

“ONE HEALTH” – The Rosetta Stone for 21st Century Health and Health Providers

Bruce Kaplan, DVM and Mary Echols, DVM, MPH

“...no single person, no single health profession, no single organization, and no single nation or people invented or owns One Health. It is an all inclusive, co-equal endeavor that belongs to all of humanity. A caveat: while honest debate over efficacious process should be welcome, factionalism should not.”

There was a 21-Gun salute marking the 65th anniversary of D-Day on the Normandy shores (Omaha Beach) June 6, 2009. All who know history can easily recognize this commemoration of the liberation of France as a paradigm-like shifting victory for world freedom over the evils of Nazism. Without it, many of us in North America, Europe and elsewhere might not be here today and others could be living as slaves to an ideology of intolerance and hate.

The famous paradigm change in the science of astronomy, resulting from the emergence of Copernicus' successful predictive concept about the changing positions of both stars and planets (his heliocentric theory of planetary movement) in the 16th century, ushered in the beginning of a scientific revolution with a new view of a greatly enlarged universe. This one man was a seminal figure in the history of scientific thought(s) that reverberate to this day ... as was Winston Churchill during World War II.

A paradigm has been described as “picking up the other end of the stick,” which is essentially a process of “handling the same bundle of data as before, but placing them in a new system of relations with one another by giving them a different framework”.¹ The One Health concept is a “tradition-shattering complement to the tradition-bound activity of normal [medicine and health related] science.” Implementation would be a virtual revolutionary paradigm shift where “one conceptual world view is replaced by another.”² One Health takes this philosophic logic a step further. It melds the revolutionary competition into a paradigm by:

“[Espousing] a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of [health and] health care for humans and animals. The synergism achieved will advance health care for the 21st century and beyond by accelerating biomedical research discoveries, enhancing public health efficacy, expeditiously expanding the scientific knowledge base, and improving medical education and clinical care. When properly implemented, it will help protect and save untold millions of lives in our present and future generations.”³

This is truly a paradigm shift—a type of scientific revolution—away from the past acceptance by many in the health and health care milieu. Old turf barriers would be

eliminated or at least significantly lowered in the interest of more rapid scientific advancement for protecting and saving lives in today's world and that of tomorrow. This represents a pattern of scientific maturation. To be accepted as *the* health paradigm of our time it would need concrete examples of how it appears to compete better, i.e. more successfully than the status quo. Indeed, it has prominent advocates for the past 200 years! Yet, it is only now re-emerging again in the early 21st century as a viable competitor.

Physicians of the past such as Benjamin Rush, MD (18th century) famed during the American revolutionary period; Rudolf Virchow, MD, (19th century) known as Father of Cellular Pathology; and Sir William Osler (19th century), dubbed the Father of Modern Medicine pioneered and supported the principles of collaboration between human and veterinary medicine. Among this illustrious threesome, Virchow, known as the founder of comparative medicine, cellular biology and veterinary pathology, coined the term 'zoonosis' meaning diseases transmissible from animals to man and said, "*between animal and human medicine there are no dividing lines—nor should there be. The object is different but the experience obtained constitutes the basis of all medicine*".⁴

On the veterinary medical side of the One Health equation, three notable veterinarians of the 20th century include Karl F. Meyer, DVM, MD (Hon.), regarded as "the most versatile microbe hunter since Louis Pasteur and a giant in public health", Calvin Schwabe, DVM, D.Sc., coined the term "one medicine" (now called One Health) and James H. Steele, DVM, MPH, founder of the veterinary public health division of the Centers for Disease Control and Prevention (USA).

So what? What has One Health contributed in the 20th century?



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Eminent virologists, Drs. Karl Johnson (physician) and Fred Murphy (veterinarian) worked at CDC as co-equal investigators, together discovering the etiologic agent of Ebola hemorrhagic fever, the Ebola virus. Dr. Johnson described their "One Health" collaborations:

"Fred Murphy and I collaborated on zoonotic viruses, their pathogenesis, epidemiology, and ecology; initially at great distance but later in daily contact at CDC. Although Ebola virus was perhaps the most notable project, our work over many years truly exemplifies the concept of One World, One Medicine, One Health.

My prayer is that support, both scientific and financial, for the marriage of human and veterinary medicine will grow at an ever expanding rate. The earth requires it."



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November 15, 2008 – Dr. Fred Murphy (veterinarian), Dr. Johnson's CDC colleague-collaborator in the discovery and identification of the etiologic agent of Ebola hemorrhagic fever, the Ebola virus.

"My recent delving into the foundations of medical and veterinary virology has provided much evidence of common roots and incredible early interplay, much more than we see today. For example, Walter Reed and his colleagues, the discoverers of the first human virus, yellow fever virus, acknowledged the influence of Friedrich Loeffler and Paul Frosch, who had discovered the first virus, foot-and-mouth disease virus, a few years earlier.

From my reading, it was Sir William Osler, the founder of modern human medicine and of veterinary pathology, who in the late 1800s coined the term One Medicine. Calvin Schwabe, the inspiring veterinary epidemiologist from UC Davis, has been credited with revitalizing the concept, and now it seems that the concept is gaining new breadth and depth, thanks to the efforts of the One Health Initiative. As others have noted, bringing substance to the concept, shaking up institutions and individuals, will require a difficult and long-term effort, especially as this applies to the interplay of physicians, veterinarians and biological scientists in biomedical research and in the scholarly base for public health – but, as Arnold Palmer said, "Never up, never in."

Another monumental example was the 1996 Nobel prize awarded to a physician Rolf Zinkernagel and veterinarian Peter Doherty. These two collaborators discovered how the body's immune system distinguishes normal cells from virus-infected cells.



Rolf Zinkernagel, MD, PhD - Nobel Laureate 1996
University Hospital Zurich
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Peter C. Doherty, DVM, PhD - Nobel Laureate 1996
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The early 21st century physician and former President of the American Medical Association, Ronald Davis, MD [now deceased] collaborated with the former President of the American Veterinary Medical Association, Roger K. Mahr, DVM helping to establish a bond between the AMA and AVMA. Davis skillfully shepherded an historic One Health supportive resolution through to adoption by the American Medical Association membership—a major milestone in the progress of this modern day One Health movement.



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July 3, 2007 – American Medical Association (AMA)

"I'm delighted that the AMA House of Delegates has approved a resolution calling for increased collaboration between the human and veterinary medical communities and I look forward to seeing a stronger partnership between physicians and veterinarians. Emerging infectious diseases, with the threats of cross-species transmission and pandemics, represent one of many reasons why the human and veterinary medical professions must work more closely together."

So what has One Health done for us lately, i.e. in the 21st century? One impressive guiding light example: During the first decade of this century, veterinarian James "Jimi" Cook, DVM, PhD, a University of Missouri- Columbia college of veterinary medicine professor of orthopedic surgery and physician B. Sonny Bal, MD, JD, MBA, Associate Professor of Orthopedic Surgery college of medicine have been on the trail of practicable clinical medicine betterment. Drs. Cook and Bal have collaborated for over seven years on efforts to create hip and knee replacements without using commonplace biomechanical metal and plastic materials. The technique being developed by Cook for dogs initially, involves use of laboratory grown tissue (cartilage) that can be molded into

replicas of joints that require replacement. Bal and Cook are concomitantly developing a process whereby a similar process can be adapted for humans.

These two One Health supporters were recognized for their important biomedical research in the MISSOURIAN Newspaper, Tuesday, June 2, 2009.

<http://www.columbiamissourian.com/stories/2009/06/02/mu-research-may-lead-treatment-lou-gehrigs-disease/>

Following this story, Dr. Sonny Bal told the One Health Initiative website:

“Jimi Cook [DVM, PhD] and I have worked alongside a team of specialists from medicine, veterinary medicine, and engineering for seven years now. Our current focus is to develop replacement joints that mimic the natural process of cartilage and bone formation as they grow and develop. This kind of collaboration is essential to the creation of better options for the replacement of failing hips and other joints. By working with specialists in the veterinary field, we are able to evaluate our technology more rapidly, and that means that we will be able to develop these alternatives for humans sooner than if we worked alone.” Sonny Bal [MD, JD, MBA]



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Now in the early 21st century the health sciences stand on the threshold of implementing the “One Health” paradigm shift that will enhance and fast forward the protection and saving of millions of lives in today’s and tomorrow’s generations. Unlike the Copernicus example, no single person, no single health profession, no single organization, and no single nation or people invented or owns One Health. It is an all inclusive, co-equal endeavor that belongs to all of humanity. A caveat: while honest debate over efficacious process should be welcomed, factionalism should not.

A unique and first of its kind One Health monograph—containing 13 diverse essays—was recently published that provides a strong scientific international case for implementing the One Health concept worldwide. It is the product of 53 interdisciplinary prominent professionals (physicians, veterinarians, and health scientists) from 12 countries.⁵

One Health has indeed become the “Rosetta Stone” (i.e., something that is a critical key to the process of decryption or translation of a difficult encoding of information) for a health enlightening paradigm shift revolution. It is the critical key that translates difficult problem solving into less difficult models. It presents a means for the health scientific communities to pivot towards a more panoramic view, a *sustainable revolution⁶ (described as an environmental definition for our civilization to survive) and the pursuit of altruistic excellence notwithstanding respectable status quo advancements of the past.

* “By understanding the characteristics and intentions of the Sustainability Revolution, we will be better prepared to tackle complex problems requiring an open-minded and cooperative approach”.

1. Herbert Butterfield. *The origins of Modern Science, 1300-1800* (London, 1949), pp. 1-7.
2. Thomas S. Kuhn. *The Structure of Scientific Revolution*, The University of Chicago Press (Chicago and London), Third Edition 1996.
3. Monath, Thomas P., Kaplan, Bruce, Kahn, Laura H., Woodall, Jack. One Health Initiative website <http://www.onehealthinitiative.com>. Originated October 1, 2008.
4. Kahn, Laura H., Kaplan, Bruce, Steele, James H. *Confronting zoonoses through closer collaboration between medicine and veterinary medicine (as ‘One Medicine’)* Veterinaria Italiana 2007; 43: 5-19.
http://www.izs.it/vet_italiana/2007/43_1/5_19.pdf
5. Kaplan, Bruce, Kahn, Laura H., Monath, Thomas P. ‘One Health - One Medicine’: linking human, animal and environmental health. Veterinaria Italiana 2009 - Volume 45 (1), January-March.
http://www.izs.it/vet_italiana/2009/45_1/45_1.htm
6. Andres R. Edwards. *The Sustainability Revolution – portrait of a paradigm shift*, New Society Publishers (Canada), 3rd Printing December 2006.

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