psychology. Formulated by British psychologist Conwy Lloyd Morgan, this asserted that higher processes of cognition should not be inferred in animals if lower processes (such as reflexes, instincts, or trial-and-error learning), could account for behaviour.³²

However, from the turn of the century and into the 1940s, the Scottish naturalist and evolutionary biologist Sir John Arthur Thomson (1861-1933), a leader within the British nature study movement and a proponent of the new natural history and new biology, was well-known to New Zealand teachers. His *Study of Animal Life*, published between 1892 and 1917, was praised in 1909 by “Dinornis,” the nature study columnist for the weekly *Otago Witness*, and was one of several of Thomson’s texts recommended for teachers in the interwar syllabi.³³ *Study of Animal Life* refuted an over-emphasis on instincts, stating for example that only insects were truly instinctual and that larger-brained animals were more complex and learnt by experience.³⁴ In the 1930s, Thomson’s theory of “psychobiology,” which observed the promise

of consciousness in even simple animals, echoed contemporaries in this field. It was cited in the official journal of the New Zealand Educational Institute, *National Education*.³⁵

Unlike zoology texts that typically began with the amoeba, proceeding through evolutionary classification, the initial chapters of *Study of Animal Life* entitled “The Web of Life,” “The Struggle of Life,” “Social Life of Animals,” and “The Domestic Life of Animals” discussed animal communities, sociability, and emotional experience before entering into detailed morphology and theories of evolution and heredity. Mirroring this approach, New Zealand teachers encouraged springtime observation of families of farm animals from the primers. Studying nesting field birds, or broody hens and their chicks, was a popular activity. Joyce advised repeated visits to farms in spring to observe farm animal play, the “love of the mother,” and from Standard I more detailed observation such as the pitch of offspring cries.³⁶

Thomson’s early chapters, like most nature study material, also highlighted cooperation more than competition within nature. The term “struggle to survive” (the phrase of choice within New Zealand school syllabi before and after WWII) evoked a common struggle rather than the more violent, competitive, trope, “survival of the fittest.”³⁷ Thomson generalised these natural laws of sociability and “mutual aid,” concluding that “Man is the realisation of antecedent societies [...] As biologists and perhaps as philosophers, we are led to conclude that man is determined by that whole of which he is a part.” The “fittest” animals, Thomson argued, were the most social.³⁸

Popular debate about the animal mind gathered renewed momentum in the 1930s with refreshed discourse in animal ethology. Films, newspaper nature study columns and children’s pages at this time regularly highlighted stories of animal intelligence.³⁹ The British evolutionary ethologist Julian Huxley, known to teachers through WWI-era nature study texts and within public media between the 1920s and 1950s, railed against biologists’ over-emphasis on measureable behaviour and denial of animal emotion.⁴⁰ He also added a further warning to school educators in 1930:

It seems to me that there is, perhaps, more popular misapprehension on the subject of animal behaviour than on any other biological subject. You usually either find the idea that animals are a simple type of reflex machine, or more usually the idea that they are little human beings with just the same thoughts and emotions as ourselves, which they are, for some reason, unable to express. Both these attitudes are completely wrong, and lead into serious error.⁴¹

For New Zealand educationists, as elsewhere, the tightrope between empathetic identification and unhelpful anthropomorphism was always a difficult one to traverse. New Zealand’s interwar syllabi stressed that “over-sentimentality” and the implication of a “too human psychology” be avoided. Recommended nature study stories for juniors such as the *Ugly Duckling*, although replete with anthropomorphism, were defended and permitted on the basis of children’s “natural,” innate identification.⁴² However, alternative, reality-based stories were provided for older pupils. A story on “Doctoring a Sick Pig,” for example, suggested for Standard II English classes in *National Education* in 1935, included questions to encourage observation of animal pleasure (“What did the pig do when Philip scratched her back?”) and questions about unresponsiveness, implying illness.⁴³

Although the individual personalities of farmed animals were acknowledged in some nature study guides, animal behaviour was usually presented in terms of general species characteristics.⁴⁴ The American wildlife preservationist Ernest Seton Thomson’s story books, recommended in the 1928 syllabus, noted generally that in animals “we can find the virtues most admired in Man.” However, his anthropomorphic descriptions of wild animals were more directly challenging to hunters than to farmers. The boundaries were blurred though, as in *Lives of the Hunted* (1919), for example, where he ascribed personalities to mountain sheep. A

leading ewe, “the Wise One,” had “plenty of good sheep sense”; “Spikerdoe,” an “active ewe ... in her prime,” was “cool, sagacious [and] keen of eye, nose and ear,” while “Krag,” an unmated bachelor ram, was free to develop his powers “before being hampered and weakened by the responsibilities and mingled joys of a family.”⁴⁵

Aesthetics, Spirituality and Moral Kindness

The term “sympathy” in nature study referred to connection through aesthetic appreciation as well as moral empathy and an understanding of biological kinship. John Rennie’s *The Aims and Methods of Nature Study* (1911), a British text still listed in the recommended texts for teachers in the 1928 syllabus, advised that nature study balanced “knowing, feeling and doing, head, heart and hand” in order to encourage an “intelligent outlook” and an appreciation of the dynamic vitality of “growing, feeding, breathing, digesting, moving, feeling, [and] even struggling [living creatures],” and “a sympathetic recognition of her aesthetic aspects.” Likewise, C. Von Wyss’s nature study guide, recommended in the same syllabus and still in circulation in the 1950s, discussed the importance of nature study for developing a “happy and sympathetic relationship with plants and animals,” “the artistic emotions” and skills for “discerning beauty and fitness.”⁴⁶

The aesthetic appreciation of beautiful (human and non-human) animals in this era was endorsed by both religious romanticism and science. Pleasurable form and movement was believed to benefit the psyche, enhance a sense of connection, and reflect divinely-sanctioned natural laws of racial heredity and health. The rural women’s magazine, the *New Zealand Countrywoman*, in 1933 for example, cited biblical instruction to observe the animals of the field and sky as well as Thomson’s scientific view that observation of wild animals was pleasurable because their movement echoed human rhythms.⁴⁷ Aesthetics also applied to farmed animals. *Study of Animal Life*, for instance, observed that all healthy animals were “harmonious in form” and that “ugly animals are the products of ... human interference ... [and] excretions of civilisation.”⁴⁸ The cultivation of beautiful animals through responsible husbandry was a core value espoused by agricultural leaders, especially prior to WWII.⁴⁹

Nature study was seen, as one teacher in the *New Zealand Journal of Education* said in 1905, as a means of counteracting “the mischievous materialism of our age.”⁵⁰ This comment reflected public debate about positivist science and the negation of spiritual perspectives, including the essential vitalism or sanctity of God’s creations.⁵¹ In recent years, historians challenging narratives of secular nationalism have affirmed the significance of religious faith and values in New Zealand society, especially prior to the 1960s. This applied especially to female teachers because women were the predominant church-goers in this era.⁵² However, as Geoff Troughton noted, many men of this era also retained religious and moral values.⁵³ Even farmers expressed religious sentiment, or, more commonly beyond 1930, religiously-infused moral sentiment about living creatures.⁵⁴ At the turn of the century animal advocates within New Zealand’s scientific community still publicly mused about the animal soul, while scientists and religious leaders continued to attempt to reconcile evolutionary and religious perspectives.⁵⁵

From the turn of the century, humanitarianism in its broadest sense was considered a mark of both improved citizenry and improved science. The animal rights movement, stimulated by popular debates about animal intelligence in the late-nineteenth century, moderated scientific practice and public attitudes. In New Zealand, branches of the SPCA were established in the four main city centres by the 1880s. Leading farmers advocating new scientific methods from the turn of the century also coupled scientific advancement with humane methods.⁵⁶

Thus, in articulating the latest trends in nature study education in 1909, and drawing on the views of Thomson and his colleague Professor Patrick Geddes, Dinornis advised against

“barbaric” animal vivisection and other forms of “necrology” in classrooms. Young people, Dinornis asserted, should study living animals to appreciate “what is beautiful and wonderful in Nature” and develop the mental attitude of the artist prior to “industry or scientific specialism.”⁵⁷ Dinornis’s rival columnist, “Magister,” protested that dissection of insects should be permitted for students who were keen to study functional anatomy and become “nature students” rather than mere “nature-lovers.”⁵⁸

While the anti-vivisection debate challenged dissection within schools, from the 1920s onwards, public debate on this issue was predominantly focused on universities and medical schools,⁵⁹ and smaller animals such as insects continued to be used in nature study. Mulgan and Joyce’s pre-1930 nature study manuals encouraged the embalming of insects, spiders, butterflies, and moths for school “museums.” Joyce suggested—with the proviso that pupils be “warned against cruelty of any kind, intentional or otherwise”—that from Standard I-IV, children could learn how to preserve spiders in bottles of formalin solution or methylated spirits, how to catch and mount moths and butterflies, and how to kill and preserve beetles and large insects with boiling water and formalin, or as dry-mounted specimens. Such activities were absent from the post-WWII syllabus and manuals, although they continued within secondary schools.⁶⁰

Nature study and senior science subjects were correlated with moral instruction and character training which, throughout the pre-WWII period, specified “kindness to animals.” Hogben’s *Moral Instruction in Schools* (1908) proclaimed that teachers should emphasise this, along with humankind’s place in nature.⁶¹ This latter point (echoed in subsequent syllabi) was in part an indirect allusion to evolutionary ideas and human-animal kinship. But it also referred to the notion of human exceptionalism – that humans, as “higher” animals with a moral sense, had both rights and responsibilities to the natural world, including their “lower” animal kin.⁶² Throughout the decades, the *New Zealand School Journal* championed various adult role-models with animal-loving attitudes, from sympathetic military heroes demonstrating through animal care that “The wise and strong should seek/The welfare of the weak” to Saint Francis and his modern scientific equivalent, Doctor Doolittle.⁶³ Hogben also believed that “nature subjects” for older students, including physiology and zoology, could also indirectly teach responsibility for animals, and he urged Sunday Schools to continue the tradition of theological instruction through nature study to convey “the order and beauty of [God’s] universe and the interdependent [*sic*] of man and the lower forms of life.”⁶⁴ Sunday Schools were commonly attended up until the late 1960s, with songs reinforcing “good shepherd” empathy for “all things bright and beautiful.”⁶⁵

The phrase “kindness to animals” appeared in the explanatory appendices of the 1914-1923 syllabi.⁶⁶ But in the 1928 syllabus kindness to animals was highlighted, appearing fourth in a list of nine moral qualities for character training in standard classes. Mirroring Hogben, this syllabus emphasised the care of all living things, the “Divine Hand” guiding pupils’ spiritual, mental, and physical development, and that inculcating moral ideas was the most important aspect of a teacher’s work.⁶⁷ The syllabus reaffirmed the point that nature study’s objective to inspire a “love of art, science and religion,”⁶⁸ and many of its recommended nature study and elementary science texts for teachers interwove moral, religious, and evolutionary perspectives.⁶⁹ Thomson’s recommended texts in this syllabus combined Christian and evolutionary perspectives, appealing to sustained neo-vitalist ideas about the animal soul. He commented for example, that ducks, geese, pheasants and pigeons “love much and joyously” and that the bird’s “spirit is more full than in any other creature.”⁷⁰

Birds of all kinds were a popular subject in nature study, occupying an ambiguous, liminal space as animals, but not fully-so. As spiritual messengers and “Nature’s minstrels” in Māori and Western metaphysics, with their perch on a lower branch of the evolutionary tree than mammal-man or mammal-cow, they enabled less contentious commentary on the animal

mind and soul and protective, human stewardship.⁷¹ Bird poetry in particular, reflecting romantic, natural theology traditions, was especially popular during the 1930s.⁷² This trend coincided with the syllabus emphasis on moral kindness, but also with Depression-era concern about moral entropy, rural animal welfare concerns, and the refreshed naturalist ethology.⁷³

The Depression-era emphasis on moral kindness was also influenced by expanded SPCA education programmes in partnership with schools, especially in cities and towns.⁷⁴ As Swarbrick has explained, the SPCA commenced school initiatives from the 1880s and their essay competitions for primary and high schools became popular from the turn of the century. Joyce's interwar manual recommended SPCA classroom talks as a means of correlating nature study and civic instruction, and in the same period, from 1923, a national animal welfare week was marked in schools.⁷⁵ Resistance was faced in rural districts, particularly prior to WWI. In the dairy farming region of Taranaki, for example, the *Hawera and Normanby Star* reported in 1912 that when members of the local SPCA requested permission to address school classrooms they were required to limit their sessions to after-school hours.⁷⁶

However, the school agricultural club movement, which blossomed from the 1920s and again from the mid-1930s when they were actively encouraged by the Department of Education, explicitly aimed to foster "a love of animals." Competition days mirrored the display of well-cared-for animals in Agricultural and Pastoral shows.⁷⁷ As the *Northern Advocate* explained in 1924, healthy and well-behaved animals were a source of moral pride:

On these occasions we see horses and cattle that are a source of pride to their owners, and we cannot fail to realise that these animals repay the care and kindness bestowed upon them. Nor can we fail to be convinced that the members of the dumb creation have a special claim upon the sympathy and generosity of those who are of a higher order.⁷⁸

Although the integration of nature study with senior science subjects and club activities was designed to instil a holistic appreciation of farm animals that would promote humane (and economically sensible) animal husbandry, emotional sentiment was restrained through instruction in the objective assessment of animals. Senior pupils used score cards, for example, to learn the craft of selective breeding and overcome emotional bias.⁷⁹ The moral tension within school agricultural events did not go unnoticed. Critics prior to WWII who complained about overly-feminised religious morality being detrimental for boys were concerned about the conflicting messages of moral as opposed to vocational instruction.⁸⁰

While agricultural clubs encouraged a degree of emotional attachment to young farm animals, other school pets played an important role in teaching children about patience, kindness, disciplined duty and the basic needs of animals. The Victorian notion of pet-keeping preventing criminality and aiding children's transition into civilised adulthood was explicit prior to WWI and continued within public, church, and farming discourse. And, as Swarbrick has noted, the *School Journal* from its earliest years featured pet-keeping stories.⁸¹ However, within the classroom, teachers required easy-care options. Mulgan was in favour of classroom aquariums, and the humble goldfish was suggested in the 1923 syllabus. Children would learn, it said, about requirements for food, the physical effects of water and light, the inter-relationships of fish, plants, and snails, and the creation of an environment "for the fish to play about."⁸²

Joyce's manual recommended a range of school pets, including rabbits, canaries, doves, guinea pigs, hedgehogs, song birds, white mice, and opossums. It also detailed care instructions. Guinea pigs, for example, only needed "grass, lettuce, cabbage, carrots, rauraki, dandelion [...] a well strawed hutch, cleaned daily, and a dry run in a fairly warm spot." The opossum, by comparison, required a curtained bedroom, a large tree branch for climbing, "shoots of broadleaf, kamahi, broad-gum, mapau, rata blossoms, supplejack, fuchsia,

makomako berries [...] and anything sweet.”⁸³ Children were encouraged to give special attention to their pets’ comfort in cold weather in terms of bedding, food, and cleaning, and were urged to keep a record of appearance and habits. Instructions for specific projects reiterated that children should be kind and avoid frightening animals. With the suggestion for a Standard II “pet exhibit,” for example, Joyce reminded teachers to explain that cats and dogs would be unhappy at school, and when creating a school fish pond, children were to “try and make the inmates of the pond feel so little frightened that they will come to the edge of the pond quite readily.”⁸⁴ The term “inmates” had moral resonance, as many educators, animal rights advocates, and farmers championed the instinct for freedom, believing that confinement was unhealthy, physically and mentally, for any animal.⁸⁵

Rationalising Agriculture

As educationists were charged with enabling the child’s adaptive functioning, nature study reflected the integration of utilitarian, moral and biological ideas within wider society that rationalised the use and sacrifice of animals. It was not only theological and evolutionary concepts of human dominion and exceptionalism that justified animal use.⁸⁶ The utilitarian mindset, whereby human and non-human animals were valued according to their contribution to the greater [human] good, was popularly enmeshed with the evolutionary concept of living things functioning through the “division of labour” within the “economy of nature” in emerging turn-of-the-century ecological ideas about the natural world.⁸⁷ From 1919, the “humanized” nature study syllabus presented animals in relation to human biology and economic interests—the latter particularly from Standard IV onwards. This shift was in keeping with socio-biology trends in American biology education spurred by experimental biology, urban population concerns, and the intensification of agriculture.⁸⁸

Theories about animal sociability, interdependence, and cooperation within the economy of nature ennobled farmed animals as co-evolved companions of progressive farmers. Thomson explained that evolved animals possessed a sense of the social group and that this sense applied to farmed animals, who were considered sociable and tame (or, as Darwin phrased it, “civilised”) versions of their wild relatives.⁸⁹ The syllabi encouraged reflection upon animal “friends” (particularly industrious ones) from the primers and juniors where story books were important vectors for this analogy.⁹⁰ From the middle division, pupils categorised animals as either “friends” or “enemies” of man, and an awareness of the differences between wild and domestic animals was expected by the senior forms.⁹¹ Wild animals were a different “type,” it was argued, for they were generally hardier and more “cunning” than domestic species, and ill-suited to civilised captivity. Correlated lessons in English and Geography reinforced an association between co-existing (evolving) wild and primitive animal and human races.⁹²

The notion of “animal workers” supported arguments for ethical husbandry because the value of mutual aid and communal duty was inherent in the contract between “man and [working] beast.” Animal husbandry texts of the interwar period conveyed this ethos, correlating the rights of animal and human workers, which had long been argued by animal advocates. Exercises in animal care conveyed a process of mutual service. After detailing the care of hens and their chicks for Standard IV pupils, for example, Joyce recommended a lesson on “the egg, its food value, and the economic importance of chicken farming.”⁹³

Tension between the injunction for kindness to animals and the extermination of unhelpful “pests” was also moderated through evolutionary and ecological ideas about “friends,” “foes,” and the “struggle to survive.” Joyce suggested that from Standard III, pupils learn about the extermination of mice and rats as carriers of disease, and of the codlin moth (albeit without going into detail about orchardists’ treatment for this). Pupils could learn how to make fly traps for summer “swot the fly” campaigns. In Standard IV, lessons on the friends

and foes of the garden (bees, ladybirds, and the thrush, grey warbler, and wax eye versus aphids, green flies, grass-grubs, potato moth, caterpillar, and so on) were recommended.⁹⁴

Post-WWII syllabus

A key reason for the expansion of primary school nature study from 1948 was that biology as an integrated subject (as opposed to botany and zoology) had been introduced as a core subject within New Zealand’s post-primary schools. Nature study aligned with this, prioritising biological rather than physical science themes in the senior classes.⁹⁵ A Canterbury Science Teachers’ Association booklet circulated to 300 secondary schools in 1946 mirrored the agendas of earlier nature study advocates. Biology was seen as a means by which students could recognise their physical and psychological kinship with other animals. It conveyed fundamental lessons for human life, the health sciences, farming, and agricultural science, and, through refuting the “utterly utilitarian,” was “a potent civilising factor.” Likewise, nature study’s common core enabled sympathetic perspectives within fundamental ecological and evolutionary themes, although the latter was not explicitly stated, as historian Colin McGeorge detailed, due to anti-evolutionary sentiment at this time.⁹⁶

Common Core of Basic Nature Study
AT LEAST ONE TOPIC MUST BE SELECTED FROM EACH OF THE SECTIONS (a) TO (f)

Underlying Themes	Junior Division		Middle Division		Senior Division	
	Seasonal Change		Adaptation and the Struggle to Survive		Inter-relation and Interdependence	Man's attempt to control and modify nature
	Standard 1	Standard 2	Standard 3	Standard 4	Form I	Form II
(a) One of the smaller Plants	Daffodil Poppy Buttercup Mushroom	Pansy Nasturtium Daisy Bean	Pea or Sweetpea Dandelion Groundsel Strawberry	Primrose Dock Thistle Onion	Antirrhinum Clover Turnip Pumpkin	Gladiolus Grass or Cereal Turnip Fern or Fungus Potato
(b) A Tree or Shrub	An orchard tree	A deciduous tree	A climber or scrambler, e.g. ivy, blackberry, honeysuckle	A scrub plant e.g. goose, manuka, bracken An introduced shrub	A native tree or shrub e.g. kauri, tuihaka, kowhai, haka	An introduced tree An orchard tree
(c) A Mammal	Dog Mouse Sheep	Cat Pig Cow	Hedgehog Rabbit Hare	Goat Horse Opossum	Cow Hedgehog Ferret	Sheep Rat Weasel or Stoat
(d) A Bird	Powl House Sparrow Blackbird Canary	Duck Starling Thrush Budgerigar	Waxey Lark Hawk, Owl A Gull	Fantail Goldfinch Kingfisher A Wader	Tui or Bellbird Waxey Chaffinch Grey Warbler	Starling or Myna's Yellowhammer Hedge Sparrow Greenfinch
(e) An Insect	Butterfly Grasshopper Ladybird Beetle	Earwig Cricket Bumble bee Crane fly	Moth Ant Housefly Cicada	Mantis Caterpillar Stick insect Beetle or dragon fly	Beet White Butterfly Aphid Ladybird	Mosquito Cockroach Grass grub A potatoe weevil
(f) Another Small Animal	Frog Earthworm Orb-web spider	Snail Slug Nursery spider	Lizard Fish Hunting spider	Slater (Woodlice) Crab Frog	Fish Crayfish Orb-web spider	Earthworm Mollusc Famulet or sheet-web spider

Fig. 2. Revised Syllabus in Nature Study (1948), 5. Nature study’s core curriculum, based around unified evolutionary and ecological themes—“seasonal change” (and life cycles), “adaptation and the struggle to survive,” “inter-relation and interdependence,” and “man’s attempt to control and modify nature”—enforced the study of animals as well as plants, including familiar farm animals, from junior to senior classes.

Despite the post-war syllabus no longer incorporating a formal section on character training with the injunction for kindness to animals, or overt religious sentiment, the experienced teacher and nature study author William Martin, who published *New Zealand Nature Study* to coincide with the release of the new syllabus, continued to promote nature study’s role in character development. Citing Bailey, he reiterated the “civilising” role of nature study which aimed to preserve the “instinct” for, and aesthetic pleasure in, connectedness, and a “spirit of wonder,” “reverence,” and “love of nature.” He also prompted observation of farm animals’ “speech,” alarm responses, emotions such as happiness and anger and intelligence—

or an animal's lack of it. Martin provided no detail to elucidate intelligence, however, and, unsurprisingly given the nation's economic focus on farming exports at this time, devoted considerable space instead to farm animal breeds, encouraging attention to which sheep, for example, provided the best wool, biggest fleece, or the choicest mutton.⁹⁷

In the 1950s, Christchurch Teachers' College lecturer David Beggs' nature study handbook, commissioned to compliment the post-war syllabus, noted that "[i]t should hardly be necessary to say that living things should be treated with kindness and care." He reminded teachers that the sympathetic handling of animals was a sign of good teaching. Compared with Joyce's 1920s manual this emphasis was light, but it indicated, perhaps, a faith in teacher competence in this era of improved official support for professional development.⁹⁸ Beggs' section on mammals commenced with reference to humans, and he provided more details than did previous texts on animal behaviour in order to convey "a broad understanding of the animal as a basis for correct nurture." Children could observe, for example, herd hierarchies, "cow language," and "the mother's care for her calf and her distress at losing it" as a lesson in mammalian maternal instinct. However, although Beggs noted that the importance of the cows' products "should not ... overshadow her importance as a living creature," most physical and behavioural observations of farm animals clearly aided industry agendas.⁹⁹ This attention to animal psychology aligned with growing agricultural sector research in this field, and with a new wave of popular interest in socio-biology following WWII.¹⁰⁰

Rural agricultural instructors endorsed the new syllabus's strengthened emphasis on both plant and animal life and on general biology. However, instructors warned that crowded and busy post-WWII urban schools would struggle with implementing practical aspects.¹⁰¹ Reduced opportunities for field observation in urban schools and neighbourhoods limited children's appreciation of animal psychology in particular.¹⁰²

Conclusions and Implications

There were practical barriers to the direct study of animals in schools, and ideologically, the study of animal behaviour—especially that of farmed animals—was fraught. Teachers, charged with the transmission of cultural values about animals, were advised against "over-sentimentality" due to debates about anthropomorphic identification, the animal mind, and concerns about pupils' adjustment to vocational roles.

Despite these problems, in the decades prior to WWII moral instruction in kindness to animals and ideas about human-animal kinship were sustained within New Zealand nature study and correlated subjects. Elements of the syllabus supporting sympathetic perspectives included the focus on general biological ideas and principles, aesthetic appreciation, humane and spiritual values, and attention to animal habits that were taken to indicate sociability, emotional expression, and, to a lesser extent, intelligence. Kindness to animals was continually mentioned within the syllabus, although it was emphasised during Hogben's term of office prior to WWI and in the 1928 syllabus. Birds were a focus of vitalist sentiment, aiding classroom discussion of this and of psychological principles, while evading conflict around sentiment with farmed animals. Ecological and evolutionary ideas, entwined as they were with moral and religious perspectives, supported sympathetic approaches, but also helped rationalise the "contract" with working animals and the war on pests.

This study has also outlined broader scientific and social contexts supporting sympathetic approaches to animals within nature study. Nature study aligned with pro-naturalist trends in biology education, including vitalist and religious ideas, the promotion of ethical science and ethical husbandry, rising animal welfare and anti-vivisection movements, and ongoing debate in the field of comparative psychology. Although nature study was malleable to different perspectives, it can be understood as a site of resistance to purely utilitarian and mechanist viewpoints. This study highlights how New Zealand's syllabi were influenced by

internationally-known biologists such as Thomson and Huxley who catered to popular and school audiences and upheld holistic perspectives on animals and respect for the animal mind. It also provides an alternative platform from which to view secondary school agricultural science education. Scholars to date have framed this as being slow to develop, impeded by teachers' lack of interest and skills in agriculture and by a "generational resistance" to practical science. However, it is important to differentiate the scientific outlooks that were supported and opposed.¹⁰³

Through examining the reinvigoration of nature study in the post-WWII period, it is clear that continued support for this subject was not based entirely on nationalistic identification with native flora and fauna as Kohlstedt proposed. Significantly, the new syllabus enforced attention to larger animals, supporting economically-valued skills in basic animal husbandry and biological science. Responsible animal husbandry, including awareness of psychological functioning, was a sustained agenda, in keeping with agricultural science trends. However, reduced opportunities for direct observation of animals in daily life within expanding urban centres and schools presented challenges to this agenda.

Despite the post-WWII farming boom, a cultural legacy of pre-war nature study and naturalist perspectives was discernible during WWII and in the subsequent two decades. Experienced farmers and those on a dwindling number of family farms expressed concern about inadequate attention to fundamental animal husbandry, including "natural laws" of health and the humane treatment of animals.¹⁰⁴ Correspondingly, animal rights (and animal welfare) activism increased. As Swarbrick noted, as early as 1920 the SPCA observed a general improvement in the treatment of animals which they attributed to childhood education. From 1941-1961, SPCA branches became common in rural areas, and in 1960, Christchurch Labour MP and the first woman cabinet minister in New Zealand, Mabel Howard, led the Animals Protection Act through Parliament. The SPCA's first nationwide campaign in 1954 addressed the issue of battery-caged hens.¹⁰⁵ Mirroring the sense of kinship instilled in nature study education, opponents' views on this were often expressed in terms of fundamental psychological and physical needs. Industry leaders, for their part, also advocated cages on the basis of concerns about "bullying" and "cannibalism" within over-crowded barn and range systems.¹⁰⁶

Farming approaches have always been variable. Even today, empathetic husbandry is determined by farmer attitudes, as well as by practical factors such as technology and the number and turnover of animals.¹⁰⁷ However, it is fair to say that in the first half of the twentieth century, nature study played a significant role in inculcating an attitude of biological and psychological kinship. It aided a sense of connection and respect for ethical farming (however rationalised and paradoxical this concept). The same scientific ideas and ethical values that continued to be propounded within post-WWII nature study also supported impetus for animal welfare initiatives.

¹ Erik Olssen, "Towards a New Society," in *The Oxford History of New Zealand*, ed. Geoffrey Rice (Oxford: Oxford University Press, 1992), 276-77. Post-primary schooling in this era included secondary, district high and technical schools.

² Kirstie Ross, *Going Bush: New Zealanders and Nature in the Twentieth Century* (Auckland: Auckland University Press, 2008), 27-31. On Bailey, see Sally Kohlstedt, "Nature Study in North America and Australasia, 1890-1945: International Connections and Local Implementations," *Historical Records of Australian Science* 11, no. 3 (1997): 445; G. W. Rodwell, "The Country Life Movement and Educational Reform in the United States," in *Rural Education in Australia and New Zealand*, ed. R. C. Petersen and G. W. Rodwell (Casuarina, Australia: William Michael Press, 1993), 10.

³ Farming comprised over 70 percent of New Zealand's export earnings in the period from 1900-1940. See Howard Lee and Tom Brooking, "A Cautionary Tale: Rural Education in New Zealand, 1900-1940," in *Rural Education in Australia and New Zealand*, ed. Petersen and Rodwell, 51. On the development of scientific farming see Paul Star and Tom Brooking, "The Farmer, Science and the State in New Zealand," in *Seeds of Empire: The Environmental Transformation of New Zealand*, ed. Tom Brooking and Eric Pawson (London and New York: I.B. Tauris, 2011), 159-77.

⁴ Kohlstedt, "Nature Study in North America and Australasia," 439-54.

⁵ Ross, *Going Bush*, 26-46; Kohlstedt, *Teaching Children Science: Hands-On Nature Study in North America, 1890-1930* (Chicago: University of Chicago Press, 2010), 103-10, 137-39.

⁶ An early historical study was Carolyn J. Mincham's, *The Horse in New Zealand; Attitude & Heart* (Auckland: David Bateman, 2011). Cultural studies publications from the New Zealand Centre for Human Animal Studies include, for example, Annie Potts, Philip Armstrong, and Deidre Brown, *A New Zealand Book of Beasts: Animals in Our Culture, History and Everyday Life* (Auckland: Auckland University Press, 2013). My own earlier postgraduate studies have also addressed this theme. See for example Janine Cook, "Stock Portraiture. Bulbous Udders and Beefy Sides. A&P Livestock Photographs in the Otago Witness" (P.G.Dip. research essay, University of Otago, 2006).

⁷ James Beattie and John Stenhouse, "God and the Natural World in Nineteenth-Century New Zealand," in *Christianity, Modernity and Culture: New Perspectives in New Zealand History*, ed. J. Stenhouse and G. A. Wood (Adelaide: ATF Press, 2005), 180-203.

⁸ Nancy Swarbrick, *Creature Comforts: New Zealanders and their Pets: An Illustrated History* (Dunedin: Otago University Press, 2013), especially 107-49.

⁹ See for example, Angela Wanhalla, "Gender, Race and Colonial Identity: Women and Eugenics in New Zealand, 1918-1939" (M.A. thesis, University of Canterbury, 2001), 73-83; Katrina Ford, "The Tyranny of the Microbe: Microbial Mentalities in New Zealand, c.1880-1915" (PhD thesis, University of Auckland, 2013). For a more expansive discussion of biology and animal husbandry ideas, please refer to my thesis: Janine Cook, *Feathered Friends & Human Animals: General Biology and Comparative Description within the New Zealand Poultry Press c. 1900-1960* (PhD thesis, Victoria University of Wellington, 2015).

¹⁰ See for example, *Public Schools. Regulations for Inspection and Syllabus of Instruction* (Wellington: Govt. Printer, 1914), 13, 17, 40-41; *Notes on Nature Study and Elementary Agriculture* (Wellington: Wellington Education Board, 1911).

¹¹ For an example in an international manual, see John Rennie, *The Aims and Methods of Nature Study* (London: W. B. Clive, 1911), 2.

¹² See for example, "The Growing Spirit of Enquiry. Quickened by the Stress of War," *National Education (NEd)*, 15 March, 1919, 23.

¹³ "Death of Dr W. J. Anderson," *Evening Post (EP)*, 21 January 1931, 10; J. R. Cresswell to Director of Education, 22 August, 1919, Conferences – Congresses etc. – Conference on Agricultural Education 1919-1957, E2 390 4/10/3 (Archives NZ (ANZ), Wellington); "Agricultural Training," *NEd*, 1 July, 1919, 123.

¹⁴ "Agricultural Education in New Zealand," *Education Gazette*, 1 July, 1925, 106-108.

¹⁵ *Public Schools. Regulations for Inspection and Syllabus of Instruction* (1914), 40; New Zealand Education Department (NZED), *Public Schools: Organization, Examination, Inspection and Syllabus of Instruction With Appendices* (Wellington: Govt. Printer, 1923), 56.

¹⁶ "Aims and Methods of Nature Study in the Lower Standards and into the Higher Standards," in *Report of Proceedings at Conference of Agricultural Instructors, May 1937*, Conferences – Congresses etc. – Conference on Agricultural Education 1919-1957, E2 390 4/10/3 (ANZ, Wellington), n. p.; L. W. M. McCaskill's foreword in William Martin, *New Zealand Nature Study* (Christchurch: Whitcombe and Tombs, 1947), n. p.

¹⁷ *Public Schools. Regulations for Inspection and Syllabus of Instruction* (1914), 25; NZED, *Syllabus of Instruction for Public Schools* (Wellington: Govt. Printer, 1928), 41; Ross, *Going Bush*, 34-35.

¹⁸ E. K. Mulgan, *The New Zealand Nature-Study Book* (Christchurch: Whitcombe & Tombs Ltd., 1905), 245.

¹⁹ M. E. Joyce, *Suggestions for Nature Study in New Zealand Schools* (Nelson: R. W. Stiles & Co., 1925), 5-6; "Whitcombe and Tombs Ltd.," *Press*, 19 September, 1927, 1.

²⁰ Joyce, *Suggestions for Nature Study*, 6.

²¹ *Revised Syllabus in Nature Study* (Wellington: Dept. of Education, 1948), 3-6, 23, 27; *Report to CIPS on Science in Primary Schools* (Wallis House, October 1960), Primary Education – Syllabus – 1942-1963, BCDQ1050 A739 1698a (ANZ, Auckland); Martin, *New Zealand Nature Study*, 7; David Beggs, *Nature Study: A Handbook for Teachers* (Wellington: Dept. of Education, 1954), 9-31. The 1960 report cited here recommended less weighting be placed on biology and more emphasis on the physical sciences within elementary science in the senior classes. This informed the New Zealand General Science Revision Committee's *Draft Syllabus and Science Guide for Teachers* (Wellington: School Publications Branch, Dept. of Education, 1965) and *Primary School Syllabus. Science for Forms I and II* (Wellington: Dept. of Education, 1967). The latter taught evolution and had an ecological focus, but with no requirement to observe particular animals other than "terrestrial" and "aquatic." See 4-5.

²² Lynn K. Nyhart, "Natural History and the 'New' Biology," in *Cultures of Natural History*, ed. N. Jardine, J. A. Secord and E. C. Spary (Cambridge: Cambridge University Press, 1996), 426-43; Robert E. Kohler, *Landscapes & Labscapes: Exploring the Lab-Field Border in Biology* (Chicago: University of Chicago Press, 2002), 23-59; Lynn K. Nyhart, *Modern Nature: The Rise of the Biological Perspective in Germany* (Chicago: University of Chicago Press, 2009), 1-34; On general biology in universities, see for example, University of Otago, *Calendar for the Year* (Dunedin: The University, 1890), 70-71; Auckland University College, *Calendar* (Auckland: The College, 1905), 41. Biology as a subject was taught at some schools from 1934, but general science, including biology, and general biology as an optional subject, were included within the curriculum reforms of 1946. See Jacqui L. Bay, "Evolution of Senior Secondary School Biology Education in New Zealand: Impact of Changes in Biological Science from 1878 to 2008," *New Zealand Science Review* 66 no. 33 (2009): 119 and endnote 99.

²³ See for example, NZED, *Public Schools* (1923), 57-60; J. McK. Miller, "School Gardening and Nature Study," *NEd*, 1 September, 1930, 453.

²⁴ *Public Schools. Regulations for Inspection and Syllabus of Instruction* (1914), 46. See also, for example, NZED, *Syllabus of Instruction for Public Schools*, (1928), 174.

²⁵ See for example, NZED, *Syllabus of Instruction for Public Schools* (1928), 178; F. G. A. Stuckney, "Respiration and Carbon Assimilation in Plants," *Education Gazette*, 1 February, 1923, 6.

²⁶ Teachers were familiar with this popular concept, which was also reinforced within health education. See Barbara Brookes, "Hygiene, Health and Bodily Knowledge, 1880-1940: A New Zealand Case Study," *Journal of Family History* 28 (2003): 297-313; J. Renfrew White, *Growing Body: Its Nature, Needs and Training* (Dunedin: Coulls Somerville Wilkie, 1932).

²⁷ NZED, *Regulations for the Organization, Examination and Inspection of Public Schools* (1919), 22; NZED, *Public Schools* (1923), 94.

²⁸ NZED, *Syllabus of Instruction for Public Schools*, (1928), 173.

²⁹ Rev. P. B. Fraser, *Evolutionism and Ape-man-ism in Schools. New Syllabus Challenged* (Dunedin: Otago Daily Times Print, 1929); Colin McGeorge, "Evolution and the Primary School Cuniculum 1900-1950," *History of Education* 21, no. 2, (1992): 205-18; Tony Taylor, "Thomas Hunter and the Campaign Against Eugenics," *New Zealand Journal of History (NZJH)* 39, no. 2 (2005), 195-214; Staffan Müller-Wille and Hans-Jörg Rheinberger, *A Cultural History of Heredity* (Chicago and London: University of Chicago Press, 2012), 155-56.

³⁰ Mulgan, *The New Zealand Nature-Study Book*, 240, 244.

³¹ *Ibid*, 169-74.

³² On New Zealand public debate, see for example "Topics of the Day. Animals at School," *Press*, 9 May, 1904, 6; E. Kay Robinson, "Study of Domestic Animals," *Otago Witness (OW)*, 24 January, 1906, 76. On Morgan's law and behaviourism see C. L. Morgan, *An Introduction to Comparative Psychology*, 2nd ed. (London: W. Scott, 1903) and Daniel Philip Todes, *Pavlov's Physiology Factory* (Baltimore: John Hopkins University Press, 2002). The reductionist focus to biology generally from 1890-1915 is noted in Garland Allen, *Life Science in the Twentieth Century* (Cambridge: Cambridge University Press, 1978), xiv-xxii, 8-9.

³³ E. W. Jenkins and B. J. Swinnerton, "The School Nature Study Union, 1903-94," *History of Education* 25, no. 2 (1996), 182; J. Arthur Thomson, *The Study of Animal Life* (London: John Murray,

1917). Ross, *Going Bush*, 34; "Biologist's Death," *New Zealand Herald (NZH)*, 14 February, 1933, 9; "When a Month was a Day," *EP*, 8 April, 1922, 16; "Y.M.C.A. Notes," *Hutt News*, 11 March, 1942, 5; Dinornis [pseud.], "Nature Study: Right and Wrong," *Otago Witness (OW)*, 5 May, 1909, 9. The 1928 syllabus's recommended texts for teachers included four of Thomson's books, and he wrote the introduction in another. See NZED, *Syllabus of Instruction for Public Schools* (1928), 220; John Rennie, *The Aims and Methods of Nature Study*. (London: W.B. Clive, 1911), xi-xvi. Thomson was also cited in post-WWII publications. See for example, Martin, *New Zealand Nature Study*, 7.

³⁴ Thomson, *The Study of Animal Life*, 170-71.

³⁵ F. G. A. Stuckney, "The Spirit of the New Syllabus," *NEd*, 1 May, 1929, 153; Sir J. Arthur Thomson and Patrick Geddes, *Life: Outlines of General Biology Vol. 1* (London: Williams & Norgate Ltd, 1931), 406-08; Margaret Floy Washburn, *The Animal Mind: A Textbook of Comparative Psychology* (New York: MacMillan Co., 1923), 38-52.

³⁶ "Poultry as a School Subject," *New Zealand Poultry Journal (NZPJ)*, 20 July, 1914, 32; Joyce, *Suggestions for Nature Study*, 19, 34; J. McK. Miller, *School Gardening and Nature Study*, 453; "School Poultry Clubs," *New Zealand Poultry World (NZPW)* 5, no. 12, (1942): 12.

³⁷ Thomson, *The Study of Animal Life*: vii-xi.

³⁸ *Ibid*, 99.

³⁹ See for example, "The Cow Wins for 'Horse Sense,'" *The Auckland Star Weekend Pictorial*, 31 December, 1937, 14; Amusements, *Auckland Star (AS)*, 29 August, 1935, 28; "Youth's Leisure Hour. Animals' Clever Ways," *NZH*, 4 April, 1936, 9; "The Sign of the Hand and Paw," *The Press Ship*, 14 August, 1937, 3.

⁴⁰ Thomson, *The Study of Animal Life*: 111; "Politeness in Flies," *Ellesmere Guardian*, 5 June, 1925, 5; "Books Received," *AS*, 15 November, 1930, 2; "Film on Nutrition," *NZH*, 11 November, 1937, 19; J. Harris, "Popular Science," *National Education*, XXII, no. 232 (1 March, 1940): 64; Julian Huxley, *Essays of a Biologist* (London: Chatto & Windus, 1923), 107.

⁴¹ Huxley in an address to Britain's School Nature Union, 1930, cited in Frances Pitt, *The Intelligence of Animals* (London: George Allen & Unwin Ltd., 1931), 5.

⁴² NZED, *Syllabus of Instruction for Public Schools* (1928), 164-68; "The Study of Poetry in Primary and District High Schools," *Education Gazette*, 1 August, 1922, 84; A. G. L. Cork's address in *Report of Proceedings at Conference of Agricultural Instructors, May 1937*, n. p.

⁴³ F. W. Moore, "Suggestions on English," *Supplement to NEd*, 1 November, 1935, 1-2.

⁴⁴ As in Mulgan's text. See chapters on farmed animals and individual variation noted in Edmund Sanders' *Beast Book for the Pocket: The Vertebrates of Britain, Wild and Domestic Other than Birds and Fishes* (London: Oxford University Press, 1937), 4. This was recommended in David Beggs, *Nature Study*, 257; "Film and Book References," 20 March, 1961, General Admin Files – Primary Schools – Revision 1928-1965, ABDM W3569 282 15/21/1.

⁴⁵ Ernest Seton Thomson, *Lives of the Hunted* (London: Hodder & Stoughton, 1919), 30-59; NZED, *Syllabus of Instruction for Public Schools*, (1928), 219.

⁴⁶ John Rennie, *The Aims and Methods of Nature Study* (London: W. B. Clive, 1911), xi-2; C. Von Wyss, *The Teaching of Nature Study* (London: Adam & Charles Black, 1951), 7; NZED, *Syllabus of Instruction for Public Schools*, (1928), 218-19.

⁴⁷ Nadia Gush, "Beauty of Health: Cora Wilding and the Sunlight League" (M.A. thesis, University of Canterbury, 2003), 28-43; "The Place of Beauty," *New Zealand Countrywoman (NZCW)*, 20 May, 1933, III.

⁴⁸ Thomson, *The Study of Animal Life*, 16.

⁴⁹ See for example, Sundowner [pseud.], "The Farmer's Stewardship," *AS*, 22 February, 1928, 21; and see Bert Theunissen, "Breeding without Mendelism: Theory and Practice of Dairy Cattle Breeding in the Netherlands 1900-1950," *Journal of the History of Biology (JHistBio)* 41, no. 4 (2008): 676. Emphasis on beauty declined due to mass production and progeny testing in post-WWII genetic programmes. See C. J. Goldsmith, "Developing Trends in Specialisation in the Poultry Industry," *NZPW* 17, no. 9 (1954): 318-19; Ernest Nielsen, Experiments in Poultry-Breeding, *New Zealand Journal of Science and Technology*, February 1945, 271-81.

⁵⁰ "The New Syllabus - Its History and Working," *New Zealand Journal of Education* VII, no. 73 (1905): 154.

⁵¹ Scientific theory on the origins of life and the nature of consciousness (in human and non-human animals), and, related to the attack on spiritual worldviews, utilitarian and materialistic attitudes, were of concern. See for example, "The Decay of Materialism," *Taranaki Daily News*, 16 November, 1904, 4; "The Soul of Progress," *OW*, 10 April, 1907, 80.

⁵² See for example, Stenhouse, "God's Own Silence: Secular Nationalism, Christianity and the Writing of New Zealand History," *NZJH* 38 (2004): 56-57.

⁵³ Geoffrey Troughton, "Religion, Churches and Childhood in New Zealand, c.1900-1940," *NZJH* 40, no. 1 (2006): 51.

⁵⁴ For example, Sundowner [pseud.], "The Farmer's Stewardship," 21; The Wanderer [pseud.], "Beauty and Utility," *NZPW* 4, no. 3 (1941): 6. See also Cook, *Feathered Friends & Human Animals*, 294-95.

⁵⁵ William Carlile, "Animal Intelligence," *Transactions and Proceedings of the Royal Society of NZ (TPRSNZ)* 24 (1891): 349-54; Charles W. Purnell, "The Animal Mind as a Factor in Organic Evolution," *TPRSNZ* 32 (1899): 243-52; John Stenhouse, "Darwinism in New Zealand, 1859 -1900," in *Disseminating Darwinism: The Role of Place, Race, Religion, and Gender*, ed. Ronald Numbers and John Stenhouse (Cambridge: Cambridge University Press, 1999), 63-89. See also, for example, "The Science Congress," *OW*, 15 January, 1902, 50; "The New Theology," *OW*, 23 January, 1907, 19.

⁵⁶ See for example, "Poultry Yard," *Auckland Weekly News*, 13 November, 1902, 44; Stewart Richards, "Conan Doyle's 'Challenger' Unchampioned: William Rutherford, F.R.S. (1839-99), and the Origins of Practical Physiology in Britain," *Notes and Records of the Royal Society of London* 40, no. 2 (1986): 199-205. On the SPCA and legislation see Swarbrick, *Creature Comforts*, 107-17.

⁵⁷ Dinornis [pseud.], "Nature Study: Right and Wrong," 86; Dinornis, "'Alpha' and Nature Study," *OW*, 16 June, 1909, 86.

⁵⁸ Magister [pseud.], "Our Public Schools Column," *ODT*, 27 May, 1909, 4.

⁵⁹ "Natural History Study," *EP*, 30 September, 1922, 12; "Humanitarian and Anti-vivisection Society," *Press*, 19 November, 1929, 15; "Education in Schools," *Press*, 21 May, 1934, 8; "Alleged Vivisection," *EP*, 26 June, 1944, 4; Swarbrick, *Creature Comforts*, 224-26.

⁶⁰ Mulgan, *The New Zealand Nature-Study Book*, vi; Joyce, *Suggestions for Nature Study*, 19, 30-31, 36. On secondary school dissection, see for example, The Director of Education to Mr E. H. W. Rowntree, 22 August, 1949, Secondary Education – Courses of Instruction – Science, 1928-1960, ABEP W4262 7749 Box 2070 34/2/4 Pt.1 (ANZ, Wellington).

⁶¹ George. H. Hogben, "Moral Instruction and Training in the Schools of New Zealand," in *Moral Instruction and Training in the Schools: Report of an International Inquiry*, ed. M. E. Sadler (London: Longmans, Green & Co., 1908), 2-3; "Moral Education. Schools of the World. A British Empire Commission," *OW*, 4 November, 1908, 18; NZED, *Syllabus of Instruction for Public Schools* (1928), 42.

⁶² On humankind's "place" in nature, see NZED, *Syllabus of Instruction for Public Schools* (1928), 41; Professor Edward Percival, Presidential Address – June 14, 1946, "Biology as a School Subject" (Canterbury Science Teachers' Association), Secondary Education – Courses of Instruction – Science, 1928-1960, ABEP W4262 7749 Box 2070 34/2/4 Pt 1 (ANZ, Wellington). On human exceptionalism, see Barbara Noske, *Beyond Boundaries: Humans and Animals* (Montreal: Black Rose Books 1997), 68-79.

⁶³ "General Custer and the Bird's Nest," *New Zealand School Journal (NZSJ)* III, no. 8, (1909): 126; "Saint Francis and the Birds," *NZSJ* XXXIII, no. 6, (1939): 80-84; "Doctor Doolittle," *NZSJ* XXXIII, no. 9, (1939): 135-38.

⁶⁴ M. E. Sadler, *Moral Instruction in Schools: Report of an International Inquiry*, vol. II (London: Longmans, Green & Co., 1910), 313; "Teaching the Young. Methods of Sunday School Work. Lecture by Mr. G. Hogben," *EP*, 11 February 1908, 3.

⁶⁵ John Stenhouse, "God's Own Silence," 57; For example, the Dunedin Public Library holds Carey Bonner, *Child Songs. Volume II: For the Primary and Junior Departments of the Sunday School and Day School and for Home Singing* (London: Pilgrim Press, 1914). Songs include "Behold the Birds of the Air" and "Insects and Animals." The nineteenth-century hymn "All Things Bright and Beautiful" gained popularity from the 1920s. See David Cook, *Children Sing: Christian Songs for Boys and*

- Girls (Elgin, 1962); Hymnary.org, accessed 10 January 2016, http://www.hymnary.org/text/each_little_flower_that_opens; This hymn was also recited in schools. See *The Study of Poetry in Primary and District High Schools*, 85.
- ⁶⁶ *Public Schools. Regulations for Inspection and Syllabus of Instruction* (1914), 28; *Regulations for the Organization, Examination and Inspection of Public Schools and the Syllabus of Instruction with Appendices* (Wellington, Govt. Printer, 1919), 25; NZED, *Public Schools* (1923), 60.
- ⁶⁷ NZED, *Syllabus of Instruction for Public Schools* (1937), 6-7, 65-66.
- ⁶⁸ *Ibid*, 166.
- ⁶⁹ See for example, Hugh Robert Mill, *The Realm of Nature: An Outline of Physiography*, 2nd ed. (London: John Murray, 1913); Benjamin Moore, *The Origin and Nature of Life*, Home University Library of Modern Knowledge (London: Williams & Norgate, 1913).
- ⁷⁰ Thomson, *The Study of Animal Life*: 287-89; On Thomson's views, see also David Kahan, "Authors: John Arthur Thomson " Gifford Lectures. Over 100 Years of Renowned Lectures on Natural Theology, accessed 30 July 2013, <http://www.giffordlectures.org/Author.asp?AuthorID=166>
- ⁷¹ Martin, *New Zealand Nature Study*, 157; Murdoch Riley, *Māori Bird Lore*, (Viking Sevensseas NZ Ltd., 2001); See Romantic, natural theology references to birds in *NEd* XII, no. 128 (1 September, 1930): 435.
- ⁷² See for example, "The Robin's Grave," *NZSJ* XII, no. 128, (1930): 435.
- ⁷³ Tom Brooking and Eric Pawson, *Seeds of Empire: The Environmental Transformation of New Zealand* (London and New York: I.B. Tauris, 2011), 179. See also for example, Orpington [pseud.], "Poultry Keeping. Mass Production," *AS*, 13 September, 1935, 14; "Be Kind to All Dumb Creatures," *NZCW*, 18 December, 1933, 7.
- ⁷⁴ Swarbrick, *Creature Comforts*, 139.
- ⁷⁵ Joyce, "Suggested Correlation Sheet for Primers," in *Suggestions for Nature Study*, n. p.; "Animals' Welfare Week," *AS*, 5 December, 1923, 4; and see for example, "Passing Notes," *Education Gazette*, 1 July, 1926, 1.
- ⁷⁶ Swarbrick, *Creature Comforts*, 119-22; "Local and General," *Hawera & Normanby Star*, 25 October, 1912, 4. See also for example, "S. P. C. A.," *Feilding Star*, 27 February, 1914, 2; "Regard for Animals," *Timaru Herald*, 1 May, 1917, 9; "S. P. C. A.," *Sun*, 17 April, 1918, 8.
- ⁷⁷ R. L. McNabb, "An Investigation into the Development and Value of the School Club Movement in Taranaki Primary Schools, with Special Reference to the School Agricultural Club" (Victoria University College, 1943), 29; Swarbrick, *Creature Comforts*, 133-46.
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- ⁸⁰ Troughton, "Religion, Churches and Childhood," 51.
- ⁸¹ See for example, Julia C. Flewellyn, "What Women Can Do. Work that is a Pleasure and Not a Task. An Excellent Employment for the Home-Loving Woman," *NZPJ*, 20 May, 1907, 10 [**needs a source, an issue number and date, also author's first name**]; Editor, "To the Children," *Waiapu Church Gazette*, 1 November, 1927, 15; John Woodward, "A Corner for Youngsters," *New Zealand Poultry World* 1, no. 11 (1938): 13; Dorothee Brantz, "The Domestication of Empire: Human-Animal Relations at the Intersection of Civilization, Evolution, and Acclimitization in the Nineteenth Century," in *A Cultural History of Animals in the Age of Empire*, ed. Kathleen Kete (New York: Berg, 2007), 73-93; Swarbrick, *Creature Comforts*, 124.
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- ⁸⁴ *Ibid*, 26, 29.
- ⁸⁵ See for example, "Liberty and Captivity" *OW*, 26 June, 1905, 40; "Artificial Children," *Free Lance*, 18 August, 1906, 6; "Industrial Bulletin," Massachusetts, cited in "Chicken Factories," *AS*, 5 June, 1931, 14.

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- ⁸⁹ Thomson, *The Study of Animal Life*: 18-29, 97-99.
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