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The Information Landscape Transformation: The Changing Role of Scientific Societies



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The Information Landscape

The information landscape refers to the suite of sources of information available to individuals. Several decades ago these sources of information encompassed books and libraries, magazines and newspapers, encyclopedias, annals, dictionaries, government records, archives and registries, individuals, and scholarly organizations and societies. More recently, radio and television were added as sources of factual material. Most of these materials were reviewed by experts in the relevant fields and their accuracy based on current information and knowledge was confirmed. Scholarly societies have played an important role in the certification and dissemination of knowledge to their membership and to society at large.

Although information could be obtained, it was not as easy to access as it is today. The development of the internet has transformed the information landscape much as the invention of the book and written documentation of learning and lore did centuries ago.

The internet offers a wide range of information, is readily searchable, interactive, open 24/7, portable, available worldwide, personalizable, shareable, and relatively easy to use. This widespread plethora of information has altered not just how we access new knowledge but how we in fact view information. The desired knowledge has

to be instantaneous and come up readily in a search of the internet. If it does not, then the knowledge is not perceived to exist. Also, the information has to be well-packaged and visible, and therein lays a major problem of today's information landscape. Misinformation can be equally attractively packaged and search engines can be gamed to make such sites appear first in a list of information outlets. When it comes to the internet, our new societal maxim is "let the user beware." Books are read for entertainment, but reading through a book for snippets of useful information and data is definitely passé. The internet has become so much the source of information and knowledge that searching library collections and written works has become a lost skill. Even reading is being displaced by the onslaught of video as a key mechanism for distribution of learning.

In this merit lecture I have decided not to reflect on the past and past accomplishments but to focus on the future of the American Society for Enology and Viticulture and address the key question: What role do scholarly societies play in this new information landscape?

Just the Facts, Ma'am

Scholarly societies have had a strong focus on delivering new factual information covering the span of knowledge encompassed by the members of the association. Factual knowledge was and still is deemed as having high value and informational spin as having no value. New knowledge was distributed in a manner allowing accurate interpretation by the informed members of the society. This factual information was compiled into concepts, directions, and new areas for investigation and applied to addressing major issues confronting society. New knowledge was accepted as the only pillar of progress and societal evolution. Scholarly societies served as repositories of factual information via the creation and maintenance of publication outlets such as journals, textbooks, annals, reviews, and technical monographs. The accuracy of new information was certified via the process of peer review. Many venues were developed

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for the dissemination of factual information to the membership; in addition to publication and annual national meetings, regional branches, specialized symposia, and workshops became the norm. Societies also provided extensive career networking and mentoring opportunities enabling sharing of experience-based knowledge. Continuing education programs ensured empowerment of members to access and apply the new knowledge being gained. Societies also became the vehicle for translation and distribution of new knowledge and discoveries to society at large. In essence, societies replaced the role of tribal elders in accumulation and dissemination of both old and new knowledge to subsequent generations.

The immediacy of the internet has impacted the traditional ways in which scholarly societies have operated. In today's knowledge landscape, individuals simply want the answer. And they want it now. The internet is a great source of answers; the only problem being is that there is no guarantee of the validity of those answers. We are creating generations of cynics who have learned that "facts" are often not facts but magical thinking of the individual presenting the information, often with a vested interest in that information being perceived as correct. If opinion can so easily become fact, are all facts opinion? This is the true danger to scholarly societies and academia in general where high value is placed on factual knowledge and obfuscation of the facts is regarded as misconduct by one's peers and punishable by public retraction and loss of professional status. The internet lacks filters; even product and site reviews are unreliable, as the reviews are often paid for by the site. Scholarly societies have always been information filters and this certification function is more vital in today's world than ever before.

The Role of Scholarly Societies in Today's Information Landscape

Scholarly societies must reclaim their role as principal generators and caretakers of knowledge in the "wild west" of today's information landscape. There are many barriers to establishing and asserting that role on-line but also bountiful opportunities to better serve membership.

Management of the data tsunami. We have entered the era of big data, and big means large sets of detailed data that are rich in applicable information. Sequencing of whole genomes of microbes, *Vitis* cultivars, and human consumers is commonplace. In addition, large data sets evaluating gene expression, protein profiles, and metabolite patterns are enabling the understanding of biology at an amazingly detailed and comprehensive level. These research activities are being fueled by advances in chemistry and chemical analyses. We are also able to profile climactic, geographic, and soil data and to map

the performance of individual vines. Precision viticulture will soon be taken to a new unimaginable level. We are understanding the sustainability of ecosystems at a detailed level and are gaining knowledge on judicious stewardship of our physical and biological environment. New knowledge is being generated at a prestigious rate, much faster than at any previous time in human history. A challenge for scholarly societies is to embrace this new pace of knowledge discovery and sustain an informed membership.

Certification of factual information. Inaccurate information also seems to be generated at an equally rapid rate and packaged to look like the real thing. Anyone can create an "expert" site and be perceived as providing reviewed or evaluated information. Oftentimes these sites have copied information from other sites or operate like Wikipedia in acknowledging that some informational content has not been reviewed and may be inaccurate. It is vital that scholarly societies be a presence with accurate information, even if that information is copied and pasted to other sites. There is no substitution for peer review and it is important that societies invest in the review process and in their reviewers. Journals must maintain high and transparent standards for acceptance of manuscripts for publication and provide for training of new researchers in those standards of acceptability.

Distribution of information. In addition to primary research articles in journals, literature reviews, fact sheets, books, and proceedings remain indispensably important outlets for validated knowledge. However, it is important to accept the fact that full articles are now rarely read in their entirety and that abstracts or summaries are important and must accurately reflect the content of the paper. Unfortunately, there are well-known incidences of article hype wherein authors make statements in the abstract not supported by data in the manuscript, knowing their work will be cited solely on the basis of the abstract. This will be challenging as the abstract has become the main mechanism by which articles and even journals are "advertised." Article impact statements are important in today's information landscape but perhaps should be written by independent members of the society with no vested interest in the article to ensure validity. Societies will also need to invest in expertise in videography and help members provide translated knowledge in currently popular formats. Regrettably, societies must now also police other outlets of information to counter misinformation and misuse of the knowledge base generated by that society. Groups of individual scientists are now engaging in this activity by writing letters to national press outlets or by posting to websites. This activity could be supported by scholarly societies, not in a manner condemning the inventors of misinformation but as a teaching opportunity for society as a whole.

Sorting, translation and communication of information. Long ago information and knowledge was obtained exclusively from the spoken word. The invention of writing and the creation of books shifted that dynamic toward the written word. Now we face a similar dynamic shift in knowledge transmission enabled by cyberspace and the immediacy of information. Scholarly societies now must take into consideration the diversity of ways by which people access knowledge and information. The written word still has a place in today's world, but primary research outlets are less and less consulted by nonexperts. Targeted workshops, technical reviews, online guides, and apps are going to be part of the portfolio of any successful scholarly society. Video presentation of information continues to grow in importance, as do social media technologies. One key area of information dissemination is the provision of mechanism by which experience-based knowledge can be shared and validated. There is a growing attraction to opinion-based commentary, and societies will need to develop standards for entering this arena. The same knowledge may have to be presented in a variety of formats in order to reach a broad audience. Societies will also need to analyze the "who" and "how" of information access by their membership and tailor translational activities accordingly. New information on how individuals learn is also being developed and we are migrating away from standardized delivery of educational content. New learners will be experienced in a plethora of learning environments and some environments may be better suited to a specific type of content. We are transitioning from one mode of knowledge transmission, the published article, to a multiplicity of distribution channels and styles.

Providing 24/7 opportunities for networking, mentoring, and interaction. People learn from people, sometimes as a direct source of information and other times as a resource to locate needed information in a published format. Social media has greatly enhanced the ability to learn directly from others. Scholarly societies will need to provide a space by which this interaction can occur. Establishment of subnetworks within the wine and grape industries and ask-the-expert interaction space may be of value. In addition, on-line panel discussions of key topics that can be recorded and viewed at a later date may be more important than single lecture webinars. It has become clear that most people will not watch an entire filmed webinar, so societies need to become adept at short presentations of critical information in an easily searchable fashion. Face-to-face networking opportunities are also vital—we learn much from body language and direct exchange of ideas.

Delivering continual education. Information and knowledge is dynamic; as new discoveries are made, what was "known" can become incorrect. Concepts can change

as can our understanding of the physical and biological world. The pace at which new information is being generated can lead to a datedness of expertise. Scholarly societies need to become leaders in continual education, not continuing but continual. Knowledge gained during matriculation in an academic program is now similar to buying a new car; it becomes devalued over time as new knowledge displaces the old. In today's world, learned concepts have a short shelf life. Societies need to provide continual education 24/7 and enhance peer-to-peer learning, trading the experience of older members for the latest knowledge base of newer members. Societies can serve members by providing certification of gaining and updating knowledge and documenting mastery of new knowledge. Continual education programs need to respect the diversity of the membership community and be responsive to the changing needs of that community. Open two-way communication between society leaders and the membership needs to be designed, facilitated, and dynamic.

Resource for answers. In today's impatient world, information and knowledge is most often sought for a practical purpose—to provide an answer to a question critical to the seeker of information. Societies have not historically been providers of answers, but instead disseminate factual information, enabling interpretation by those receiving that information. There is no shortage of people willing to give answers, although the accuracy of that answer may be an issue. To maintain relevance to society as a whole, scholarly societies will need to become providers of answers. This can be accomplished in a variety of formats by providing ask-the-expert opportunities, frequently asked questions, or "how do I" pages on the society website. Societies will also have to have a presence as designers in the world of mobile apps. This role will be crucial to managing the data tsunami.

Pitfalls in Today's Information Landscape

Similar to the "wild west" of yore, today's information landscape is fraught with peril. The open-access movement was initiated to make sure that public access to publicly funded research was a reality. Indeed, making newly generated knowledge available quickly with broad accessibility is a noble objective. However, the funding models for open-access can encourage a relaxation of publication and scientific standards. *Science* recently published a study of the success in acceptance of a bogus wonder drug paper to open-access outlets (Bohannon 2013). Over half of the journals to which this flawed paper was submitted accepted the paper. It is not clear if the reviews were flawed or if peer review even occurred for these outlets. The primary driving factor for acceptance may be economic. The publication of scientific articles of questionable scientific validity threatens the entire knowledge dissemination process. Experts will

readily spot the errors in such works, but members of the general public may not. This may lead to public distrust of supposedly science-based knowledge and that would precipitate a crisis in societal progress. Scholarly societies need to be vocal in demanding rigorous review and decrying processes that place economic solvency or even profit ahead of rigor.

Another issue that today's information landscape poses for scientists and scholarly societies is that the immediacy of obtaining an answer obscures the challenges and costs associated with generating that knowledge and with providing validation of information. Scholarly societies need to become advocates for maintenance of funding streams for knowledge generation and be visible partners in translation and dissemination of information for their membership and the public.

The Path Forward

My challenge to the ASEV is to craft an innovative operational vision for ASEV that capitalizes on today's information landscape. First and foremost, the society needs to maintain the credibility and integrity of the journal and support excellence in both science and reviewing. The society needs to disseminate a broader portfolio of

knowledge and create new outlets targeted at translation of technical information and in sharing experience-based knowledge. The society needs to adapt to the more rapid pace of knowledge generation and provide mechanisms to turn the data tsunami into usable practical information. I thank the society for the opportunity to serve you as your Science Editor for the *American Journal of Enology and Viticulture* and look forward to helping chart our course for the future.

References

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