

Feature

ONE HEALTH



One health, many histories

In another of *Veterinary Record's* series of articles on One Health, Abigail Woods and Michael Bresalier discuss the complex history of veterinary-medical collaboration and highlight the social, political and institutional factors that have contributed towards shaping the One Health model

DOES One Health have a history? If, as claimed by Paul Gibbs in an earlier article in this series (Gibbs 2014a), its adoption marks a paradigm shift in approaches to health, then how can something so novel have a past? Alternatively, for One Health sceptics who argue that advancing human health has always lain at the heart of veterinary endeavour, One Health history is simply veterinary history; there is nothing distinctive about it. However, if One Health is viewed as simply the latest in a series of integrated, collaborative approaches to health, then it certainly has a history.

Aspects of these earlier approaches feature frequently in scientific publications and websites on One Health (for example,

'For One Health sceptics who argue that advancing human health has always lain at the heart of veterinary endeavour, One Health history is simply veterinary history: there is nothing distinctive about it'

Schwabe 1984, Kahn and others 2007, Cardiff and others 2008, King and others 2008, Zinsstag and others 2011, CDC 2014), and in a recent stream of correspondence to the *Veterinary Record* (December 14, 2013, vol 173, p 587; March 1, 2014, vol 174, p 227; March 15, 2014, vol 174, p 283; April 19, 2014, vol 174, p 411). Authors

Abigail Woods, MA, MSc, VetMB, PhD, MRCVS,
Michael Bresalier, BA, MES, PhD,
Department of History, King's College London, Strand,
London WC2R 2LS, UK
e-mail: abigail.woods@kcl.ac.uk

Photograph: Wellcome Images



The London Veterinary College circa 1800. Teaching at the college, which was located on the present-day site of the Royal Veterinary College's Camden campus, was subject to strong medical influence for several decades after its foundation in 1791

recount the names of past individuals, institutions, discoveries and campaigns that contributed to its development. However, it is important to recognise that the inclusion of this historical material derives more from a concern with the present than the desire to understand the past. Asserting the longevity of One Health, or highlighting famous individuals who supposedly pursued it, is one way of establishing its legitimacy. Moreover, as institutions, individuals and funding bodies line up to pledge their support for One Health and to jostle over its exact definition, versions of its past can prove useful in gaining personal, professional and institutional leverage over its future.

Consequently, in scientific contexts, much of what currently passes for One Health history is actually One Health politics. Confined to an unrepresentative sample of historically unconnected developments, which are presented, in linear fashion, as leading up to One Health today, it overlooks key questions surrounding the contexts and motivations for engaging in collaborative, integrated approaches to health.

This article is predicated on the belief that history, like veterinary medicine, should

be unbiased and evidence-based, and that this approach is vital if we are to learn from, rather than simply manipulate, the past. It presents a brief selection of findings from an ongoing research project that will result in a series of book-length accounts of One Health history. Three brief episodes have been selected to shed light on some of the connections that have emerged around human and animal health, and to account for the development of a self-conscious 'One Medicine' campaign to promote them.

The early veterinary profession

The creation of veterinary schools across Europe in the late 18th and early 19th centuries is often portrayed as a definite break with the past, in which a newly enlightened approach to animal healing superseded the ignorance and cruelty of earlier generations (Schwabe 1992, Wilkinson 1992). However, there is mounting evidence of continuity, particularly in the activities of medical doctors, whose interest in animal bodies and

'Long before the veterinary profession was founded, doctors studied comparative anatomy and conducted experiments and surgical procedures on live animals'

diseases pre-dated the veterinary profession, shaped its development, and persisted in spite of it.

Long before the veterinary profession was founded, doctors studied comparative anatomy and conducted experiments and surgical procedures on live animals (Chaplin 2009). Their advice was sought frequently during 18th century European epizootics of cattle plague (Wilkinson 1992). From

around 1740, they contributed to a newly medicalised literature on equine healthcare, offered lectures on horse anatomy, and established infirmaries for horse treatment and the training of pupils (MacKay, M., personal communication).

The London Veterinary College, created in 1791, bore many similarities to these earlier infirmaries, and it was partly created, and largely run, by doctors already committed to the study of animals (MacKay, M., personal communication). Several prominent teachers in the London medical schools sat on the college's organising committee. When the first college principal, Charles Vial de Saint Bel, died unexpectedly in 1793, they followed the example of surgeon, John Hunter, in opening their

'Doctors did not just study and investigate animal diseases, they also participated in veterinary practice'

lectures freely to veterinary students (RVC 1793). This arrangement was replicated later in Edinburgh, and meant that, like their medical contemporaries, veterinary students could supplement their clinical training with a choice of other lectures (Anon 1840, Lawrence 1988). Medical lecturers also led the examination of veterinary students until the creation of the Royal College of Veterinary Surgeons in 1844, and continued to participate thereafter (Pugh 1962).

Saint Bel's successor, who remained in post until 1839, was the surgeon Edward Coleman. He had studied under John Hunter, conducted animal experiments on drowning and investigated the comparative anatomy of the eye (Coleman 1791). His credentials as a 'man of science' were important in winning public support for the college and army commissions for its students (RVC 1795, Pugh 1962). A veterinary qualification proved attractive to surgeons; 130 had received their diplomas by 1830. Medical students could also attend short courses on diseases of the horse delivered by Coleman at Guys and St Thomas's hospitals (South 1817, Anon 1830).

Medical interest, influence, and participation in veterinary education were equally evident in Edinburgh. In 1816, the town council moved to create a new university chair in comparative anatomy, veterinary physic and surgery, for comparative anatomist, John Barclay (MD). When the university resisted, Barclay worked to develop extramural courses in veterinary surgery, delivered by William Dick, a farrier, who had attended his comparative anatomy lectures. In 1823, Dick was appointed, at Barclay's recommendation, to lecture on behalf of

the Highland and Agricultural Society (HAS). Students included medical men, farriers, smiths and agriculturalists. Following the general trend to establish private medical schools, Dick then created a private veterinary school in Clyde Street (Gardiner 2009, Macdonald and Warwick 2012).

From 1830, under the auspices of the new London University, vet William Youatt offered a course on the anatomy and diseases of domestic animals which was attended by doctors as well as vets. His lectures were published in full in *The Lancet*, which also reviewed veterinary texts, aired disputes on how to shoe horses, and participated in veterinary politics (Youatt 1831). As the medical superintendent to London zoo, Youatt conducted postmortem examinations on animals, which were attended by members of the London Zoological Society, many of them doctors (Youatt 1836-40).

Doctors did not just study and investigate animal diseases, they also participated in veterinary practice. Youatt complained that they interfered with the cases in his veterinary infirmary, and that many conducted veterinary practices on their own account (Anon 1835). There were also reports of vets providing clinical services to humans. Lancashire was supposedly notorious for its 'bone-setters or veterinary surgeons' (GM 1844), while in Scotland, surgeons were said to compete with vets for human patients (Anon 1850).

There were additional linkages in the study of animal diseases that appeared transmissible to people. Youatt's 1830 book

'Lancashire was supposedly notorious for its 'bone-setters or veterinary surgeons', while in Scotland, surgeons were said to compete with vets for human patients'

on rabies, which identified the dog bite as a key means of spread, stimulated much medical discussion (Youatt 1830, Pemberton and Worboys 2007). In 1833, he was invited by Dr John Elliotson to attend a human postmortem examination at St Thomas's hospital. This examination, and Youatt's collection and inoculation of samples into an ass, revealed that the patient had died of glanders (Anon 1833). During the cholera epidemic of 1831-1832, suspected cases of the disease in animals were frequently



Photograph: Wellcome Images

Portrait of William Youatt, a leading veterinary surgeon of the 1820s and 1830s. His activities in veterinary education, practice and research repeatedly intersected with those of doctors

investigated by doctors, while William Dick examined a human case for comparison with his animal patients (Anon 1831, Dick 1832).

Space limitations preclude further examples and the examination of contexts beyond Britain. However, the above evidence begins to illustrate the sheer extent of the crossovers and interactions between medical and veterinary fields in the first few decades of the 19th century. It shows that the establishment of barriers between human and animal health did not follow immediately or inevitably upon the veterinary profession's creation. In fact, the new veterinary sphere offered additional opportunities for the expression of pre-existing medical interests in animals and their diseases.

Zoonotic diseases

Zoonotic diseases, and the scientists who elucidated them, feature in all histories of One Health. Supposedly it was here that key connections between human and animal health were forged, and the two professions brought into closer alignment. Although, as noted above, some zoonotic diseases were recognised in the early decades of the 19th century, the adoption of germ theory, and experimental bacteriological practices that relied heavily on animals, led to the reconceptualisation and expansion of this category during the 1870s and 1880s. Previously unconnected diseases were shown to have the same causal agents in people and animals, leading to efforts to elucidate

Feature

and block their pathways of transmission (Wilkinson 1992, Hardy 2003).

While these developments were significant, it is important to note that the connections that 19th century investigators drew between human and animal diseases were by no means confined to zoonoses. In focusing on them, existing histories overlook the richness and significance of wider disease links. Also, while zoonotic diseases did indeed become a shared concern of late 19th century doctors and vets, efforts to understand and manage them actually undermined existing collaborative relationships between the professions.

Scanning through the 19th century medical press, it becomes apparent that in Britain at least, doctors had many reasons for studying animal diseases in addition to zoonotic spread. Believing, for much of the century, that epidemics were caused by changes in the atmosphere, they studied them in both humans and animals in the hope of explaining these environmental factors. The desire to categorise diseases and to understand basic pathological processes, such as inflammation, led them to study animal diseases that seemed analogous to human diseases. Smallpox, cowpox, sheep pox and 'grease' in horses attracted considerable attention. Animals were also useful for disease experiments. In addition, they were studied in relation to people in order to work out how differences in body structure, function and habits affected the expression of disease (Richardson 1863, Budd 1863, Crisp 1871, Lindsay 1874, Klein 1876).

Although based on ideas of disease that have no present-day parallel, these investigations – which largely pre-dated the

formation of modern research institutions – are important to the history of One Health because they marked a high point in veterinary-medical collaborations. In their search for general laws, doctors relied heavily on vets for insights into the health and disease of particular animal species. They especially valued clinical observations that derived from experiences of animal disease in veterinary practice. Vets were also important suppliers of diseased and dead animal bodies for medical investigations. These collaborations developed at grass roots level and were largely problem-driven. Unrestrained by institutional barriers and

'Public health doctors took charge of the sanitary aspects of animal keeping in order to preserve neighbours from "nuisance" and consumers from dirty milk and rotten meat'

established ways of working, they pre-dated self-conscious efforts to promote integrated approaches to health (Anon 1846-1880).

The growing prominence of zoonotic diseases in the later 19th century disrupted this productive, informal division of labour. The problem was partly institutional. From the mid-19th century onwards, the British state assumed increasing responsibility for promoting the health of humans and animals. First doctors, then vets were employed for this purpose, but they were located in separate structures in local and central government. The veterinary role was to promote trade and agriculture by controlling contagious animal diseases.

Public health doctors took charge of the sanitary aspects of animal keeping in order to preserve neighbours from 'nuisance' and consumers from dirty milk and rotten meat. Zoonotic diseases cut across these spheres, raising questions of who was responsible for dealing with them (Anon 1965, Waddington 2004).

Disputes also arose over questions of animal health expertise. As noted above, doctors had grown to depend on veterinary clinical insights. However, during the 1880s, public health investigators traced a series of diphtheria and scarlet fever outbreaks to milk from cows that vets insisted were healthy (Medical Officer of the Local Government Board 1885, 1886). In the ensuing controversy, vets disputed the claims of public health doctors and the underpinning bacteriological evidence (Brown 1888). Doctors, in turn, queried vets' clinical abilities, pointed out their commercial interest in protecting farming clients, and implied that they were incapable of conducting and understanding the results of scientific experiments (Anon 1886).

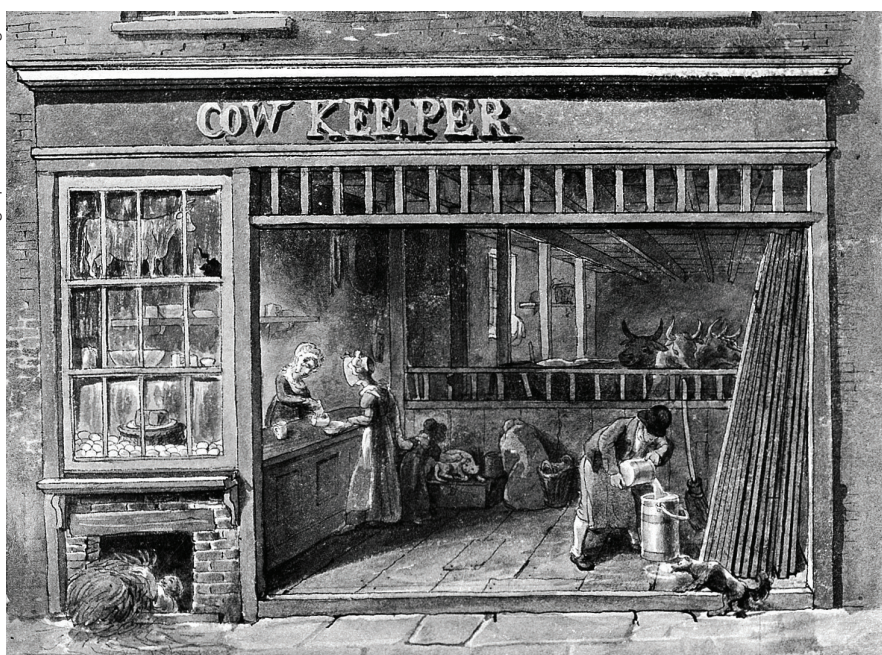
As relations grew hostile, the public health establishment decided to construct its own expertise in 'comparative pathology' by initiating scientific investigations into animal diseases under the government's Medical Department (Anon 1884). Vets countered by asserting their public health functions, starting their own journal of comparative pathology (established by John McFadyean in 1888) and appointing a medical bacteriologist, Edgar Crookshank, to investigate zoonotic diseases under the government's Veterinary Department (Penberthy 1887, Agricultural Department of the Privy Council Office 1888, 1889). These events set the tone of state veterinary-medical relationships for decades to come. They reveal that while on epistemological grounds collaborative approaches to zoonotic diseases made perfect sense, institutionally and professionally they proved impossible to achieve.

'One Medicine'

Throughout the late 20th and early 21st centuries, the desire to build closer links between human and animal health was articulated through the rubric of 'One Medicine'. Although the One Health agenda later broke new ground in its concern with the environmental and wildlife aspects of health, the influence of One Medicine – and of Calvin Schwabe, the American veterinary epidemiologist widely credited with coining the concept – are generally acknowledged (Gibbs 2014b, Kaplan and Scott 2011).

However, there seems to be little understanding of how and why One Medicine emerged as a self-conscious agenda. This is an important question. If the campaign for One Health was driven by the health challenges, institutional

Photograph: Wellcome Images



A 19th century London dairy. Dairies were hotbeds of disease. The 1880s discovery of zoonotic diseases that spread via milk raised contentious questions over who should be responsible for controlling them: public health doctors or vets

priorities and professional politics of the 21st century (Gibbs 2014a), then what caused the emergence of One Medicine? Why was it necessary to promote collaborative working practices when they had taken place earlier as a matter of course?

Calls to treat medicine as 'one' feature sporadically throughout history, but momentum began to build in the inter-war years, some decades before Schwabe published his much cited volume *Veterinary Medicine and Human Health* (1984). The drive for integration was inspired by a growing professional and epistemological separation of human and veterinary medicine, which arose partly from the politics of zoonosis control, as outlined above, and partly from the changing use of animals in scientific research.

Formerly, medical scientists had conducted their investigations using a diversity of animals to represent particular species. This narrowed during the early 20th century to a few selected species that were regarded as model humans (Logan 2002). Vets such as O. Charnock Bradley, Principal of the Royal (Dick) Veterinary College, and T. W. M. Cameron, professor of parasitology at McGill University, argued against this shift. They called, instead, for veterinary-medical collaboration in studying spontaneous disease processes among a wide range of animals, in order to generate fundamental insights common to all (Bradley 1927, Cameron 1938). One outcome of this thinking was the formation of a Comparative Medicine Section of the Royal Society of Medicine (Allbutt 1924).

During the early 1950s, meetings in the USA and Britain aimed to demonstrate the practical value of comparative experimental research, and to place it within medical, veterinary and graduate school curricula (Jones 1959). While this developed some footing in Britain, it won more substantial support in the USA, from the National Institutes of Health and the Rockefeller Foundation. The veterinary schools at the University of Pennsylvania and University of Minnesota emerged as leading centres. Characterised by close relationships with their medical schools and departments, they regularly promoted their programmes as examples of 'One Medicine' (Schmidt 1962, Cass 1973).

Meanwhile, a new international context emerged for the promotion of comparative medicine, zoonosis control and veterinary-medical collaborations: the Veterinary Public Health (VPH) unit of the World Health Organization (WHO). This unit propelled the development of the One Medicine concept and the careers of those who supported it. The reasons for its creation can be traced to the health problems, demographic politics and development agendas of the post-second world war era (Staples 2006). It was proposed by American

veterinarian, James H. Steele, later a leading proponent of One Medicine. He had already, in the aftermath of the second world war, created a new Veterinary Service of the US Public Health Service, and a veterinary public health programme for the US Communicable Disease Center, focusing on the surveillance and control of zoonoses (Steele 1991, 2008). Under his influence, the unit was established in 1948 and American veterinary scientist Martin M. Kaplan was appointed director (Kaplan 1953, Steele 1991, Steele 2008).

Kaplan developed close relations with the Food and Agriculture Organization (FAO), other UN agencies, and the World Organisation for Animal Health (OIE), leading to collaborative programmes on zoonoses, meat hygiene and veterinary education. Framing animal health as a crucial problem for human health and development, the FAO and WHO positioned veterinarians trained and working in public health as vital to realising these goals. Throughout the 1950s and 1960s, joint WHO/FAO/VPH programmes were key vehicles for improving animal health and production, thereby advancing the health and nutritional status of rapidly expanding populations in the developing world (WHO/FAO 1956).

Meanwhile, in the West, infectious diseases had given way to chronic disease as the prime cause of morbidity and mortality. A new WHO comparative medicine programme, created under the

'Calls to treat medicine as 'one' feature sporadically throughout history, but momentum began to build in the inter-war years'

VPH unit in 1958, sought to tackle such problems by expanding the kinds of animals used in basic medical research on cancer and cardiovascular disease. Under W. I. B. Beveridge, director of the Institute of Animal Pathology at Cambridge, the programme expanded to include comparative virology, neuropathology and mycoplasmaology (Anon 1961, Kaplan 1961, Cotchin 1962, Beveridge 1969). Although he did not employ the term One Medicine, Beveridge believed that progress in understanding health and disease in the past and the future depended on the combined expertise of the veterinary, medical and biological sciences (Beveridge 1972).

Calvin Schwabe was a product of these contexts, building a career that moved between comparative medicine and VPH, and between the WHO, FAO and academic institutions in the USA and overseas. His relationships with individuals and organisations that promoted integrated approaches to animal and human health and disease informed his vision of

One Medicine. Articulated at length in *Veterinary Medicine and Human Health*, it drew together ideas and developments in comparative medicine, veterinary public health, epidemiology, nutrition and international health, into a single programmatic vision that is still widely cited today (Schwabe 1984, 2004).

Conclusion

Calvin Schwabe is not only known for articulating a One Medicine agenda; he also produced a highly influential (although poorly referenced) account of its history. By claiming that the most significant advances in health had been achieved by figures like Jenner, Virchow, Pasteur, Koch, Smith, Salmon and others who had traversed the boundaries between animal and human health, he sought to justify and win support for his One Medicine vision. Not surprisingly, this account has gained considerable purchase amongst the present-day promoters of One Health, and continues to inform their narratives of its past.

However, there is much more to be learned about One Health history. While the material presented here is necessarily brief and episodic, it begins to explain why, in certain times and places, the investigation, study and practice of human and animal health came together, and why, elsewhere, they moved apart. It thereby illustrates the need to push beyond the great figures and discoveries in history, to consider how social, epistemological, institutional and political factors have influenced the course of integrated, collaborative approaches to health.

Acknowledgments

This article is drawn from a Wellcome Trust-funded programme of historical research: 'One medicine? Investigating human and animal disease.' The authors would like to thank the Wellcome Trust for their support, and colleagues Angela Cassidy and Rachel Mason Dentinger for their input and advice.

References

- AGRICULTURAL DEPARTMENT OF THE PRIVY COUNCIL OFFICE (1888) Report. Parliamentary Papers, c5679
- AGRICULTURAL DEPARTMENT OF THE PRIVY COUNCIL OFFICE (1889) Report. Parliamentary Papers, c5995
- ALLBUTT, C. (1924) The integration of medicine. *Proceedings of the Royal Society of Medicine (Section of Comparative Medicine)* 17, 1-3
- ANON (1830) *Veterinarian* iii, 698
- ANON (1831) History of the rise, progress, ravages etc of the blue cholera. *Lancet* 17, 273-274
- ANON (1833) St Thomas's Hospital. Glanders in the human subject. *Lancet* 19, 728-731
- ANON (1835) Medical men and veterinary surgeons. *Veterinarian* viii, 580-585
- ANON (1840) Dinner of the friends and students of the veterinary college, Edinburgh. *Veterinarian* xiii, 364-372
- ANON (1846-80) Specimens from the lower animals. Various authors. *Transactions of the Pathological Society of London* passim.
- ANON (1850) Miscellaneous intelligence. *London Medical Journal* 0, 921

- ANON (1884) The dangers of our milk supply. *British Medical Journal* **i**, 569-570
- ANON (1886) Diphtheria and milk. *Lancet* **127**, 796-797
- ANON (1961) Comparative medicine. *WHO Chronicle* **15**, 399-405
- ANON (1965) Animal health. HMSO
- BEVERIDGE, W. I. B. (1969) Comparative medicine in theory and practice. *WHO Chronicle* **23**, 547-553
- BEVERIDGE, W. I. B. (1972) Frontiers in Comparative Medicine: the Wesley Spink Lectures on Comparative medicine. University of Minnesota Press
- BRADLEY, O. C. (1927) What is comparative medicine? *Proceedings of the Royal Society of Medicine* **21**, 129-134
- BROWN, G. (1888) Report on eruptive diseases on the teats and udders in cows in relation to scarlet fever in man. Parliamentary Papers c5481
- BUDD, W. (1863) *Variola ovina*, sheep's small-pox. *British Medical Journal* **ii**, 141-150
- CASS, J. (1973) One Medicine. *Human and Veterinary Perspectives in Biology and Medicine* **16**, 418-426
- CAMERON, T. W. M. (1938) Diseases common to animals and man. *Canadian Journal of Comparative Medicine* **2**, 121-128
- CARDIFF, R., WARD, J. & BARTHOLD, S. (2008) One medicine – one pathology: are veterinary and human pathology prepared? *Laboratory Investigation* **88**, 18-26
- CDC (2014) History of One Health. www.cdc.gov/onehealth/people-events.html. Accessed May 30, 2014
- CHAPLIN, S. (2009) John Hunter and the museum oecconomy, 1750-1800 (PhD thesis, King's College London). <http://wellcomelibrary.org/content/documents/john-hunter-and-the-museum-oecconomy>. Accessed June 24, 2014
- COLEMAN, E. (1791) A Dissertation on Suspended Respiration, from Drowning, Hanging, and Suffocation. J. Johnson.
- COTCHIN, E. (1962) The problems of comparative oncology. *Bulletin of the World Health Organization* **26**, 633-648
- CRISP, E. (1871) Specimens of cataract and opacities of the cornea, in the lower animals. *Transactions of the Pathological Society of London* **22**, 350-353
- CUNNINGHAM, A. (2010) The Anatomist Anatomist's: An Experimental Discipline in Enlightenment Europe. Ashgate
- DICK, W. (1832) On cholera in domestic animals. *Lancet* **20**, 138-142
- GARDINER, A. (2009) Elephants and exclusivity: an episode from the pre-Dick history of veterinary education in Edinburgh. *Veterinary History* **13**, 299-309
- GIBBS, E. P. J. (2014a) The evolution of One Health: a decade of progress and challenges for the future. *Veterinary Record* doi: 10.1136/vr.g1431
- GIBBS, E. P. J. (2014b) Origins of One Health and One Medicine. *Veterinary Record* doi: 10.1136/vr.g1372
- GM (1844) Lancashire bone setters. *Provincial Medical and Surgical Journal* **8**, 483
- HARDY, A. (2003) Animals, disease, and man: making connections. *Perspectives in Biology and Medicine* **46**, 200-215
- JONES, T. L. (1959) Comparative medicine – the half-open door. *Canadian Journal of Comparative Medicine and Veterinary Science* **22**, 416-419
- KAHN, L. H., KAPLAN, B., STEELE, J. H. (2007) Confronting zoonoses through closer collaboration between medicine and veterinary medicine (as 'one medicine'). *Veterinaria Italiana* **43**, 5-19
- KAPLAN, M. M. (1953) The concept of veterinary public health and its application in the World Health Organization. *Bulletin of the World Health Organization* **7**, 227-236
- KAPLAN, M. M. (1961) Comparative medical studies of chronic degenerative diseases as a veterinary public health activity. *Journal of the American Medical Women's Association* **16**, 296-299
- KAPLAN, B. & SCOTT, C. (2011) Who coined the term 'One Medicine'? www.onehealthinitiative.com. Accessed May 30, 2014
- KING, L. J., ANDERSON, L. R., BLACKMORE, C. G., BLACKWELL, M. J., LAUTNER, E. A., MARCUS, L. C., MEYER, T. E. & OTHERS (2008) Executive summary of the AVMA One Health Initiative Task Force report. *Journal of the American Veterinary Medical Association* **233**, 259-261
- KLEIN, E. (1876) Report on so-called enteric or typhoid fever of the pig. In Report of the Medical Officer of the Local Government Board. Parliamentary Papers, c1608, 91-101
- LAWRENCE, S. C. (1988) Entrepreneurs and private enterprise: the development of medical lecturing in London, 1775-1820. *Bulletin of the History of Medicine* **62**, 171-192
- LINDSAY, W. L. (1874) Community of disease in man and other animals. *British and Foreign Medico-Chirurgical Review* **53**, 150-85
- LOGAN, C. (2002) Before there were standards: the role of test animals in the production of empirical generality in physiology. *Journal of the History of Biology* **35**, 329-363
- MACDONALD, A. & WARWICK, C. (2012) Early teaching of the veterinary art and science in Edinburgh. *Veterinary History* **16**, 227-274
- MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD (1886) Report. Parliamentary Papers c5171
- MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD (1885) Report. Parliamentary Papers c4844-I
- PEMBERTON, N. & WORBOYS, M. (2007) Mad dogs and Englishmen: Rabies in Britain, 1830-2000. Palgrave Macmillan
- PENBERTHY, J. (1887) Scarlet fever and milk. *The Times*, June 13, p15
- PUGH, L. (1962) From Farriery to Veterinary Medicine. Heffer & Sons
- RICHARDSON, B. (1863) The present position and prospects of epidemic science. *British Medical Journal* **ii**, 597-601
- RVC (1793) General committee meeting, September 17. RVC minute books, RCVS Knowledge library
- RVC (1795) Council meeting: draft of petition to lay before Parliament, January 17. RVC minute books. RCVS Knowledge library
- SCHMIDT, C. F. (1962). Editorial: One Medicine for more than one world. *Circulation Research* **11**, 901-903
- SCHWABE, C. (1984) Veterinary Medicine and Human health. Williams & Wilkins
- SCHWABE, C. (1992) Interactions between human and animal medicine: past, present, future. In History of the Healing Professions: Parallels between Veterinary and Medical History. Ed A. R. Michell.
- SCHWABE, C. (2004) Keynote address: the calculus of disease – importance of an integrating mindset. *Preventive Veterinary Medicine* **62**, 193-205
- SOUTH, J. E. (1817) Lectures on the veterinary art delivered by Edward Coleman esq in the medical theatre at Guy's hospital. Wellcome Library
- STAPLES, A. L. S. (2006) The Birth of Development: How the World Bank, Food and Agriculture Organization, and World Health Organization Changed the World, 1945-1965. Kent State University Press
- STEELE, J. (1991) History of veterinary public health in the United States of America. *Revue Scientifique Et Technique De L'Office International Des Epizooties* **10**, 951-983
- STEELE, J. (2008) Veterinary public health: Past success, new opportunities. *Preventive Veterinary Medicine* **86**, 224-243
- VARIOUS REPORTS AND EDITORIALS ON DIPHTHERIA, SCARLET FEVER AND MILK (1886-1887) *Lancet* 127-130
- WADDINGTON, K. (2004) The bovine scourge: meat, tuberculosis and the public health, 1850-1914. Boydell
- WILKINSON, L. (1992) Animals and Disease: An Introduction to the History of Comparative Medicine. Cambridge University Press
- WHO/FAO (1956) Advisory group on veterinary public health'. WHO Technical Report Series no 111, Geneva. World Health Organization
- YOUATT, W. (1831) Lectures on veterinary medicine delivered in the University of London. *Lancet* **17**, 333-337
- YOUATT, W. (1836-40) Contributions to comparative pathology. *Veterinarian* **ix** – **xiii**, passim
- YOUATT, W. (1830) On Canine Madness. Longman
- ZINSSTAG, J., SCHELLING, E., WALTNER-TOEWS, D. & TANNER, M. (2011) From 'one medicine' to 'one health' and systemic approaches to health and well-being. *Preventive Veterinary Medicine* **101**, 148-56

doi: 10.1136/vr.g3678

One health, many histories

Abigail Woods and Michael Bresalier

Veterinary Record 2014 174: 650-654

doi: 10.1136/vr.g3678

Updated information and services can be found at:

<http://veterinaryrecord.bmj.com/content/174/26/650.full.html>

These include:

References

This article cites 31 articles, 1 of which can be accessed free at:

<http://veterinaryrecord.bmj.com/content/174/26/650.full.html#ref-list-1>

**Email alerting
service**

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:

<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:

<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:

<http://group.bmj.com/subscribe/>