

Wider aspects of a career in entomology.

26. Evolution of the Entomological Society of Canada

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This series of articles outlines some ancillary aspects of my entomological career. The approach includes information about insects and their environments, conclusions about scientific activities and their setting, and general observations. This article describes successive changes in the operation of the Entomological Society of Canada, based especially on my own knowledge about the Society.



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Introduction

The Entomological Society of Canada (ESC) has changed a great deal over the years. This article on its evolution summarizes elements of the Society's development, management, achievements, and value. It is partly based on experiences during my membership for more than 50 years. Consequently, as one of this series of articles, it is a personal viewpoint and not any sort of official account.

A simple story about the ESC would outline the production of scientific publications and the current services to members. The sort of story preferred by fiction writers would describe a grand vision or heroic visionary moving forward into the future. This account is neither. Instead, it shows how the Society advanced through a series of adjustments, largely influenced by outside forces, that were made by the collective work of hundreds of volunteers with the common goal of supporting entomology.

The timing and extent of sets of changes are documented in more or less chronological order. However, some important operational aspects are mentioned only briefly. They include the work of officers responsible for day-to-day administration and financial requirements, and of some essential committees with ongoing or relatively unspectacular responsibilities.

Selected references are cited¹, but I have omitted other items that might belong in an exhaustive treatment: illustrations of people, publications, and logos; tables, graphs, diagrams, and maps; and even organizational charts!

Although no complete documentation is intended, therefore, many pages are required to do justice to the diversity and complexity of the changes, and to the efforts of members who implemented them. Brief summaries would fail to show the developing patterns, and their consequences both large and small ... and would conceal the fact that the progressions of activity were often convoluted!

A single long article seemed more likely to be useful for future reference than many smaller installments. Therefore, headings and subheadings, a table of contents, and cross references are incorporated here to assist in navigating the text as well as to reduce repetition.

The Society's activities are best known to me through my involvement in ESC affairs. Apart from attending annual meetings regularly and publishing in the journals (and other Society publications), I was a member of the Governing Board², Chair of the Finance, Publications, Membership, Language Advisory, Publications Procedures, and other committees, member of these and other committees, and member of the Executive Council.

Moreover, implementing the recommendations of the first strategic review (1995–1996) fell to me, before and during my term as President in 1997–1998. That procedure involved major changes in ESC staff and in production of scientific journals (including the first outside contract for that purpose), and the reorganization of ESC committees.

In addition, I was linked for many years with the Society's role in the Biological Survey of Canada. As long-term Secretary-Treasurer of the Biological Survey Foundation, I had experience with a registered charity like the ESC Scholarship Fund. Finally, my research included extensive syntheses about the fauna of Canada, requiring familiarity with applicable literature, much of which was featured in the publications of the ESC.

¹ Documents that are not readily accessible are not cited, even though they may include additional details such as the pros and cons of particular actions or recommendations.

² The ESC was run by a "Governing Board" until 2013, when a change in legislation reconstituted the governing body as a "Board of Directors" (see *Governance*). The term "Board" is used here for either format.

Tracing the evolution of the ESC allows general insights too, because it mirrors some of the marked economic, political, technological, and social developments that took place throughout my career and beyond. Viewing the past in this way provides context as the inevitable process of change continues.

History

Development

The ESC began in 1863, and launched *The Canadian Entomologist* in 1868. However, it was renamed the Entomological Society of Ontario in 1871, allowing it to receive annual funding from the government of Ontario (Timms 2009). As the numbers of Canadian entomologists grew, the Entomological Society of Canada was set up as an entity separate from the Ontario society in 1950. That organization became incorporated in 1956, and took over full (rather than joint) responsibility for the journal in 1960.

The long development of the Society up to that time, during which some regional societies arose from what originally were branches elsewhere of the Ontario society, is outlined by Connor (1982).

The aims of the ESC of 1863 reflect its origins in a group of keen insect collectors. They proposed to prepare as complete a collection as possible of Canadian insects for general information and reference; to hold duplicate specimens contributed by entomologists for distribution amongst its members; and to hold meetings from time to time for mutual information and the advancement of science. The first aim was eventually adopted especially by governments and universities. The second was partly met regionally. The third continues. The production of a journal was soon added, although initially it functioned partly as a newsletter.

The early objectives of the Society, then, were chiefly to encourage entomology and publish the journal. Meetings were held to bring together members with shared interests in entomology, but these people had a wide range of backgrounds and interests in the natural world. Increasingly, though, the Society focussed on professional entomological activities, so that by the first decade of the 20th century its core mission resembled that of the current society.

Over time, the ESC developed still wider activities to allow people to share their interest in Canadian insects. It now disseminates entomological knowledge through scientific journals and other publications; makes available considerable amounts of information and numerous resources on a website; provides multiple further avenues for entomologists to present their work and ideas (and to be recognized for them); helps entomologists to interact and cooperate; supports entomology locally and nationally; and promotes the development of younger entomologists.

Therefore, change is one of the most conspicuous features of the Society's history. Nonetheless, some initiatives were slow to begin. In the early days, a few older gentlemen on the Governing Board took a very conservative approach to Society affairs. More than once, they declared that something could not be done because the Society had never considered it before!

Even so, the ESC tried hard to promote entomology, and since then its approach has steadily broadened. The Society adapted to ongoing changes in publishing, communication, legislation, federal support for science, and other factors that have characterized the last half-century. It developed new themes brought forward by members, and made focussed attempts to prepare for the future, especially by means of strategic reviews completed in 1996, 2005, and 2017.

Despite the relatively limited number of professional entomologists in the country, therefore, a pattern of encouragement, expansion, and advance emerges from the story summarized below.

Archives

Early records of the ESC and of the Entomological Society of Ontario (ESO) when it was the national society were accumulated by the ESO. Custody of those holdings was given in 1974 to the McLaughlin Library at the University of Guelph (McEwen 1974), and from 1993 the ESO archives were professionally preserved and catalogued there (MacDonald 1993). They remain available for use (Entomological Society of Ontario Collection 2023).

The ESC set up archives in Ottawa in 1963, realizing the need to preserve its own records after it separated from the ESO. In 1967–1968, these materials were transferred to the University of Sherbrooke so that the first archivist could work on them (O’Neil 1971). After initial sorting and systematization, several years of additional work by the archivist (sometimes assisted by a broader committee) allowed many records to be transferred by agreement to the Public Archives of Canada in 1974.

The ESC’s Archives Committee was dissolved the following year and the Archivist’s duties transferred to the Secretary. In 1977 the committee, now called the Heritage Committee, was reactivated and assembled additional items. Further consultation with the Public Archives led to a 1979 agreement by which the Archives would assess and systematize the material.

The Heritage Committee continued to select additional worthy archival material that could be added to the ESC’s collected holdings in the National Archives³ (e.g., Riegert 1986). The process was placed on hold in 1989, when space was not available because of problems with the archives building, but additional deposits resumed in 1992.

Nevertheless, the pace of deposits soon slowed. The Archives sought selected material only, notably papers from two or three prominent entomologists, which were requested in 1995 (although apparently the committee could not obtain them despite appeals to members). However, annual meeting programs were deposited for several more years. Library and Archives Canada now holds more than 5 m of material from the Society⁴.

Given declining interest from the national archives, many records remained with the ESC. Recent paper and digital files were preserved by the Secretary, and some were kept in the ESC office.

³ The different names reflect a change from Public Archives of Canada to National Archives of Canada in 1987, and then to Library and Archives Canada in 2004.

⁴ Archivists use linear measurements for archival materials to show the shelf space required. The nature of the Society’s material can be confirmed through a collection search at Library and Archives Canada (bac-lac.gc.ca). The ESC archives are mainly textual, but there are also about 1 700 photographs and art, as well as a few microfilms and other materials. There are few large accessions, and most additions since 1995 comprise only one or a few annual meeting programs.

Before the Headquarters building that housed the office for 24 years was sold in January 2015, minutes and other available documents of historical significance were scanned and digitized. In 2018, after detailed preparation, older scanned documents from 1960 onwards, as well as more recent digital records, were placed in a secure cloud-based digital archive accessed through the Society's association management company (see *Governance*), following Standard Operating Procedures. The archived documents are accessible to Board members. (Other members can address queries to the Heritage Committee.)

Much official ESC email correspondence is now sent through the association management company, allowing it to be conserved for future reference on the digital platform, along with official documents and records. Duplicate digital copies of documents useful for organizing and administering Society activities are also held by the ESC Secretary and other Officers.

The *Bulletin* (see *Publications*) includes summaries of all ESC actions since 1969, and remains the most valuable single resource to help track the development of the Society. All issues are now freely accessible online. A second valuable resource is material that has been gathered into the History and Heritage subsection of the ESC website. These documents provide information on individual entomologists in the form of older summaries by province, collected biographical references, and obituaries, as well as Heritage lectures and other items.

Remaining hard-copy documents, ESC objects (e.g., the gavel), material related to awards, and a complete series of scientific publications are safely housed in a rented storage locker in Ottawa. The Physical Assets Committee is now responsible for these items.

This article summarizes many of the actions documented in the Society's historical records over the last 60 years.

Scientific societies and group advocacy

A wide general aim of the ESC is to advocate for entomology, and for many years after I first became a member it seemed to be the major preoccupation of the Society.

Political advocacy has been pursued most successfully by societies that are very large. For example, the American Association for the Advancement of Science (AAAS; see aaas.org)—the largest scientific society in the world—has over 120 000 American and international members. It is a non-profit organization funded mainly by large foundations and the government of the United States, at a level of several million US dollars per year ... rather more than the ESC!

Its stated goals are to promote cooperation among scientists, defend scientific freedom, encourage scientific responsibility, and support scientific education and science outreach for the betterment of humanity. It interacts closely with the US government, and undertakes many relevant contract and other activities in addition to publishing multiple journals.

No organization in Canada has a mission nearly as extensive as the AAAS. However, the ESC's wish to influence science policy became stronger and stronger between the 1960s and the 1990s (for reasons explained below), and it sought to join larger and more influential Canadian organizations that would coordinate messages about scientific needs.

SCITEC, representing the entire Canadian scientific, engineering and technological communities, was established in 1970. The ESC immediately joined that group. In late 1982 SCITEC was merged into the Association for the Advancement of Science in Canada (AASC), intended as a Canadian branch of the AAAS, but it soon faltered (e.g., Dufour 2012).

The ESC also belonged to the International Union of Biological Scientists (IUBS), and the International Union for the Conservation of Nature (IUCN). Later (in 2000), the ESC even joined the American Institute of Biological Sciences (AIBS) for a time, becoming the first non-American member to do so. Although useful information came to light, there was little progress with issues in Canada.

Potential direct liaison with political representatives also took place. COPSE, the Committee of Parliamentarians, Scientists, and Engineers, was organized in 1981 (partly as a successor to SCITEC's 1976 Canadian Parliamentary Scientific Committee), and I attended the meetings for several years on behalf of the ESC.

My main impression of these gatherings was not encouraging. Relatively few parliamentarians were interested enough in science to attend. Among those who came and I was able to talk to, one or two were surprisingly uninformed and simple-minded, whilst others—in striking contrast—could quickly comprehend complex matters. Even so, their analyses emphasized the short-term, and would centre on implications for their constituencies and their own interests.

The efforts of these organizations may have had some effect, but—as outlined below—attempts to strengthen research (even for conspicuous global issues such as the environment), were largely offset by a weakening Canadian economy and short-term political judgments.

The ESC was most active in Canadian umbrella groups for biology. The Biological Council of Canada (BCC, established in 1966) was made up of biological societies such as the ESC, the Canadian Society of Zoologists, and the Canadian Botanical Association. One member was the Canadian Council of University Biology Chairs (CCUBC), which fosters and promotes university education and research. It remains active in that role (e.g., CCUBC 2023a).

The Canadian Federation of Biological Societies (CFBS, established in 1957 and later officially registered as a lobbyist) served only the biomedical sciences community at first, but subsequently included other biologists. Like the BCC, it aimed to encourage biological sciences, contribute to science and technology policy, and lobby for research funding.

All of these groups (and individual societies, see below) emphasized the need for better support for research and development, and especially for basic science. They prepared numerous documents summarizing data and consolidating expert advice (e.g., Anonymous 1983; CCUBC 2023b). Active members of the ESC (e.g., Ball 1983) believed that efforts at the political level should try to establish a climate that would lead to increased support for science generally, rather than focussing directly on benefits for entomology. That role would best be carried out by the umbrella societies.

The BCC regularly published reports about its activities in the ESC *Bulletin* when the Society was a member. In 1977 it proposed a Canadian Institute of Biology to develop a more powerful lobby, but there was insufficient interest from member societies to proceed.

The BCC failed to secure grants for its work, and without guaranteed funding depended largely on the energy of a changing executive. It proved difficult to integrate the voices of the various societies (and some societies were little involved anyway). Nor could major successes in influencing policy be demonstrated. Some constituent societies therefore withdrew

(including the ESC in 1974, although it rejoined in 1977), judging that their interests were being little rewarded for the cost of the member levies.

Independent advisory boards established by the government also provided advice on how best to advance Canadian science. The Science Council of Canada (SCC, established in 1966) published many reports ([SCC] 2023). One report recognized neglected inventory studies as a key need in basic biology in Canada (SCC 1972), a stance that helped to reinforce the ESC's proposal that led to the Biological Survey of Canada for terrestrial arthropods (see below). However, the SCC's assertion was not officially validated until 20 years later, with international recognition that the assessment of biodiversity was important!

The National Round Table on the Environment and the Economy (NRTEE, established in 1988) endeavoured to ensure that science as well as economics would figure strongly in federal approaches to environmental problems. Its context and mandate are shown in annual reports (e.g., NRTEE 1996), and the organization produced many recommendations and analyses (see [NRTEE] 2023).

To an ever-increasing degree, however, the Canadian government became resistant to scientific advice even from its own advisory panels. The SCC was disbanded in 1992, and the NRTEE in 2013 (e.g., NRTEE 2013; Quirion et al. 2016). Eventually, even outside communications by government scientists were restricted lest they present results that were inconsistent with policy (e.g., Owens 2018).

These trends diminished still further the potential effectiveness of umbrella organizations for science in general, as well as for biology in particular. The BCC came to believe that it would not be able to secure adequate support, and merged into the CFBS in 1990. At the same time, the CFBS expanded further, notably by adding the Canadian Pharmaceutical Manufacturers Association.

The ESC joined the expanded CFBS in 1990 (Gibson 1993), absorbing the substantial cost for each member for 3 years. The members then voted to leave, many of them failing to see worthwhile results from the advocacy. After 1994, the ESC was no longer a member.

The Canadian Pharmaceutical Manufacturers Association had a separate and powerful lobby, representing Canadian drug manufacturers, including branches of multi-national companies. It was able to argue successfully against some government proposals. This success continued before and after it joined the CFBS, which then could also lobby on its behalf. The interests of the small societies that had belonged to the BCC seemed likely to have a lower profile. Indeed, several constituent societies could see no relevant outcomes from CFBS advocacy and eventually left the organization too. It was dissolved in 2010.

The operation of umbrella groups for biology in Canada had proved unsustainable. In any event, whereas scientists such as physicists and chemists have a reputation for pulling together, some biologists try only to secure for themselves a larger slice of the potentially finite pie, rather than seeking to show the need for a larger pie. I once heard this behaviour characterized as: "When biologists are threatened [as by potential funding limitations], they draw the wagons into a circle—and shoot inwards."

Supporting entomology

The great efforts by umbrella societies just described included substantial participation by ESC representatives, primarily in the Biological Council of Canada. The ESC regarded its own actions too as essential to support entomological science and serve society (e.g., Corbet 1972a). Even as government support waned, the ESC emphasized the pervasive ecological and economic impact of insects, and advocated for specific entomological topics.

From time to time, beginning in the 1970s, the Society submitted the names of candidates for the Grant Selection Committees of the National Research Council (and later Natural Sciences and Engineering Research Council), to try to ensure that entomology would be adequately represented. These suggestions met with little success.

Many initiatives came from the work of the ESC's Science Policy Committee and Public Education Committee. Those bodies were combined, separated, and re-staffed more than once as the Society sought the best framework for its efforts.

Four elements of the Society's attempts to sustain entomology in Canada can be identified: engaging entomologists to recognize threats to their science from government policies and become more vocal; sending correspondence to federal decision-makers on behalf of the Society to urge appropriate policies; preparing briefs and reports to document the need for particular actions and for study of certain entomological topics (and so underpin pertinent recommendations and encourage worthwhile activities); and trying to enhance public recognition of the interest and importance of insects and thus improve the setting in which policy decisions would be made.

Informing and engaging entomologists

For many years, Presidential and Gold Medal addresses at the annual meeting (published from 1969 in the *Bulletin*), together with editorials and opinion pieces, highlighted harmful reductions in support for entomological research. They exhorted members to become involved politically to advocate solutions, including membership in the umbrella societies (cf. Wiggins 1983).

The presentations recognized the poor federal support for scientific research, discussed the present state and future course of entomology, exposed deficiencies in the government's approach, and suggested remedies (e.g., Harris 1974; Wellington 1978; McEwen 1979; Eidt 1988a). Concerns about the neglect of systematics despite its importance (e.g., Mason 1969; Kevan 1969; Wiggins 1992) were endorsed by a resolution carried at the annual meeting in 1991.

These commentaries reflected the absence of a coherent long-term policy for science in Canada. The government did not understand that applied science is only as good as the basic science that underpins it. Basic research and development were neglected in favour of applied demands, and long-term investigations faltered in comparison to short-term projects seen as attractive to policy-makers.

Because the benefits of basic research come chiefly in the future, but costs in the present, long-term studies were cut back to restrain budgets. The significance of natural environments and of the species that comprise them, as well as understanding the complexity of nature, were undervalued. Because ecological predictions are never fully certain, decision-makers who were not biologists could use limited evidence to approve developments that generated revenue or

were politically advantageous, even if there might be adverse environmental effects (cf. Schindler 1976).

In parallel, as the economy slowed and overall government funding for scientists diminished, the management of scientific institutions was modified in unhelpful ways (e.g., Danks 2023, pp. 8–9). The knowledge, judgment, and efforts of scientists were undervalued. Fewer entomologists were employed in the country, and the proportion devoted to basic research was lower. Even when financing was made available, it was likely to be misapplied because “science” had not been distinguished from technology transfer, nor from glamorous individual technologies.

Influencing government—early advocacy

These patterns prompted successive ESC Presidents (in collaboration with the Science Policy Committee) to address official letters to the Prime Minister and other specific Ministers on many occasions. The letters dealt with environmental sustainability, pesticides, restrictions on conference attendance, research funding at universities, and other matters.

In particular, they emphasized general concerns about overall policies for research and development, as well as employment levels, and funding cuts to science agencies. A typical reply on behalf of the Prime Minister read: “I can assure you that the government is making every effort...”, but lacked any prospect for substantive change.

Likewise, when it was pointed out that patterns of government funding compromised the future of entomological research as much or more than that of other disciplines, a Ministerial reply to the Society, though suggesting that entomologists would not be laid off, asserted that government policy was not to increase annual budgets above 1970–1971 levels. Therefore, “flexibility and mobility” would be expected of entomologists (Olson 1970).

Accordingly, when the Agriculture Research Station in Belleville, Ontario, was closed in 1972, for example, the 17 research entomologists there were reassigned to 10 establishments across the country, where they would be expected to work mainly on local applied problems. Although current layoffs of departmental entomologists were avoided, later attrition was used to reduce the number of employees.

These trends confirmed that basic science, especially in entomology, was being neglected. Indeed, despite constant federal messages about “budget restraint”, the number of entomologists continued to decline even as the public service expanded (McEwen 1979, p. 72).

In summary, attempts by the ESC to influence politicians—just like similar attempts by the umbrella organizations—yielded little if any reversal in the fortune of entomologists. In hindsight, this failure might have been expected.

First, amid the cacophony of conflicting demands, politicians from successive governments—lacking wisdom, vision, and expertise—did what they had always done: decide on the basis of pragmatism and political expediency (Leroux and Cartier 1991). Outside advice was ignored, and even internal executives who were senior scientists (as opposed to career managers) could not persuade their political masters otherwise, and were disregarded.

An Assistant Deputy Minister once told me that he could argue with his political superiors only twice against a particular policy, no matter how misguided. The third time, he could either help to implement it or be replaced by someone compliant.

Second, at the operational level, many of the senior managers I talked to were unwilling (or could not see a way) to address “public good” themes, such as environmental protections,

ecological understanding, long-term values, heritage, and discoveries in basic science. Specific short-term activities that they could both control and quickly justify to their leaders were preferred instead.

Such political realities were captured in a talk I attended, delivered by a principal member of the National Round Table on the Environment and the Economy. On behalf of that independent advisory group to the Canadian government, he had met with senior politicians to talk about the need for environmental sustainability, heritage values, and the like, but they had no interest whatsoever. However, as soon as he told them that a linkage with the idea of environmental sustainability might help to secure agreements from indigenous people for the development of a tax-generating diamond mine on their lands, the politicians became fully engaged.

Again, as soon as web-based data banks could be set up (following advances in computers and the Internet), they were seen by managers as particularly attractive, and were easier to justify to non-biologists than the basic systematics work needed to make them feasible. Yet another digital platform might be funded to host existing data about a well-known group (such as birds). However, no additional funding was assigned to basic taxonomic work that would allow comparable portals to be set up for inadequately known arthropod taxa (Danks 2018, p. 27).

Third, it was difficult for the small number of entomologists to be heard above other scientific voices. For example, in the late 1980s, the Biological Survey of Canada saw the need to investigate the impact of climate change on insects. It was in touch with the Royal Society of Canada, which had been charged with developing the Canadian Global Change Program. However, the people heading that program wanted very large-scale modelling endeavours to test particular hypotheses (as might be appropriate for climatological data, perhaps), and not the sort of baseline work needed for an entomological component (Danks 2016, pp. 75–76).

In any case, the job of scientists is to discover and interpret information, not to act as politicians, professional lobbyists, or full-time advocates. Moreover, hiring a full-time lobbyist would be unreasonably expensive for a small society. Although potentially feasible for a large umbrella organization (but still not guaranteed to influence policy) this route had been deemed too costly relative to its benefits for entomology (see *Scientific societies and group advocacy*).

Briefs and projects

During this period of intensive advocacy by the Society, various more or less formal briefs and reports were prepared in an attempt to underpin some of the recommendations. Documents with similar but broader aims were also being produced by the umbrella organizations, as outlined above.

The ESC secured outside funding for a few specific products. Contracts with the Department of Supply and Services, and then the Public Service Commission, were used to assess the future demand and supply of entomological manpower (McEwen et al. 1976; Madder et al. 1984).

Given the prevailing political context, few major changes were predicted by either study, and little change in demand took place in the interval between them. Any hope that such studies would promote the need for entomologists was not met.

Agriculture Canada supported two analyses by the ESC of the benefits and costs of controlling destructive insects (Stemeroff and George 1983; Madder and Stemeroff 1988).

However, these demonstrations of the value of relevant work still did not lead to any visible strengthening of basic research or entomological staff.

Other briefs were initiated by the ESC to promote or comment on subjects of particular entomological, educational, or practical interest: populations and resources (ESC 1970a), pesticides and the environment (ESC 1970b), laboratory cultures of insects and related arthropods in Canada (Kelleher 1971), university research funding (Mackauer et al. 1978), entomological education in Canadian universities (Holliday et al. 1983), microbial insecticides (Morris et al. 1986), insect transmitted plant diseases (ESC 1993a), and pest management policy (ESC 1993b).

For a time, the ESC's Science Policy Committee maintained a dossier of neglected areas of study, and the Biological Survey of Canada (launched by the ESC in 1977) identified many similar topics. The Biological Survey then produced a large number of briefs about the value of studying certain arthropods or habitats in Canada, and about methods to study biodiversity. The initial proposal for the Survey (1974) and a progress update (1977) were also published.

Collections of Canadian arthropods (1978), soil arthropods (1982), appraisal of environmental disturbance (1984), the need for an inventory of freshwater springs (specific federal brief, 1984), insects of Canada (1988), arctic invertebrate biology (1989), arthropods of freshwater springs (1990), arthropod ectoparasites of vertebrates (1991), research collections (1991), methods for sampling terrestrial arthropods (1994), preservation of collections (specific federal brief, 1995), ecosystem management (1996), guidelines for biodiversity studies (1996), specific validation of those guidelines (2000), funding for biodiversity studies (website information 2000), label data standards (2001), grassland arthropods (2002), and voucher specimens (2003) were all considered. All of the briefs produced by the Biological Survey are listed with full citations by Danks (2016, pp. 137–138).

Some of this information showed how the diversity of arthropods should actually be assessed, attempting to steer the many, mostly small and inadequate, "biodiversity studies" that had been funded in response to the 1993 Convention on Biological Diversity.

Recommendations about guidelines for specimens collected during biodiversity studies and grant-assisted research were transmitted to the Natural Sciences and Engineering Research Council (NSERC) and more widely (1995). Reviewed by core personnel rather than senior politicians, they were adopted by NSERC.

The ESC and the Biological Survey treated some of the topics in much greater detail by holding scientific symposia, and publishing symposium proceedings and other works. Many ESC symposia took place at annual meetings. All of the Survey's scientific publications, documents, and background information are given under each project by Danks (2016), and full citations of the various symposia and workshops are also collected into a single list (pp. 143–144).

The general and scientific reports prepared by the Entomological Society of Canada and the Biological Survey of Canada proved valuable to entomology because many of them synthesized scientific findings, supported cooperative projects, and were followed up by entomologists. Nevertheless, like the letters about policy noted in the previous subsection, no conspicuous influence on decisions at a senior level could be claimed.

For instance, on behalf of the Biological Survey, a colleague and I presented a brief to the Commission of Inquiry on Federal Water Policy (the Pearse Commission, 1984), elaborating a recommendation made to Inland Waters Canada in 1983. It called for a national inventory of

freshwater springs to improve the setting for research of various kinds, encompassing studies of arthropods as well as other informative analyses.

One of the Commissioners noted that, among the scores of briefs presented, the Biological Survey was the only proponent that did not want something for itself. Those with more forceful vested interests must have been rewarded, however, because no government inventory was made.

Likewise, follow-ups from the Survey's briefs on biodiversity, as well as participation in various workshops, suggested that the Canadian government's response to the Convention was more political than scientific. Apparently, the chief aim was not to push science forward but to claim that Canada had responded appropriately to the Convention.

Existing studies were listed to show how much the country was doing, but few additional resources were forthcoming. Workshops organized by the lightly funded "Biodiversity Convention Office" to develop specific assessment methods were funded, but not any actual research or follow-up (and the scientific experts who contributed received only travel expenses). Broader workshops to develop policies sought simple short-term tasks that might impress senior leaders, not a substantive long-term plan (Danks 2016, p. 93; Danks 2018, p. 26).

Later advocacy

The ESC was an independent body with scientific credibility, yet most of its policy statements had fallen on deaf ears. The lack of response became ever more apparent.

As early as 1992, the annual report from the Chair of the Science Policy Committee (the next ESC President) stated that "No contacts were made, nor lobbying conducted...; it was considered a waste of time during the current economic recession." (Riegert 1992). After a carefully crafted brief demonstrating the need for scientific action had been finalized by the Biological Survey, one member commented privately that "In Ottawa, this document and 50 cents will get you a cup of coffee." Nowadays, of course, for that sum you wouldn't even get the coffee!

Despite such reservations, many Presidents, the Science Policy Committee, and other members persisted in trying to sway government policy, but the activity became less frequent. Concerns about endangered species were registered through the work of an Ad hoc committee (from late 1988 until 1997, when it was combined into the Science Policy Committee). An ESC resolution in 1994 declared that endangered species legislation should not include provisions that would impede the study of insect diversity.

Recommendations on how best to follow up the Convention on Biological Diversity were sent forward. Letters of support for the International Commission on Biological Nomenclature (ICZN) and other bodies were written. The ESC rejoined the International Union of Biological Scientists (IUBS) in 2007.

However, most of the Society's initiatives now responded to developments that would impede entomological studies, such as particular funding cuts, rather than raising ongoing general concerns about scientific resources and the need for science-based approaches. The Science Policy Committee also dealt with a few specific topics rather than with general themes. For example, it considered funding requests from organizations protecting wilderness or studying pollinators.

During this period, letters to Ministers, and resolutions passed at the joint annual meeting, pointed out specific adverse impacts on the study of entomology. Massive cuts to the Canada Institute for Scientific and Technical Information of the National Research Council (NRC) in 2009 would cause the loss of the monographs series. That series had already accepted several lengthy taxonomic treatments of insect groups, but they would not now be published there. Free electronic access to NRC journals would end when the program was transformed. Ways should be found to allow entomological research despite prohibitions on the transfer of genetic resources that stemmed from the Convention on Biological Diversity (ESC resolution 2009). Proposed closure of the Experimental Lakes Area in Ontario, where much investment had been made to collect valuable scientific reference data, would compromise years of research (2012). Federal restrictions on travel would impede scientific discourse (2013).

A few of the harmful plans were partly offset. For example, the Experimental Lakes Area was taken over by the International Institute for Sustainable Development. Perhaps the advocacy of the ESC helped to mitigate some of the outcomes, but entomology suffered further harms. Agriculture and Agri-Food Canada closed the Cereal Research Centre in Winnipeg in 2014, with corresponding staff reductions (Lamb et al. 2013).

Indeed, responses to the Society's advocacy tended to follow the same pattern as in earlier decades. After separate letters about travel restrictions had been sent to two different government departments, the *Bulletin* reported drily that "Both letters received identical responses."

A change of federal government in 2015 gave hope for improvement. The ESC's letter to Ministers of the new Liberal administration called for the judicious reversal of the downsizing of federal science, which was jeopardizing Canada's ability to make knowledge-based decisions needed in the modern world (Anonymous 2015c). No less than four Ministers replied (Anonymous 2016), declaring that they recognized the importance of science. Admitted too was the need for "more transparent and open government".

Nevertheless, even when some funding was improved, the short-term thinking that had characterized earlier decades—underestimating the importance of long-term scientific research, failing to distinguish research from short-term technology transfer, and promoting topics with wide public appeal—predominated. There was no clear upsurge in support for basic research in general, nor for entomology in particular.

Canada's overall commitment to research and development is still much smaller than other developed countries. In 2021 Canada spent only about 1.7% of GDP [Gross Domestic Product] on research and development, whereas the level was around 2.9% [2020] for the United Kingdom, 3.3% for Japan, and 3.5% for the United States (OECD 2023).

Despite this poor level of support, briefs and articles from the ESC continued to appear (e.g., De Clerk-Floate et al. 2011; Mason et al. 2018). The Science Policy Committee remained engaged in these issues (e.g., Huber 2017). In 2022 that committee organized two web-based seminars (webinars) entitled "Science meets policy" to encourage input from members.

Influencing senior decision-makers remains very difficult. Most current members of the political hierarchy (of any affiliation) know little about science, and far too many of them appear to weigh political or personal advantage more heavily than the potential for long-term benefits to society. To echo a characterization made a generation ago (Leroux and Cartier 1991, see above), they still lack wisdom, vision, and expertise.

Notwithstanding these difficulties at the political level, excellent work continues in government branches, universities, and other establishments thanks to the efforts and interests

of individual entomologists. So do cooperative studies, which bring added value. Many of them have been facilitated by the ESC's briefs and assessments of scientific needs, and through contacts made through the Society.

Moreover, many excellent students continue to study entomology, giving hope for the future, especially because multiple career choices in entomology are available (cf. Wheeler 2016). They extend well beyond the federal-research-scientist and academic routes taken by many members of the Society in earlier decades. Those were the opportunities most impacted by funding priorities within the federal government.

Public education

The ESC also sought to generate broader support for entomology by informing and engaging people of all ages who were outside the profession of entomology. (For those already studying entomology see *Student members*.)

A Committee for Student Encouragement, targeted at youth, was established in 1967, and a Committee on Publicizing Entomology, targeted at the general public, in 1972. Among other initiatives in this arena were engaging science writers to teach entomologists how to write successfully for the public, and a school essay contest with a prize, but those activities were short-lived.

Funds were offered to the regional societies in 1970 (\$1 000 apportioned on the basis of population) to develop cash awards or prizes that would encourage entomological activities by students at schools. The ESC also provided funds from 1971 until the early 1980s to support the newsletter of the Teen International Entomology Group (TIEG)⁵.

In Europe and elsewhere, many species other than pests are regarded in a positive light, and there are far more amateur entomologists than in North America. Entomology profits from that more favourable climate, which makes it more likely that the importance of insects will be understood.

Trying to widen public appreciation for insects in Canada, where the majority of people give little thought to species except for a few pests, was the goal of the Committee on Publicizing Entomology. In 1975 that committee was merged with the Student Encouragement Committee as the Public Education Committee.

The committee launched a number of initiatives in 1977 (Trottier et al. 1977), including a brochure on careers in entomology, and a resource catalogue listing available insect slides, films, etc., of educational value (ESC 1977). A mailing list of entomologists willing to contribute slides, give talks, and so on, was prepared⁶.

The committee also promoted entomology through news releases to those on a list compiled for the purpose in 1977. In fact, the idea of a media contact list has been emphasized repeatedly within the Society—but at infrequent intervals from the 1970s until present. However, these suggestions were not always accompanied by equal attention to preparing media-friendly documents to distribute.

Some members felt that educating the adult public is especially important to influence science policy. Exposing scientific needs, and how scientific research benefits society, might

⁵ TIEG later changed focus (see Acorn 2018b) and was called the Young Entomologists Society.

⁶ However, the lack of response to the committee's initial request prompted the comment: "Where are all the entomologists in Canada? Are they too busy writing scientific papers?!"

engender greater support than had come from attempts to lobby a small number of unreceptive politicians.

This potential linkage between public education and advocacy prompted the Society to combine the Public Education and Science Policy Committees in 1978. Unfortunately, public engagement at this level would depend on a better understanding of science, which remains relatively narrow in Canada. The combination proved inadequate, and after two years the committees were separated again. However, some activities to engage the public continued. In 1988, the Science Policy Committee organized a news conference to point out the decline of Canadian government support for scientific research (Eidt 1988b), prompting appreciable news coverage.

Schemes that might enhance interest by the public were promoted. An annotated directory of selected entomologists in Canada was generated in 1982 by asking each regional society to provide a few names of people who could answer general queries. It was made available in particular to the Science Writers Association of Canada. A collection of insect photographs was assembled on the website to enhance public interest (2002).

Postage stamps have potential promotional value, and Canada Post was lobbied successfully to produce a series of butterfly stamps to commemorate the XVIIIth International Congress of Entomology in Vancouver in 1988 (an effort made by Ray Morris, see Dixon 2004). Another series of stamps, depicting beneficial insects, was issued in 2007 (Anonymous 2007).

The idea of establishing a national insect for 2000 was addressed by a National Insect Commemoration Committee in liaison with Heritage Canada, but the idea was shelved after a poll by the federal government showed that the public was strongly against the idea (Philip 1999). The possibility was later raised again on the ESC blog (Jackson 2012).

The ESC also suggested, and provided input for, the development of Canadian coins bearing insect images, produced by the Royal Mint in 2014 (McClay 2012).

The original mandate of the Student Encouragement Committee was maintained, promoting interest in insects amongst school-age children. Children are attracted by insects, and that interest could be enhanced before it was offset by entomophobic adults. The discipline of entomology would be helped, and there might even be desirable longer-term impacts on public perception.

Seeking to reinforce the value of such activities, the Society agreed that individuals who had promoted entomology amongst young people should be recognized by a prize to be presented at annual meetings. The first such “Junior development award” came in 1977. It was later called the Criddle Award (see *Awards*).

Importantly, *annual* financial support for the regional societies was approved in 1977 for their efforts towards encouraging early interest in insects. Many societies were already developing their own programs (cf. Galloway 2020), and indeed, the ESC increasingly came to believe that student encouragement was best carried out at a local level. The support to societies, available on request, was set at \$100⁷, and increased to \$200 per year in 1983. The annual support was not always claimed (and unclaimed amounts could accumulate for up to 3 years), although when separated from the Science Policy Committee and reconstituted in 1980, the Public Education Committee included a representative from each regional society.

⁷ \$100 in 1977 had a purchasing power of about \$470 in current dollars [from Bank of Canada Consumer Price Index calculator]

Most efforts in public education were coming from individual entomologists and from regional societies, therefore. However, the committee did assemble various semi-popular published articles (1992) in the hope that they could be reprinted for distribution to schools. It recommended (1994) that a video describing entomological science be purchased or produced, and delivered to public libraries and schools through regional societies.

As regional societies continued to expand their youth encouragement programs, the Public Education Committee's role became increasingly confined to handling funding requests from those societies. Consequently, in 1997 it was once more combined with the Science Policy Committee. (It was separated again only when the latter seemed to be oversubscribed in 2015.)

Regional society efforts, some of them supported by ESC contributions, took a number of forms. Some were based on liaison with schools. Events for children and the public were organized by the Entomological Society of Ontario when the 2003 joint annual meeting was held in Sault Ste Marie.

The ESC recently enhanced its support for regional public education initiatives. Each society received a one-time supplement of \$1 000 for this purpose in 2018–2019, and annual funding was increased to \$500 in 2020.

The ESC's Public Education Committee also renewed its activities, and a booklet describing careers available for those trained in entomology was initiated. Links to a variety of Internet resources, comprising interest groups, videos, and other materials about insects, were posted in an *Education and Outreach* subsection of the website. Such resources would assist school teachers to engage their students through information and field activities, for example.

Illustrated items were prepared about “Canada's coolest or cruellest insects”, highlighting species that might stimulate interest from a wide audience and could be featured through blog posts (e.g., Acorn 2018a). Later, they were published in the *Bulletin* (e.g., Bouchard 2019; Floate et al. 2019; and 9 subsequent items so far).

Amateur involvement was also promoted from 2019 in conjunction with regional societies by planning National Insect Appreciation Day (NAIAD), an event to be held on 8 June⁸ (see the ESC website under *Resources*). The name was changed to “... Days” for 2023 [8–13 June], so that the date would be flexible⁹. However, in response to the limitations imposed by COVID, the first few events took the form of online Insect Picture Challenges, replacing planned in-person events (cf. Entomological Society of Alberta 2020).

Beyond these ESC and regional initiatives, public engagement and amateur encouragement have been favoured, especially in the last decade, by a conspicuous increase in Citizen Science. These schemes enlist non-scientists to make observations that help to document ranges, abundances, local biodiversity, or other information. Insects have been targeted or included in many of them (e.g., Acorn 2017; Xerces Society et al. 2023; Fitzpatrick et al. 2023).

The ESC was seldom engaged directly in these schemes, but its interest in promoting public awareness continues in conjunction with regional societies. The national society was part-sponsor of a 2019 scheme in Ontario, for example (Timms 2020).

⁸ The 8th day of the 6th month symbolizes 6-legged insects and their 8-legged relatives.

⁹ Such an idea appears to have been first established in 2014 in the United Kingdom as national insect week (now simply insect week).

The Biological Survey of Canada has taken part in some Citizen Science endeavours, and was a partner in Bioblitz 150 (Sheffield et al. 2017). Some of the Bioblitzes organized by the Survey itself had public participants (e.g., Peach 2022; although Acorn 2017, p. 783, cautioned against diluting core activities).

The ESC recently developed other ideas to promote amateur entomology. The most prominent result was the creation for 2020 of the membership category of Entomology Enthusiast (see *Membership*).

Modified priorities and the first strategic review

The Society's earlier general advocacy for research in entomology had little effect, and Society membership declined markedly as entomological employment fell (see *Temporal patterns of membership* below). As the appeal of external advocacy diminished, the Society began to examine its own operations more closely (Timms 2014). Costs were climbing and revenues were falling, and it had become clear that "It is not now possible to run a 500-member society as though it were still a 1000-member one. A strategic review ... might therefore be appropriate." (Danks 1994).

That recognition prompted the Society's first strategic review, completed in 1996, which examined organizational structure, publications, revenue enhancement, headquarters operations, and relations with affiliated societies. Many of its recommendations (West 1996) were implemented, after being discussed by the Board at a special session on the day before the usual business meeting.

Despite growing attention to such internal matters, the ESC continued to support entomology in many ways beyond the roles of advocacy and public education described above. It maintained the core functions of publishing the journal and providing opportunities for members to interact, and it developed and enhanced a variety of benefits and services to assist the work of individual members.

Membership

Membership is the single most important determinant of what the Society can achieve. The extensive reorganizations of the ESC that took place in the late 1990s, and again in subsequent decades, were prompted chiefly by declines in membership.

Member categories

Originally, participants in the Society were all *Regular* members. They included members from other countries, especially entomologists from the United States who had some connection with Canada. No special category was established, but eventually additional fees were assessed for mailing paper copies of ESC publications to international addresses.

However, other categories were introduced. A *Student* membership had appreciably lower fees (see *Student members*).

There were *Sustaining* members (organizations supporting the Society's aims) for many years. However, their number was very low, sometimes only two or three. A subcommittee established in 1977 to recruit sustaining members—through approaches to chemical

companies, for example—was unsuccessful, and within a few years the category was discontinued.

Emeritus membership was approved in 1971, originally with restricted member benefits. As more and more members retired, a substantial proportion of them kept their membership, and might also remain as volunteers in the Society. The category is available to those retired from careers in entomology, after regular membership for 10 years or more.

The number of *Emeritus* members varies less than that of other member categories: currently about 70 people, with a 5-year average of 14% of the membership. The benefits and costs for *Emeritus* members have been adjusted several times.

Honorary memberships (1969) and *Fellowships* (1975) were also set up, and are noted below under *Awards*.

Additional subcategories of members were established as the cost of producing the Society's publications rose. For example, after 1991, members who elected to receive the *Memoirs* paid an additional fee, and students could choose a cheaper membership without receiving *The Canadian Entomologist*. Electronic publication of the journal from 2003 led to the development of cheaper options to receive only digital and not paper copies.

Some special member categories have been considered but not viewed as warranted, such as a joint/family membership category proposed in 2001. More recently, however, new categories, with appropriate fees for each, were created to encourage membership and assist members whatever their age or stage.

Early Professional status was approved in 2014, to begin in 2015. It provided a discounted membership fee for people beginning their careers, who had completed their highest degree within the past 3 years. In 2020, that qualification was changed to within the past 5 years. *Early Professional* membership also brought discounted registration fees for annual meetings. The category is now well subscribed.

The Society's fee structure had become increasingly complex, and there were difficulties in setting up online renewals. Those problems were solved, whereupon most calls to simplify the membership structure subsided.

The category of *Entomology Enthusiast* (first approved for a 3-year trial period in 2019) was available for the 2020 membership year. The category is intended to encourage participation by entomologists other than professionals and university students of entomology. Amateurs who are interested in insects could join for a lower fee, but still gain access to the journal. Ways to involve amateurs more fully had been suggested by the Membership Committee, especially in 2004 (Sweeney 2004), but few concrete steps were taken.

Several dozen *Entomology Enthusiasts* have already joined the Society. This response confirms that many people here do have broad interests in insects or insect photography, even though dedicated amateur entomologists are much fewer in North America than in some other countries.

How the Society adjusts to accommodate these enthusiasts, and how they are treated by members, may determine the long-term impact of the category. Although many professional entomologists were helpful when I was an amateur years ago in England, a few others seemed to regard amateurs as worth exploiting for data or specimens, but not for inclusion or acknowledgement. As a result, some members of the amateur entomological community became wary of engaging with professionals.

The Society repeatedly reconsiders membership categories and fee structures, chiefly when prompted to do so by input from the Membership and Finance Committees.

Temporal patterns of membership

Over the long term, membership in the Society has reflected prevailing national attitudes to science, which determine the resources devoted to research in entomology and other subjects. K.W. Neatby, who believed in the importance of core research, was appointed in 1946 as Director of the Science Service at the Department of Agriculture, the department with the largest number of entomologists on staff (Anstey 1986; Cody et al. 1986). He tripled the annual budget, hired more staff at federal institutions, built facilities, created postdoctoral positions, and encouraged interdisciplinary work (Timms 2014).

With funding and creative freedom assured, Canadian entomologists then published a remarkable trove of taxonomic, ecological, physiological, and other work. During that period, and long afterwards, the results were put to use to manage pest problems, to characterize the fauna, and in other ways.

Membership in the ESC grew rapidly during this time. However, in the 1970s and 1980s the economic downturn and the approach of the federal government to science and its management (see *Supporting entomology*) derailed the vigour and robustness of entomology in Canada, and shrank the workforce.

For example, the number of professional entomologists associated with the Canadian National Collection of insects and arachnids fell from 40 in 1965 to only 22 in 1990 (Dang 1992). However, the size of the collection—reflecting the challenging diversity of the fauna and the energy of entomologists hired during the decades when basic science was encouraged—had increased from about 2 million specimens in 1950, to 9 million in 1970, and to 15 million by 1990 (Dang 1992, figure 1). The Department of Agriculture had 170 entomological staff in 1968, but only 89 in 1992 (Danks 1994). Fewer entomologists were seen at universities, too, where those who left might be replaced by biologists with different specialties.

Correspondingly, membership of the ESC, which peaked at 1 074 members in 1969, had fallen to 527 members by 1994 (Danks 1994). The downward trend had been inexorable, notwithstanding intermittent efforts to seek additional members through letters to the Chairs of university departments, and by direct recruitment.

Annual membership statistics were not always communicated to members, but the *Bulletin* contains scattered records, as well as figures for multiple years (e.g., Quiring 2006, for 1997–2005; Sperling 2023, for 2018–2022). Earlier, membership lists—though not always complete—were provided to members in printed form (1969, 1971, 1977, 1988, 1992, and 1997), as inserts in the *Bulletin* or separately by mail.

Tracking membership trends is made very difficult by great annual variation¹⁰. The variations appear to be correlated with multiple factors apart from the number of entomologists: the cost of membership; short-term memberships associated with lower annual meeting fees for members (particularly at the largest joint meetings); changes in meeting attendance according to the cost, distance, or attractiveness of a particular meeting (and more recently because of COVID); employer support for entomologists to attend; the availability of virtual meeting components; whether statistics were reported before or after annual meetings at which members might enroll or renew; problems associated with electronic membership renewals; ESC membership drives (particularly efforts to attract student members); and other variables.

¹⁰ Also, different sources report slightly different figures for some years.

Comparison among years is also compromised by changes in the number and characteristics of membership categories.

In broad outline, however, the records show that beyond the 1990s (when average membership for the whole decade was about 570) membership fell a little more. The average was 515 in 2001–2005, reflecting ongoing challenges of employment patterns and weakness in the national economy. Thereafter, membership stabilized, often around 450 or 500 total members, but with substantial variations. Part of the decline, especially for foreign members, may stem from widening access to digital copies of the journal.

Average membership for the past 6 years (2017–2022) was 498—but it varied from 417 to 547! Two of the three highest years included joint annual meetings at which the Entomological Society of America was present (527 in 2018, and 547 in 2022). One of the lowest was in the first year of COVID (2020), when the annual meeting was cancelled.

Continuing membership concerns and further strategic reviews

Membership seemed destined to remain relatively limited as the trends that had generated the 1995–1996 strategic review persisted. Conspicuous downturns in enrollment elicited intermittent hand-wringing about the possibility of ever-decreasing membership (e.g., Fields 2004). Increasing publication costs, inflation, and changes in revenue might therefore threaten the health of the Society.

These general patterns—rather than any acute problem—reinforced the need for continued attention to the operation of the ESC. They prompted further strategic reviews from time to time.

The review completed in 2005 (Lamb 2006) focussed on membership, but also on finances and information technology. It spawned further reviews on the implications of information technology (Cusson 2006) and on options for *The Canadian Entomologist* (Fields et al. 2007). A review of committee structure determined that no substantive changes were necessary.

For the strategic review in 2017, a full-day Board meeting was assisted by a professional facilitator. It was also supported by input requested beforehand (largely through questionnaires) from ESC committees, regional societies, and others. That review addressed membership and membership categories, but also finances, value received by members, and ways to celebrate insects and their relatives at a national level. Society governance was also examined.

A full report from the review, and a document on ways to address financial sustainability (prepared by the Treasurer), were then used to develop initiatives that are noted by Bouchard (2018b) and Anonymous (2019a, p. 57). They include interactions with regional societies that are summarized towards the end of the section on *Public Education* above, and under *Other liaisons with regional societies* below.

Along with these broad reviews and associated follow-ups, there was constant attention to possible means, both major and minor, to reduce or offset the ESC's costs. For example, additional fees were imposed to cover postage for members who still wished to receive paper copies of ESC publications. From 2009, separate printed brochures with information about award winners were discontinued, and those details were provided only in joint annual meeting documents and in the *Bulletin*. Targeted later analyses included the ESC headquarters operation in 2014 (see under *Governance*), and *The Canadian Entomologist* again in 2021 (noted under *Publications*).

The Society plans to conduct intermittent strategic reviews to ensure that it stays relevant and financially sound. The next review is in progress (2023), its initiation delayed by uncertainties created by the COVID pandemic.

Influence of cost on membership

When membership was high, many members belonged to the Society to provide general support. In 1980, responses to a questionnaire showed that for Canadian members (227 respondents) the main reasons for joining the ESC were—in descending order—to support the Society, receive *The Canadian Entomologist*, publish there, and participate in annual meetings (Turnock 1980b).

As membership declined, however, potential members became sensitive to the cost of membership relative to the perceived benefits, a trend amplified when the national economy was weak. Indeed, as already noted, some people join only for the year they plan to attend the joint annual meeting, to take advantage of the lower fee for members. Subsequently, they do not renew their membership or keep in contact with the Society.

This behaviour explains the boost in membership, especially of students, at the largest joint meetings. However, permanent members too are particularly sensitive to the cost of attending the meetings (MacQuarrie and Konopka 2018).

Consistent with a sensitivity to cost, membership dropped when fees were significantly increased (Danks 1994). In 1989, page charges were reduced at the same time, but membership fees were normally being paid by members, whereas page charges were covered by their institutions. The drop in membership acted as a warning that adequate research should be carried out before the Society acts on recommendations for major fee increases. In recent years, more prudent increases, designed merely to compensate for inflation, have been recommended.

From 1997 until 2012 (when page charges for *The Canadian Entomologist* were eliminated), members had the advantage of paying lower page charges than non-members. This advantage seemed to have little impact. Many papers were once contributed by a core of members who chose to publish most of their work in the Society's journals rather than elsewhere (cf. Danks 1994). Changes in production, and in the publishing environment, reduced this bond—and a smaller proportion of entomologists now publish in general entomological journals anyway, preferring to use outlets devoted to specific subjects (see *The Canadian Entomologist*).

These tendencies, and comments from potential members, confirm that many people focus mainly on the cost of joining the Society. They view cost as more important than general support for entomological science in Canada, for the Society, or for the journal, and believe that it outweighs the perceived benefits of membership. Apparently, the many benefits (summarized near the end of this account under *The values of membership*), and their augmentation over the years, are not fully appreciated.

Face-to-face, but not remote, conversations with people interested in entomology are a good way to bolster this appreciation. The Membership Committee reached that conclusion long ago when it launched a “personal contact” campaign in 1972!

The recent addition of member categories has had a positive impact. More than 50 people have taken up Early Professional membership (2022), suggesting that the effort to help former students has been appreciated. In the short time since the category of Entomology Enthusiast was established, about 40 enthusiasts have joined the Society.

Publications

One fundamental role of the Society has long been to produce original publications of high scientific quality in the form of its well-respected journals, *The Canadian Entomologist* and the *Memoirs of the Entomological Society of Canada*. It has also published a few books. The *Canadian Journal of Arthropod Identification*, an online journal of high quality produced by the Biological Survey of Canada, was adopted by the ESC in 2011. The *Bulletin of the Entomological Society of Canada*, providing information about Society business, scientific content (but not original research), and other entomological matters, was first published in 1969.

The Canadian Entomologist

The flagship journal of the ESC, *The Canadian Entomologist* (TCE¹¹), is the oldest scientific journal in Canada still being published, but has changed significantly over the years (e.g., Eidt 1982). Some earlier volumes contained reports of board meetings and entomological activities, for example. The content then evolved to include only core scientific papers reporting significant findings, but covering a broad range of subject areas within entomology. The progression has continued, with less observational and more applied research (Floate and Huber 2018).

A volume appeared every year from 1868/69 (volume 1) until the present (2023: volume 155), although the number of issues per year decreased from 12 (1868/69–1989) to 6 (1990–2021) in order to simplify production.

For many years, every manuscript would be submitted as an original typed paper copy, plus two carbon copies for the reviewers. Photocopiers became common after the late 1960s, and although submissions were still in hard copy two photocopies accompanied the original. With the spread of word processors and then personal computers in the 1980s, generating the manuscript was much easier, and was expected to make the editorial process easier too.

In 1982, the Finance Committee recommended a notice in the journals to advise authors who submitted long manuscripts that they should do so in word-processed format on diskette, provided the format they generated could be used directly by the printer. The hope was premature, given the variety of available systems and the specific requirements of the press.

Therefore, editors and reviewers continued to work by annotating paper copies. Editorial staff responsible for copy editing used the same system. Copy editing ensured that the text was error free and followed the standards of the journal, and also indicated how the manuscript was to be typeset for publication. That role was played for many years by a Managing Editor (initially called the Assistant Editor) in the ESC's office.

As the 1990s advanced, more and more correspondence between editors, assistant editors, and authors took place by email. For many years previously, most communications about manuscripts were sent through the postal service. It normally took months to mail typescripts and comments from author to editor, from editor to reviewers and back again, and to generate revised version(s). Then copy editing, typesetting (which generated a completely new version to be checked, rather than adjusting an existing electronic text), verifying multiple sets of proofs (including one set sent to the author), and printing, had to be completed.

¹¹ The title of the journal has always included the definite article, although most publications, even those that cite journal names in full, omit it. The abbreviation TCE is prevalent within the Society, but is italicized here because it is used elsewhere for the common industrial solvent trichloroethylene.

Generating and copy editing the text on computer gradually became common, and in 1994 manuscripts were accepted on diskette (Gerber 1994). An upgraded computer system for the ESC office was acquired the same year to facilitate electronic processing of manuscripts, a measure that would much reduce costs, as the Finance Committee had hoped years before.

At the same time, a more modern look was designed for all of the Society's publications (Gerber 1994). Beginning in 1995, the covers of *TCE*, the *Memoirs*, and the *Bulletin* had similar layout and appearance, but the covers were yellow-green, grey, and pale blue respectively.

In the face of rising costs and inflation, the Governing Board, with the Finance and Publications Committees, regularly considered how to reduce publishing costs, obtain more revenue, and encourage membership by linking it with the journal. A report about these issues was prepared in 1971. In 1974, following an increase in printer charges, the Finance Committee considered alternative publication avenues and made cost-saving proposals. There was a similar attempt in 1992–1993 after a budget with a substantial deficit had been proposed (cf. Anonymous 1992, pp. 180–181).

However, no viable alternatives were found to using a commercial press, printing on high-grade paper, and maintaining strong production standards. Appreciable savings would be possible only by compromising quality. Instead, more than one increase was applied to the cost of memberships and institutional subscriptions.

The Board decided in 1971 that publication should be restricted to members as an inducement for membership, but the restriction was not enacted after some members raised objections. However, starting in 1994, only members could apply for a waiver of page charges, a route that had been established earlier (subject to evaluation by the Publications Committee) to assist those without institutional support.

Page charges too were increased in an attempt to keep pace with rising production costs. Set at \$25 per page in 1969, they rose to \$47 in 1975, \$59 in 1978, and \$75 in 1984, although in practice the listed charges were reduced—e.g., by \$20—if a government grant-in-aid of publication (see below) had been received for that year.

In 1989, however, despite ongoing inflation, page charges were reduced to \$25¹² following a recommendation of the Finance Committee. There were compensatory increases in fees for members (and subscribers), but they led to a significant loss of members (see *Membership*).

In 1993, the Society increased *TCE* page charges modestly to \$30, but page charges for the *Memoirs* were raised to \$45, reflecting the higher production cost of these stand-alone volumes.

The Society also considered copyright issues, initially to increase visibility and acknowledgement of the journal, rather than for legal recourse. Registration of copyright was recommended on this basis by the Publications Committee in 1989, but not followed up.

Enquiries in 1995 showed that although copyright had been held by the ESC since 1924, it had never been registered. Therefore, *TCE* and the *Memoirs* were duly registered with the Canadian Intellectual Property Office (Anonymous 1995), and a copyright notice began to appear on all publications, beginning with the Nov/Dec 1995 issue of *TCE*. The Society's copyright applied only to the journals, and authors retained copyright for their individual articles.

¹² In current dollars, these page charges would have been worth about \$200 in 1969, \$260 in 1975, \$255 in 1978, and \$195 in 1984, but less than \$55 in 1989 [from Bank of Canada Consumer Price Index calculator].

By the mid 1990s, multiple factors had combined to make the method of production of the journal no longer tenable. Employing a Managing Editor was a very costly way to put out a relatively small number of issues. The cost of the actual printing had increased rapidly, at the same time as cheaper technologies became available. The expense of mailing issues to members and subscribers escalated because of postage increases. Grants-in-aid of publication, used to defray page charges to authors, had been obtained intermittently in the past from the National Research Council and then the Natural Sciences and Engineering Research Council, but were no longer available.

Furthermore, the pursuit of entomology in Canada was changing, with greater pressure to publish, and increased government control of some of the work. Results from a growing number of specialized fields of research (such as molecular biology) were also being published in more narrowly targeted journals. These trends translated into additional focus on subjects documented in other publications. The context in which *The Canadian Entomologist* operated had been modified.

In response—reflecting the results of the first strategic review—the Society contracted production, but not scientific editing, to the National Research Council Research Press (NRC). (The procedure is outlined by Danks 1997.) The change began with the July/August issue of 1997, and ended the role of Managing Editor. Cost savings were significant, while the quality of the journal was maintained through liaison with a large organization able to take advantage of modern technology, and with professional copy editors on staff.

Also in 1997, additional charges were imposed for non-members (\$10 per printed page). Final manuscripts that were not submitted electronically attracted an additional charge too (\$5 per page), continuing the trend towards digitization that had developed over the previous few years. Electronic submission of manuscripts to NRC then became routine. The association with NRC continued through 2011 (a period of nearly 15 years), under 6 successive contracts lasting one to four years each.

Technology marched forward, and in 2000 NRC confirmed the advantages of making the journal available online. The ESC slowly prepared for this option, and a parallel digital edition was published beginning in 2003. Members received both editions without extra cost for one year, but then a surcharge was imposed for those who still wished to receive paper copies.

Copyright issues had to be reconsidered for electronic publication, because the Society had copyright only for the journal as a whole, while authors retained copyright for their individual articles. A new author release form would be required. Its development led to an extraordinary amount of discussion by the Publications Committee and the Board. There were considerations of whether transfer of copyright or a licence to publish was preferable, recommendations for legal advice, and many draft versions.

In 2003, authors were advised that failure to sign the non-exclusive “Authorization to publish/ Copyright assignment” form¹³ would result in the withdrawal of their submissions by the Editor. The ESC then held copyright for articles published in *TCE* (until 2020, see below). Rates for electronic (pdf) reprints were also established in 2003.

In addition to electronic *publication*, electronic rather than hard-copy *submission and review* of manuscripts steadily increased. These stages became entirely electronic during 2006, as a new web-based submission system was introduced (Quiring 2006; Cusson 2006).

¹³ Surprisingly, in light of the elaborate discussions that had taken place, the release form was deemed confusing in 2008–2009.

The whole process of submission, review, editing, and production was now handled electronically, and time was saved at every step. The speed of publication is still affected by the nature and condition of the manuscript, the diligence of reviewers, and other factors, but today's minimum durations would have seemed impossible to entomologists a few decades ago.

For example, in 1971 (when all phases still involved paper copies and the postal service) I strove to finish the second of two related manuscripts in the hope that both would appear in the same annual volume of *TCE*. The attempt succeeded when the work was published in the December issue—because it had been transmitted more than 6 months previously, and review was relatively rapid. Most papers in that issue were submitted much earlier, and one even the year before.

As production became more efficient, the appearance of the journal was also modernized and improved. The cover of *TCE* was redesigned to feature photographs of insects and other arthropods, a format that first appeared in 2006. Images were chosen through an annual competition among members, and used for each issue during the following year. The theme was echoed by using the chosen images on the cover of the *Bulletin* in the same year.

The increasing pace of change prompted a detailed review of possible future directions for *The Canadian Entomologist* (Fields et al. 2007). Improvements of appearance and accessibility were also made as NRC Research Press enhanced their production systems and online platforms. For example, in 2010 printing was changed from an offset to a digital process, allowing much cheaper colour figures (Anonymous 2009b).

Within the Society, however, most of the attention was being directed to possible ways to maintain the number of manuscripts submitted, because submissions were falling rapidly as other journals eliminated page charges. Ways were also sought to constrain ever-increasing costs. In 2008, extra mailing fees were approved for paper copies of *TCE* and the *Bulletin* for regular, student, and emeritus members. To make ESC membership more attractive (and encourage submissions), a page-charge waiver of up to 6 pages of *TCE* per year was available to ESC members (for one accepted manuscript) starting in October 2009 (Anonymous 2009b).

The publishing environment continued to change. *The Canadian Entomologist* had tried to keep page charges low, but costs were steadily increasing, and manuscript submissions were still falling in competition with journals without page charges. Moreover, the number of subscribers was declining. Therefore, an agreement with Cambridge University Press (CUP)—of 7 years duration, with better terms than a short contract—took effect in 2012. CUP would administer the journal, produce it without page charges¹⁴, and transfer royalties to the ESC (Mason et al. 2012).

Colour illustrations were published without cost to authors. The journal was accessible online through institutional subscription, and was free for members of the ESC (Floate et al. 2013).

The Society retained copyright and other rights, and remained responsible for scientific content. However, in the absence of the NRC's professional copy editors, a freelance technical editor (Assistant Editor) was hired by the Society to maintain the high standard of the published text.

The pace of change sometimes created difficulties. Society budgets were stressed for several years from 2013 when royalty revenue from CUP was much less than expected. In 2016, the

¹⁴ Page charges were also waived for the final issue of 2011.

Press switched all of its academic content to a new online platform, Cambridge Core, a change that impeded member access until the following year.

Nonetheless, partnering with this large and credible organization assured the continuity and reach of the journal, even though higher subscription rates for non-members were now set by the Press. The contract was renewed for another 7 years in 2019. The agreement with authors changed to a licence to publish (granting only necessary rights to the journal owner), and copyright once again belonged to authors, a change-over that began with some of the papers published during 2020.

At CUP, the submission of papers and the review process were handled online through the ScholarOne system¹⁵ (Buddle 2011), greatly improving efficiency. Moreover, individual papers were posted online before each issue was completed (“FirstView”).

From 2014, papers from authors who chose to pay a one-time fee were made freely accessible to anyone online (Buddle and Floate 2014). Among changes in 2014, the agreement with CUP was amended (to protect the interests of the Press) by imposing a 6-month embargo on the sharing of manuscripts accepted for publication, and allowing only abstracts of the Version of Record to be shared or posted online.

Having a large modern partner providing streamlined processing of manuscripts and online access had other advantages. When (as part of the Scientific Editor’s ongoing quality control in 2019) *The Canadian Entomologist* wanted to take advantage of new software to screen against plagiarism in submitted papers, it was possible to implement suitable measures on the ScholarOne system (cf. Clarivate Analytics 2023).

As society in general steadily embraced digital technology, economic challenges became ever more severe for all print media. The expense of production rose and the demand for hard copies fell. By 2021, only about 50 members, and fewer and fewer institutional subscribers, still wanted paper copies. Moreover, the journal had been fully available in electronic form since 2003, and from 2012 papers had been posted online before each issue was printed.

The Society reluctantly recognized the inevitability (as many journals had already done) that printing copies was not justified, because maintaining a matching print run would bring dramatic cost increases (Anonymous 2021c). Commencing with the 2022 volume, *The Canadian Entomologist* appeared online in digital form only.

This change meant that each annual volume was no longer separated into a series of issues, and individual papers appeared as they became available. Each paper bore only an e-number—e1 to e52 in the first digital volume—as well as a DOI (Digital Object Identifier), rather than being placed in a continuing sequence of pages.

In the absence of individual issues, there were no cover photographs (the annual photo competition continued nevertheless, but for the cover of the *Bulletin* only). Without discrete issues, too, there was no list of contents¹⁶.

Two concerns about exclusively digital formats had been the long-term future availability of the content, and concordance with international code requirements. These were allayed by the existence of multiple, highly secure, digital archives, and by verification that digital taxonomic

¹⁵ ScholarOne Manuscripts is commercial software designed to facilitate peer review, and is now used by several hundred societies and publishers.

¹⁶ Therefore, contents lists were no longer sent to members, and the ESC realized that members had not been notified for several months about newly published individual papers. CUP was then asked to begin such notifications, and the ESC Secretary compiled and distributed a list of 2022 papers published up to that time.

descriptions would fulfil the requirements of the International Commission on Zoological Nomenclature and be properly registered with Zoobank.

A further advance came from an agreement in 2022 between CUP and the Canadian Research Knowledge Network, which represents 42 academic institutions across Canada (CRKN 2022). The agreement allows unlimited reading and Open Access publishing in journals, including *The Canadian Entomologist*, at no cost for those at the affiliated institutions. This connection seems likely to enhance readership.

The many changes across the years somewhat loosened the ESC's oversight, but also enhanced the journal's long-term stability and potential profile. Indeed, *TCE* has become more highly ranked amongst entomology journals since its association with Cambridge University Press. Meanwhile, scientific quality remained assured through the ESC's editorial control.

Changes in the publishing environment will continue. Revenue from sales of back issues will fall further as the limited market becomes saturated. These certainties led the Society in 2021 to review the future financial stability and sustainability of *The Canadian Entomologist*, in light of its overwhelming importance to the Society.

As a result of the review (Anonymous 2021e, 2022b¹⁷), separate accounting was established, and a Contingency Fund set up. The fund would ensure, for example, that the Assistant (technical) Editor could be supported if there was a temporary shortfall in revenue. The fund would be built up by profits (royalties received from the Press, less editorial costs), as well as annual allotments from the C.P. Alexander Endowment Fund.

That endowment was bequeathed by the dipterist C.P. Alexander (1889–1981; see Wheeler 1985) to support the journal. Revenue from the endowment had been used from time to time chiefly to cover page charges for invited review articles. In the absence of page charges, it could be devoted to more general support.

Memoirs

In addition to the journal itself, the Society published longer papers in the series *The Canadian Entomologist. Supplement*, beginning in 1955. Thirty volumes were produced until 1963, when the title was changed to *Memoirs of the Entomological Society of Canada*. Several volumes were produced each year, according to the flow of submitted manuscripts, and the *Memoir* series continued until volume 171 (1997).

For many years, the Canada Department of Agriculture¹⁸ was a major source of these memoirs, the majority of which were invaluable taxonomic monographs associated with the Canadian National Collection of insects and arachnids. However, the Society recovered its high production costs through page charges, so that author expenses for these long papers were particularly high.

When federal budgets were pruned, all branches of the government sought cost savings. By the 1980s, and especially the 1990s, technological advances had made many publication avenues cheaper than the Society's journals, as noted above for *TCE*. The institution holding

¹⁷ No more specific reference can be cited, because the report of the Task Force on Financial Sustainability of *The Canadian Entomologist* was not published [such reports were not included in the *Bulletin* in recent years].

¹⁸ The Canada Department of Agriculture was renamed Agriculture Canada in 1976, then Agriculture and Agri-Food Canada in 1993.

the Canadian National Collection¹⁹ became progressively unwilling to pay the high cost of publishing in the *Memoir* series.

Temporary support for particular volumes was obtained from time to time. However, the reduced number of submissions and the high costs meant that the Society had no option but to discontinue the *Memoirs* in 1997 when the method of production of *The Canadian Entomologist* changed.

Books

The Society also published and then sold some individual books. The review *Arctic arthropods* (Danks 1981a), and an associated bibliography (Danks 1981b), were published by the Society. They had been produced by the Biological Survey of Canada through an unsolicited proposal led by the ESC ([Danks] 1978), which followed the original proposal for the Survey itself.

Diseases and pests of vegetable crops in Canada (Howard et al. 1994) was published jointly with the Canadian Phytopathological Society. The French edition appeared in 1995 (see also under *Back issues*, and footnote 21 below).

A few books published by the Biological Survey (Danks 1987b; Kevan and Scudder 1989; Williams and Smith 1990; Danks and Downes 1997) were sold on its behalf by the ESC for a small administrative fee.

Canadian Journal of Arthropod Identification

The *Canadian Journal of Arthropod Identification* (CJAI) comprises detailed and profusely illustrated guides to the fauna (Marshall 2008; CJAI 2023).

These guides are extremely useful for identifying Canadian species in each of the treated groups, and are highly regarded by entomologists. They have been published in digital form by the Biological Survey of Canada since 2006.

In 2011, the ESC agreed to guarantee the continuity of the journal and to ensure the formal deposition of copies (cf. Legal deposit of publications regulations 2023). Such a role was essential because the Canadian Museum of Nature withdrew its financial support for the Biological Survey in 2010 (see *Biological Survey of Canada*).

The CJAI continues to be managed by the Survey. Its scientific editor, who is responsible for content, is appointed by the ESC. Work by a technical editor ensures the necessary form and function of these digital guides. Forty-seven fascicles have been published to date.

Bulletin

The Society recognized a need to enhance communication among members, and the *Bulletin of the Entomological Society of Canada* was launched with two issues in 1969. That publication was then produced quarterly (1970 to present), with reports of Society business, lists of national and regional society officers, entomological news, opinion, obituaries of deceased members, book reviews, and other items of potential interest to entomologists.

¹⁹ That institution was called the Entomology Research Institute from 1959, but then became the Biosystematics Research Institute (1973), the Biosystematics Research Centre (1986), the Biological Resources Division of the Centre for Land and Biological Resources Research (1991), and the Eastern Cereal and Oilseed Research Centre (1995). It is now called the Ottawa Research and Development Centre.

Although book reviews remained plentiful in most issues, other items, such as opinions of the International Commission on Zoological Nomenclature, personalia (brief updates about entomologists), references gleaned from the literature, and employment openings and candidates, eventually were superseded. Some of the items that replaced them are mentioned below. Editorials and guest editorials appeared in some issues.

The annual Gold Medal addresses and Heritage lectures were also published in the *Bulletin*. Paid advertising sometimes appeared there, but opinions changed from acceptance to non-acceptance and back again several times. The topic sometimes generated heated discussion, but confining advertisements to those deemed acceptable by the Publications Committee (which would reject any that displayed entomophobic attitudes, for example!) lowered the temperature.

Until 1997, the *Bulletin* contained occasional supplements, prepared on behalf of the Governing Board or the Biological Survey, normally bound into the centrefold on coloured paper. These documents were membership lists, information or reports on entomological resources, and briefs that urged action on particular entomological concerns (see *Briefs and projects*). Shorter briefs, and recommendations by Ad hoc committees, were published as articles in the main text.

The cost of production rose, and cheaper methods were implemented through several incarnations. Financial concerns in 1979 even led to a plan, to begin in 1980, that would reduce the *Bulletin* to one issue a year, and produce intervening newsletters. However, a switch to cheaper paper, and to printing from camera-ready copy rather than using more expensive typesetting, averted any drastic changes. An editorial assistant helped with proofreading and other work for the *Bulletin* from 1988.

Desktop-publishing software (Adobe Pagemaker) was first applied in 1989, and improved the appearance of the *Bulletin*. Although authors were urged to submit material on diskette, few did so initially, requiring the Bulletin Editor to keyboard the manuscripts.

Starting in December 2001, each issue was posted in pdf format on the ESC website. The role of laying out each issue soon passed from the Bulletin Editor to the Assistant Bulletin Editor, who was appointed as a Trustee in 2002. In 2007, Adobe InDesign was adopted as the software for desktop publishing, and the *Bulletin* continues to be generated on that platform.

Desktop publishing allowed many enhancements, notably those introduced by incoming editors in 2003 and in 2007. Colour was added in 2003, and (in addition to reports about Society business, and articles about specific insect species or research studies) new series of continuing articles were introduced.

Communication about the Society was strengthened when a lead column, *Up front*, written by the current President, was added to each issue, starting in 2003. Key themes were highlighted, and more detailed updates could be provided than had been possible during the President's yearly report at the annual meeting. At the same time, a final column by the Bulletin Editor, entitled *The buzz* (until 2009) and then *The last word*, appeared in each issue.

The student wing, established in 2003—and renamed *STEP corner* in 2016 after Early Professional membership was created—reflected the variety and prevalence of activities by students and recent students (see *Student members*). Other subjects included entomological techniques (“tricks of the trade”), entomological work at individual laboratories, lists of conferences, and an entomological “advice column”. Later, a short-lived entomology crossword puzzle appeared.

Each issue thus had more humorous and general contributions than in the past. The publication aimed to “follow the example set by Paul [Fields, Editor 2003–2006] and include submissions such that all readers of the *Bulletin* will find something to enjoy.” (Floate 2009 [Editor 2007–2009]).

In 2003, when many of the new elements were introduced, reports on Society business were streamlined. Minutes of the Board, reports of Officers and committees, and lists of committee members had always been published in full, but from 2003 only summaries appeared in the *Bulletin*. Some of the original documents were posted for a time on the website instead.

Likewise, after 2005 each auditor’s report, with financial statements for the previous fiscal year, was only summarized in the *Bulletin*, the full version remaining temporarily available on the website. Committee reports were summarized separately in the *Bulletin* from 2003 until 2007, when only the action items they had generated remained in the report of Board highlights.

This approach led to a striking reduction in published details. In December 1998, annual reports to the Board occupied 28 pages of the *Bulletin*. Five years later, the reports were summarized in 5½ pages, and some similar information appeared in a 4½-page summary of action items from the annual meetings of the Board and the members (December 2003). A few more years passed, and information from annual reports now appeared only in the summary of Board actions, which occupied just over 3 pages (December 2007). The savings of space (and hence potential printing and mailing expenses) helped to make feasible the additional content outlined above.

Once the *Bulletin* had been posted on the Society’s website in 2002, members could elect whether or not to receive paper copies. However, costs for printing and mailing continued to increase. Beginning with the 2013 volume, paper copies were no longer sent to institutional subscribers to *The Canadian Entomologist*, who had been receiving the *Bulletin* as part of their subscription.

After that year the *Bulletin* was produced in digital form only, and paper copies were no longer an option for members—by which time fewer than 60 people were requesting them anyway. These changes not only saved all printing and mailing costs, but also widened the options for layouts and the use of colour.

Content continued to be added. In 2015, the contents pages of the newsletters of some appropriate organizations were included by reciprocal agreement. In September 2018—to help foster national-regional connections (see *Other liaisons with regional societies*)—a section with *News from the regions* began, in effect reversing the 2003 deletion of full annual reports from regional societies. Articles from the Committee on Equity, Diversity, and Inclusion appeared from 2021.

The *Bulletin*, then, has played and continues to play a valuable role in the Society. Its evolution reflects changed priorities, advances in technology, improvements of appearance, diversification of content, and the initiatives and choices of successive editors.

The regular appearance of the *Bulletin* proactively transmits current information to members about ESC developments, serves as a quarterly reminder that the Society remains active, and presents articles about insects (and entomologists) that confirm how interesting and diverse they are. It thus serves too to reinforce the group identity of members.

Back issues

The rise of digital technology and the Internet had allowed the Society to move progressively into electronic production of its publications. The same advances led it to explore ways to make back issues available.

The earliest example came in 2005. No more copies of *Maladies et ravageurs des cultures légumières au Canada* (the French-language version of the book on the *Diseases and pests of vegetable crops in Canada*) remained, but the publication was still in demand. The President patiently disassembled a paper copy (Lamb 2005) and scanned the 554 numbered pages and many ancillary ones. Adding the necessary internal links allowed the book to be made available cheaply on a CD. Later, a digital copy could be consulted on the ESC website²⁰.

The Society soon came to recognize the importance to entomology of digital access to back issues of *The Canadian Entomologist* and the *Memoirs*. However, a great deal of effort (and expense) would be required to scan the pages. There were also potential implications of the fact that copyright of individual articles belonged to each author.

Digitization of the journals became a reality in 2009 after the Society decided that a heavy investment was warranted. All issues were scanned by NRC in 2008–2009, encompassing more than 112 000 pages, under a contract with the ESC. From the first issue of *TCE* in 1868 until digital issues were first published in 2003 there were 86 150 pages in 1530 issues (summed from Cambridge Core online archives). In addition, 171 Supplements and Memoirs, published from 1955 until 1997, occupied 26 680 pages (summed from ESC 2022b).

Only numbered pages were scanned, and not ancillary materials. This meant that the covers of *TCE*, with tables of contents, information about the Society, and author instructions (manuscript requirements, fees, etc.)—later put into each January issue in more detail—were not scanned. This content, though largely repetitive, would have added more than 6200 pages!

The digital (pdf) output was, of course, fully compatible with the existing NRC platform. The back issues were made available online through NRC, and also through an agreement with BioOne. Members had free access to them, but the entire collection of *The Canadian Entomologist* and *Memoirs of the ESC* was also sold as web archives for \$3 200. Sales were promoted by advertisements in the *Bulletin* (Anonymous 2009a) and elsewhere. Purchases by libraries became a useful source of revenue to the Society for many years.

After production of *The Canadian Entomologist* was taken over by Cambridge University Press in 2012, back issues could be still be viewed only by those who had paid for access, but current ESC members had free access to all of them. The shift by CUP to the Cambridge Core website in 2016 made it no longer possible for non-members to purchase a digital version of an individual Memoir, but subsequently CUP agreed that non-members could download the pdf file of a Memoir for a set fee (Holliday 2017).

Digitizing back issues of the *Bulletin* was accorded lower priority. It proved feasible only when a volunteer offered to do it, and the offer coincided with the discovery of a full set of back issues at the Agriculture and Agri-Food Canada research station in Summerland, BC (Gillott 2015). These volumes would probably have been discarded, but instead were sent to the volunteer.

²⁰ Updated digital versions of the book, in English and in French, were developed by the Canadian Phytopathological Society, and made accessible from 2014 on their website (Canadian Phytopathological Society 2023).

All pages before the publication became available in pdf format on the website in December 2001 were scanned into that format, although early issues have relatively low original print quality, and the pdfs are not properly searchable. In total, the 129 issues comprised nearly 5 000 main pages (summed from online copies). Also scanned were 19 centrefold supplements—the briefs, membership lists, and resource documents noted under *Briefs and projects*—comprising about 275 additional pages. A few supplements could not be scanned because they were missing from the parent issues, having been removed for reference by the original owner. More than 400 ancillary pages were included too: notably the covers, which bore tables of contents and lists of ESC and affiliate-society officers.

These efforts enabled digital versions of all issues of the *Bulletin* to be posted on the ESC website in 2014.

Conclusions

This review confirms that developing useful entomological publications, ensuring their scientific credibility and sustainability, making them widely available, and especially coping with changes, have been part of the evolution of the Society for many years.

Wider communication and modern media

In addition to the highly visible activity of producing scientific publications and maintaining their quality, societies such as the ESC rely heavily on communication among members. Outside the joint annual meetings, this role has been played since 1969 chiefly by the *Bulletin* (just described under *Publications*), but more recently was steadily extended by modern methods of electronic communication. The increasing availability of digital versions of ESC publications, a result of similar advances, was just outlined.

Electronic communication and digital media

Interpersonal communication became much more efficient as email was introduced. Although email to people outside a single organization is now taken for granted, it was not available until the 1980s, when it developed rapidly. By the early 1990s, it had a range of routine uses, and was used to facilitate management of the ESC, and committee discussions. By 1992, the ESC's membership forms included a field for an electronic mail address.

Entomologists as a whole took advantage of the growing Internet. Among early efforts were LISTSERVs (electronic mailing lists broadcasting information to interested people). The version for entomology (ENTOMO-L) was encouraged by the ESC, tested by members in 1990, and launched in 1991, making it one of the longest-lasting list servers (Kevan 2020, 2022). However, hosting moved from Canada (University of Guelph) to the United States (Pennsylvania State University) in 2020, for reasons explained by Kevan (2022).

Advances in communication also facilitated the publication process. In particular, email (and word-processing software) provided for more rapid interactions between the journal and the authors (see *The Canadian Entomologist*).

Digital technology allowed membership lists to be stored electronically. Relatively early on, they could be used to generate address labels for mass mailings and distributing ESC

publications. As the ease of use and reliability of digital media improved, there were plans to reproduce the electronic list on diskette and provide it to members. However, the project awaited a new computer in the ESC office.

Eventually, a final hard-copy version of the membership list was published in 1997. Within a few years, the list did not need to be distributed on diskette anyway, because a member directory was available in the members' area of the website.

The list of common names of insects (cf. Belton 1993) was sold to members on diskette in the 1990s, but it was transferred to the website in 1997. As these and other data moved online, the many references to "diskettes" in ESC documents abruptly disappeared. References to the website multiplied instead.

*Website*²¹

A major advance enabled by the Internet was the addition of an ESC website. It was proposed in 1995, launched in 1996, and run by a volunteer Webmaster. The same year, a Web Committee (also known as the World Wide Web or WWW Committee) was set up to help develop and maintain the site.

An Ad hoc Bulletin and Website Content Committee, established in 1999, had the mandate of weighing content with the best fit for the *Bulletin* and/or the website. The main conclusion, reinforced by the retiring Bulletin Editor in 2000, was that the *Bulletin* must continue to act as an essential permanent record of Society affairs, whereas the website, although current and with a wider reach, is impermanent. The placement of content was influenced too by the fact that paper copies of the *Bulletin* were printed until 2013. It was much more costly to produce and distribute printed content than to post the same items on the website. The Ad hoc committee was dissolved in 2000, and the continuing Web Committee was incorporated into the Publications Committee.

Over many subsequent years, the website changed greatly, adding content, reorganizing the layout, and switching hosts. The ESC site also accommodated the Biological Survey of Canada website until 2000, when that component was greatly expanded and set up independently.

For the first few years, the ESC website was hosted by the University of Alberta even as much material was added. However, websites soon became universally popular, hosting services proliferated, and monthly charges fell as competition and computer advances reduced the costs of data storage and downloads. The Society set up its own dedicated website in 2001 at esc-sec.org. A different host was used after 2007, when the url changed to esc-sec.ca.

The first Webmaster added substantial content for many years. The growing importance of the site was recognized in 2002 by appointing the Webmaster as a Trustee (later Officer) of the Society.

Some website elements listed the names and interests of members or students, but such postings diminished as concerns about privacy and allied issues gradually increased. These concerns, as well as the protection of posted data and images, were addressed more than once by the committees that helped to develop and review website content.

²¹ The terms *web site*, *web-site*, *web page*, and *web* were also used by members and Officers, but most references now use *website*. In French, *site Internet* was commonly used, but has been replaced by *site web* (and some authorities declare that only the latter term is appropriate, referring to the publicly accessible pages rather than to the network of hardware that supports them).

Photographs were made available for public reference, beginning in 2002, but only if they were free of copyright. Currently, the section for photographs holds only some images submitted to the annual contest for the covers of ESC publications (noted under *The Canadian Entomologist*). They are made available to the public free of charge (though not free of copyright), as part of the Society's mandate.

The concern about protecting content prompted the drafting of documents intended to give permission for use of website materials, and to enforce conditions on users. The drafts proved to be unworkable, and now a copyright notice simply appears on every part of the site.

In 2008, a continuing Web Content Committee was established to consider the development and subject matter of the site more fully. It incorporated the Information Technology Committee that had arisen from the 2005 strategic review.

The website continued to change, with major redesigns and added components. Some new elements, such as registration for annual meetings (2011), were originally developed through specific contracts. A tool designed for online balloting in 2012 experienced problems that were not resolved until 2013. The system for online membership renewal also experienced difficulties. Such interactive features are now handled by the ESC's association management company.

The capacity of the site was challenged as it grew. An agreement with Agriculture and Agri-Food Canada allowed entomological monographs and publications on biological control programmes in Canada (produced by that department) to be posted on the ESC website. Partly as a result, the site registered nearly 4 million page views in 2013, by non-entomologists as well as entomologists.

Eventually, the whole site was redesigned in conjunction with the association management company on to a new platform (WordPress), and launched officially in 2017 (Bouchard 2018a). Those improvements made a wide range of content universally accessible, and in addition—by continuing and refining a members area protected by a password—gave members a simple link to restricted-access scientific publications and to other benefits. The new site was compatible with both computer and mobile access, and allowed direct connection to the ESC's blog and Twitter²² feed.

Even in the member area, however, access to data on individual members is limited in response to threats such as the ill-intentioned harvesting of email addresses. However, publicly available information appears in the Directory of Entomological Education, and in the list of Directors and Officers.

The new site encountered bandwidth problems in 2021, triggered chiefly by the popularity of large illustrated fascicles of the *Canadian Journal of Arthropod Identification*. That journal was later moved to a separate, redesigned site (CJAI 2023), permanently solving the problem.

The Society's website continues to accommodate an impressive array of useful content (ESC website 2023). Undoubtedly, it will evolve further.

Social media

Members of the ESC, especially students, profited from the connectivity facilitated by the Internet, through informal activity on social platforms. Facebook began in 2004, and a page for the ESC student group was added to the website in 2007. Twitter became universally popular

²² Twitter was renamed X in 2023.

soon after its establishment in 2006, and before long members were posting on Twitter about entomological matters, including even real-time photographs taken by individuals at joint annual meetings.

The ESC adopted Twitter more formally in 2012 [Twitter@CanEntomologist], and a student Twitter feed [Twitter@ESC_Students] soon began, while the students' private Facebook group remained active.

Blogs too proliferated across the web. People always had a lot to say, but could share their thoughts more widely as web platforms became cheaper and easier to use. In 2012, an ESC blog was implemented on the website to post a range of items about the Society and about entomology in general. Two blog administrators were appointed.

The blog proved to have many uses in addition to the exchange of information about the Society. For example, it raised awareness about a plan to end the position of curator of entomology at the Royal British Columbia Museum. The blog entry stimulated letters and publicity that may have helped to ensure that a replacement curator was hired (Lindgren 2015). Indeed, such an outcome suggests that social media attention and local advocacy may be more effective than attempting to lobby the federal government (compare *Supporting entomology*).

Nevertheless, some members wondered whether Twitter and other social media would prove to be largely inconsequential for entomology (e.g., Gillott 2013a). A forceful justification (Jackson et al. 2013) demonstrated the role of these platforms in communication, and how participation helps to strengthen the community of entomologists. This benefit is the same as the one, recognized for a very long time, that stems from attending meetings and taking part in Society affairs.

As noted above, the blog and Twitter feed were fully integrated into the website during its 2017 revision, giving direct connection to both of them and encouraging wider use. People contributed from different perspectives, to spread reports about the ESC, information of entomological interest, and personal opinions. The ESC realized that any activities linked to the Society needed oversight, lest a personal posting might be deemed to be an official position of the Society when it was not. Therefore, two Social Media Administrators were appointed as Officers of the Society in 2017, expected to consult with the Web Content Committee.

In 2021, a wider Ad hoc Communications Committee was established, and became a Continuing committee the following year. Its mandate was to coordinate and streamline all forms of communication to ESC members and the outside world. The Social Media Administrator positions were then discontinued. (The Webmaster remained as an Officer of the Society).

One early priority identified by the Communications Committee was to encourage authors to submit blog posts about recent papers published in *The Canadian Entomologist*, enhanced with photographs of the authors. So far, however, author response has been minimal.

Communication about entomology and the Society continues to grow on social media. Students and early professionals are the most frequent users—their familiarity with such platforms commonly exceeds that of older entomologists!

Many members now make daily use of social media. It is difficult to quantify the wider effect of these activities. However, like the website itself, the *Bulletin*, and the annual meetings, they doubtless serve to maintain interest in insects and relevant research, inform members about Society affairs, promote involvement in key issues, and foster a sense of community. The public platforms spread information about insects well beyond Canada and members of the ESC.

Conclusions

The Society has evolved in many ways to take advantage of the technological advances of the last 50 years. The digital revolution greatly reduced the difficulty and cost of publication and administration, made previous publications and information readily available, facilitated the dissemination of facts of all kinds, and enabled easier and more rapid communication among members. As these capabilities widened, the ESC established increasingly robust structures to process manuscripts, distribute information, manage the Society, maintain the website, and monitor social platforms.

Joint Annual Meetings

Structure of meetings

A very important component of the ESC is its joint annual meeting, commonly referred to (from about 2000) as the JAM. This meeting of the national society is hosted each year by one of the regional societies affiliated with the ESC, typically in rotation unless disrupted by meetings that include additional societies, or by unusual events. Meeting locations are listed by Timms et al. (2017); websites of relatively recent meetings are linked from the ESC website.

The meetings are extraordinarily valuable for many reasons beyond their core role of communicating scientific information through formal presentations. They include the opportunity for exposure to diverse subjects, stimulation of ideas from both familiar and less familiar subject areas, and informal communications that may generate additional ideas or lead to cooperative work. Those elements are considered in more detail under *The values of membership*.

Meetings of individual regional societies differ from one another, depending on the number of members and on local interests. These factors are influenced by such things as the regional population, the nature of the fauna, and the dominant employer(s). Most of the executives and meeting organizers of some societies are concentrated at institutions in a single large city, whereas key members of others are more widespread. Similar but less marked differences occur when regional societies meet jointly with the ESC.

The small size of regional societies has great advantages for meetings. Small gatherings provide the opportunity to learn about a wide range of subjects, because there is less simultaneous competition with papers in one's main area of interest. Having fewer delegates, less complex organization, and reduced formality of proceedings allows all events to take place in close proximity. These positive features enhance communication and favour cooperation. They persist at joint annual meetings, though to a somewhat lesser degree.

In contrast, I found very large meetings, such as those that also included the Entomological Society of America, much less rewarding, because a good deal of rushing about seems to take place, without communication, as delegates fly past each other to get to the next session on their busy schedule. Certainly, it is possible to attend more scientific presentations in one's main area of interest (although these days much of the work has already been published), but sometimes at the cost of wider engagement.

The scientific components of joint meetings differ in content and structure, depending partly on local interests. Since the early 1980s, most meetings applied a more or less formal theme to

the meeting as a whole, or at least to the symposia. Nearly all of the early themes were simple and factual (e.g., Insect pest management; Diversity); some more recent ones were longer or more abstract (e.g., Predating the nation—A sesquicentennial celebration of entomology in Canada; Small is beautiful). Beginning in 1978, some meetings included symposia (and workshops) organized by the Biological Survey of Canada. Later, the BSC symposium was part of nearly every program.

The theme influences the choice of plenary speakers, the subjects of symposia, and to some extent the composition of submissions. Thematic and local preferences, as well as the make up of contributed papers, mean that subject divisions are not always the same.

Discussion groups or Special interest groups were tested in particular in 1973 (cf. Turnock 1974), and such targeted events—now usually called Workshops and with limited numbers of participants—have become a regular feature. ESC workshops have covered a wide spectrum of scientific, popular, practical, and technical subjects. A few of them were scheduled before the conference proper (e.g., an overview of the publication process in 2012).

Workshops or meetings that are separate from the ESC itself may also be held in the same week as the annual meeting, to take advantage of the fact that many of the participants have assembled at the venue. Such events have included the Agriculture and Agri-Food Canada Working Group on Biocontrol, and the Western Forum on Pest Management (and Western Committee on Crop Pests). Allied elements (e.g., Canadian Forum on Biological Control) have sometimes functioned as part of the ESC meeting itself.

A photo salon began in 1970 and continued for many years. Every national meeting now incorporates the Gold Medal address and Heritage lecture. Formal Entomology Games are arranged at meetings held with the Entomological Society of America. Board meetings and the annual business meeting of the Society take place.

Students play an increasing role. Components introduced to encourage students, as well as additions that stem from energetic work by the students themselves, are described in detail under *Student participation at annual meetings*. In summary, they include student presentations entered for President's Prizes, a plenary Graduate Student Showcase (replacing an earlier Graduate Student Symposium), and a student mixer. Sales of donated books (and other items) organized by students have generated substantial contributions to the ESC Scholarship Fund. Intermittent events included employment workshops and insect quiz games.

By the 1990s, the elements of the scientific program were more or less standardized. The 1997 joint annual meeting in Edmonton (257 participants) had 3 plenary lectures, 28 invited papers in 4 symposia, 21 speakers in 4 workshops, 51 submitted papers, 19 posters, and 32 student papers (Heming 1997).

Events that do not coincide with the scientific sessions are especially useful for informal communication. As early as 1971, the joint annual meeting in Victoria (Anonymous 1971) held a reception, a mixer, a banquet, a luncheon for retired members, and three other social events for delegates (such as a salmon barbecue). There was also a post-conference tour.

Each meeting includes a program of general activities aimed at non-entomologists who visit the host city as they accompany meeting participants. Until the early 1990s, this component was called the "Ladies Program" (see *Equity, diversity, and inclusion* below).

One issue that arose was the timing of annual meetings. Government entomologists might prefer a fall meeting that does not coincide with fieldwork. Members at universities might prefer a meeting that does not coincide with heavy teaching loads as classes begin in the fall. Meetings were held chiefly in August until 1978, but then most often in October. Those

organized jointly with the Entomological Society of America were held in November, the normal schedule for national meetings of that society.

At the request of university entomologists, the timing was reviewed from time to time, as in 1992 (when a ballot was sent to members) and 2002. Responses to a more general questionnaire after the 2019 meeting (MacQuarrie and Konopka 2020) reflect the continuing dichotomy of opinion.

However, most meetings continue to be held in the fall, because in typical locations hotel facilities and accommodation are cheaper after the summer, while weather is more pleasant before the winter. Some members noted, however, that university campus accommodation, which is available only in summer, is relatively inexpensive too, although associated conference facilities may be inadequate.

The option of holding meetings virtually rather than in-person is a significant recent development, hastened by the impact of COVID. Travel also has environmental costs. However, although some people find virtual formal presentations and similar elements to be satisfactory, most attempts to duplicate less formal meeting components, such as virtual mixers, proved to be less rewarding than their face-to-face equivalents.

An Ad hoc committee on the future of annual meetings was recently set up, charged in particular with monitoring technological developments, costs for online delivery of meeting content, decisions by other societies about virtual meetings, and allied issues.

One key consideration is finances, because the ESC has limited experience in financing virtual meetings. Therefore, it does not know how the resulting reduction of in-person attendance affects the likelihood of a surplus or deficit (see also the following subsection). A second consideration is program content, because virtual meetings tend to have fewer components, especially informal ones. A third theme is the level of involvement. Virtual participants are less integrated into the meeting experience than are people present in a physical facility.

General information to help plan meetings has also been solicited on several occasions through questionnaires, which request feedback on impressions and preferences. More than half of respondents to a recent questionnaire favoured hybrid (in-person as well as virtual) annual meetings. However, although nearly a quarter of respondents preferred in-person-only meetings, less than a tenth would be satisfied by meetings that were exclusively online (Anonymous 2021d).

Joint annual meetings will continue to be a major highlight of the Society's activities. Indeed, attendance is proportionally much higher than years ago when the Society had more members. The meetings serve to advance many key roles of the ESC, act as a major link between national and regional societies, and have also helped to consolidate wider liaisons among the societies.

Regional liaison and financing for meetings

For a number of years after the ESC was established as separate from the Ontario society, organizing the annual meetings was essentially left to the regional societies (see Timms 2009). However, the ESC recognized in the 1970s that it should interact more closely with these affiliates, and play a larger role in planning the meetings (e.g., Varty 1974). The relationship between the partners has developed more or less continuously since then.

Guidelines for joint meetings were first considered during the 1970s, as the ESC sought to be more involved. In due course, formal documents about the content and organization of meetings were prepared to assist planning by regional organizers.

These guidelines addressed such topics as the structure and financing of the meetings, and were then updated and expanded many times (notably in 1988, 2005, 2012, and 2020, as well as some intervening adjustments). As various topics arose, they were discussed with each regional society before arriving at additional guidelines agreeable to all. However, from time to time the ESC noted that regional societies did not always seem to pay full attention to the guidelines anyway!

Financial arrangements were a frequent subject of discussion. Most regional societies found it difficult to fund the necessary preparations for a joint meeting before receiving any meeting revenue, and the ESC provided an advance for that purpose.

In the 1970s the advance was \$1 250, but it was increased to \$2 500 for the 1981 meeting. That advance was separated into \$1 500 unaccountable to help with meeting arrangements, and \$1 000 accountable, typically applied to the scientific program for the travel of invited plenary speakers. An increase to \$2 500 and \$1 500 was approved in 1999, and the advances were doubled after the 2017 strategic review to a maximum of \$8 000. (However, the advance for the 2024 meeting has been raised to \$10 000 at the request of the host society, because the conference hotel requires a larger-than-usual deposit.)

Financial elements were developed in more detail than before in 1999, following Finance Committee proposals (O'Hara 1999), and were then discussed further with the affiliated societies. The ESC expected that the advance would be repaid after the event, when the regional society would have received the meeting revenue, but would forgive the advance if a meeting lost money. Also, because regional societies could ill afford a loss (even when the advance had been waived), the ESC would help to protect a regional society from losses by covering at least half of any deficit.

In return, the ESC came to expect that the two Board meetings, the Annual General Meeting, the President's reception, and other core ESC events would be funded as part of the program, and not billed separately to the ESC.

Initially it was proposed that regional societies could keep any surplus beyond the amount of the advance. Most meetings made a profit, however, and the ESC soon concluded that any surplus should be shared. Indeed, a significant fraction of meeting revenues might have come from fees charged to ESC members. In 2005 the Society proposed that the general advance should be returned as before, but the ESC should receive half of any surplus when the meeting made a profit.

After prolonged discussions, and reluctance from some societies to share profits that they had worked so hard for (e.g., Timms 2009), this formulation was eventually agreed to as binding. Possible coverage by the ESC of more than 50% of any losses would be subject to negotiation.

It proved useful to plan more and more aspects of the meeting jointly. The ESC also studied how cost savings could be made. An ESC Annual Meeting Committee continued to review the guidelines. Eventually, that committee always included the general Chairs of past meetings (see *Governance*), maximizing the exchange of accumulated knowledge. Of course, all annual meetings also have their own regional planning committees.

Most issues that arose were not related to the scientific program. For example, regional fundraising was impeded in 2004 by contacts the national society had already made to potential donors (see *Marketing and fundraising*), so a shared approach was developed.

A revision to the guidelines was required after 2015 to reflect the role of the ESC's association management company in registration, payment, and paper-submission services. The question of liability insurance for the meetings also arose at that time. Although the ESC could obtain suitable insurance, this did not extend to the regional societies, which needed their own insurance (Anonymous 2015a).

It was discovered too in 2015 that sales taxes should have been collected on meeting registration fees. The ESC decided that it would cover any such liability incurred by regional societies for meetings over the past 10 years (Anonymous 2015b).

The latest set of guidelines is comprehensive, occupying 67 pages²³. It is posted in the members area of the website (ESC 2020a). Financial policies are posted separately, and include both typical meetings and those in which more than two societies participate (ESC 2020b). The Code of Conduct for meetings (see also *Equity, diversity, and inclusion*) was applied to the 2019 meeting by the participating societies, and a revised version approved in 2020 for all subsequent meetings (ESC 2020c). Supplementary documents—an implementation guide for local organizing committees, and a process for handling complaints—were later added (see ESC 2022c).

Very large meetings (such as those with the Entomological Society of America) normally generate handsome profits. However, only a few regional societies have access to the extensive conference and hotel facilities needed for so many delegates. Smaller regional societies would never share in the surpluses from the largest meetings. Therefore, the guidelines were adjusted to allow these other societies (in addition to the ESC and the host society) to receive a share when profits are substantial.

Notwithstanding the potential for meeting revenue, the Treasurer noted that the ESC's share of the surplus from the 2018 joint meeting with the Entomological Society of America could not be regarded as “profit” ... because it was less than the amount paid to the ESC's association management company for the meeting services it had provided!

Cancellation of the 2021 in-person meeting (because of COVID) brought a particular lesson: not only was there a weighty penalty from the hotel for cancelling, but the hotel's electronic infrastructure would not be adequate to run a meeting with both virtual and in-person components (Anonymous 2021a). Of course, the booking for that meeting had to be made well in advance, before the consequences of the COVID pandemic were known.

Other considerations about virtual meetings, and recent actions to evaluate them, are noted at the end of the previous subsection.

Other liaisons with regional societies

The seven regional societies were established between 1871 and 1953 (Gillott and Giberson 2017), and each one became formally affiliated with the ESC. The societies are smaller than

²³ The guide deals with Responsibilities, Mandatory and Advisory policies (including codes of conduct), Selecting a date and location, Forming a local organizing committee, Fundraising and sponsorship (including promotion), Duties for local arrangements, Program components (including student program, scientific elements, awards, and other events), Registration, Budgeting, and Follow-up.

the ESC, and may have less ambitious agendas, but all have been highly effective in stimulating the active involvement and cooperation of local members.

This energy is indicated by the fact that many regional societies have their own journals (Gillott 2011). Apt regional logos are another index of polished infrastructures. Many of them were characterized by articles published in the *Bulletin* during 2020 and 2021²⁴.

The energy of the regional societies supports entomology and thus enhances interest in the national society. For many years, in addition to coordination and financial assistance for annual meetings, the ESC has supported the ways that affiliated societies encourage interest in insects amongst young people by making grants available for that purpose (see *Public education*).

In the past, the ESC occasionally made broader suggestions for cooperation, although few additional activities developed because of funding restrictions. For example, one proposal of the Publications Committee in 2002 was to work with the regional societies, if they were interested, to create a grant program to assist cataloguing and maintenance of regional libraries.

Annual reports from regional societies to the Board were once printed in full in the *Bulletin*, but from 2003 only brief summaries were provided under ESC business. However, the 2017 strategic review re-emphasized the importance of the Society's linkages with regional societies, and from 2018 a section with news from the regions was included in every *Bulletin*.

The 2017 review also prompted the national and regional societies to seek additional ways in which they could join forces to sustain and encourage entomology. Financial support to each regional society from the ESC was increased. The joint annual meeting advance was doubled (see the preceding section). Extra support was given to encourage interest in insects by young people, and public engagement was encouraged through National Insect Appreciation Days (see *Public education*).

Increased connections and discussions led to a new eight-society emblem featuring each society's logo, demonstrating the linkages and mutual support among them (Floate 2019). The emblem is posted on the ESC website, and on the websites of the regional societies, where the individual logos in the emblem serve as links to the websites of each society.

Continuing communication among the societies was then ensured by instituting regular meetings twice per year (Anonymous 2021b). Experiences about annual meetings, virtual conferences, local leadership in public education, and other matters are being shared, and additional initiatives considered.

Governance

Basic structure

Within the legal framework of incorporation, policy is set by the ESC Board, composed of elected Directors; ongoing decisions are made by an Executive Council, composed of successive Presidents (4 Directors); major roles are played by appointed Officers²⁵; there are a few Representatives to other bodies; and many general operations are carried out, and recommendations generated, by Committees.

²⁴ The logo for the ESC itself, featuring a maple leaf and the grylloblattid *Grylloblatta campodeiformis*, was devised by Keith Kevan, and the Society shield bearing that logo was presented to the ESC by the Entomological Society of Quebec in 1967 (Vickery and Stewart 1991).

²⁵ ESC Presidents, Secretaries, and Treasurers are listed chronologically by Timms et al. (2017).

The ESC was incorporated in 1956 as a Not-for-profit Corporation (to study, advance and promote entomology), operating according to Bylaws approved under the Canada Corporations Act. The Act brought legal responsibilities for corporate records, annual meetings of members, and many other items. A tax return had to be filed annually (even for organizations that pay no income tax) with the Canada Revenue Agency (CRA)²⁶.

The governing legislation was changed in 2009 to the Canada Not-for-profit Corporations Act, with many similar rules but with some that required extensive changes, before an October 2014 deadline, to allow the existing corporation to continue. Impacts on the governance of the ESC included the way the Board was staffed, the method of electing Directors, the end of the fiscal year (June 30 rather than December 31, to shorten the interval before the Annual General Meeting), and other procedures (Gibson 2014). Many formal documents had to be revised.

Volunteers contributed vast amounts of time to identify the changes and procedures needed for compliance with the new Act, to prepare corresponding documents, and to have the changes ratified by the membership. Revised Bylaws approved by members were accepted by federal authorities in 2013, and Articles of Continuance issued. Resulting changes to key internal documents were approved by members in 2014. Vision and Mission statements were also developed (see McClay 2013; ESC 2023c). (Changes in governance initiated by the Society, as opposed to dictated by legislative changes, are outlined below.)

Actions of the ESC are determined by the Board of Directors (formerly the Governing Board). Directors are elected for 3-year terms by the membership, and members must also approve the actions of the Board at the Annual General Meeting. The Board itself meets at least twice annually at the time of that meeting (before and after election of the new members of the Board).

Board meetings are attended by the 4 members of the Executive, other national Directors (3 at-large, Student and Early Professional Affairs (SEPA), Equity, Diversity, and Inclusion (EDI)), a Director proposed (but no longer appointed) by each of the 7 regional societies, the Executive Director (from the Society's association management company), and some Officers including the Secretary and Treasurer. Although appointments to the Board changed with the new Act, attendance at its meetings remained similar. About 20 people are present at typical Board meetings, whether in person or by videoconference.

The results of the many decisions made each year by the Board are incorporated in other sections of this account. Groups of changes that were particularly consequential came from three strategic reviews (see *Modified priorities and the first strategic review*, and *Continuing membership concerns and strategic reviews*), and from adjustments in production of the journal (see *The Canadian Entomologist*).

Interim decisions fall to the Executive Council, led by the current President. At one time, the Executive comprised the present, next, and previous Presidents, but beginning in 1977 a future President would be elected by members 2 years in advance. This 2nd Vice-President was added to the Executive (the President-elect or Vice-President now being the 1st Vice-President). The increase from 3 to 4 members allowed the people running the Society to gain an additional year of experience in the role, and spread out the workload to some degree.

Continuing tasks are carried out by Officers. The Officers are appointed by and report to the Board, and include appointees who were termed "Trustees" when the Society was regulated by

²⁶ Initially the official name was the Department of National Revenue (usually called Revenue Canada from the mid-1970s), then Canada Customs and Revenue Agency from 1999 until 2005, and now Canada Revenue Agency.

the earlier legislation. (At that time, they were members of the Board, a status now confined to elected Directors.) Originally, there was an Editor, a Secretary (or Secretary-Treasurer), and a Treasurer (from 1951), but now there are additional Officers, as outlined under *Adjustments in governance* below.

Representatives can be appointed by the Board to represent the ESC on outside bodies or at meetings of other societies.

Other specific responsibilities are assigned to various Committees reporting to the Board. All ongoing committees, which persist from year to year, are now called Continuing committees. (In the past, some were specified as Permanent or as Standing committees.)

Ad hoc committees can be set up when required to consider particular issues. Some such temporary groups were once called Working groups or Study teams. The latest term is Task force.

Three documents define the operation of the Society: Bylaws, Standing Rules, and Committee Guidelines. Current versions of each of these key documents are available in the members area of the ESC website.

The overall purpose and structure of the Society are dictated by the Bylaws, or Articles of Incorporation [Continuance]. Any Bylaw changes must be approved by the membership and also by the responsible Ministry of the federal government (Innovation, Science, and Economic Development Canada²⁷). For example, the Bylaws had to be amended in 2011 to allow the use of electronic rather than postal ballots.

Directors, Officers, Committees, and Representatives are governed by Standing Rules that define the general nature, responsibilities, and operating principles for each. Relationships with employees are specified. The Standing Rules also show the types of Members, and outline general procedures for Society activities (including meetings) and for the establishment of dues. These formal Rules must be consistent with the Bylaws.

The responsibilities of each committee are spelled out more fully in Committee Guidelines. The guidelines list many detailed requirements, and span 51 pages at present.

Governance of the ESC was significantly streamlined following the 2017 Strategic Review (Anonymous 2019b). A Bylaw adjustment approved in 2018 allows the ESC Standing Rules to be changed without the need for approval at the next Annual General Meeting of members, although members must be notified of changes approved by the Board (Anonymous 2019a, b). Moreover, many internal details about committees were moved from the Standing Rules to the Committee Guidelines, leaving only broad statements about the function of each committee in the Rules. Earlier practice was to specify many aspects of committee composition and operations in the Standing Rules, so that even minor adjustments would require time-consuming member approvals. Adjustments to Continuing and Ad hoc committees and their guidelines now simply require Board approval.

The Committee Guidelines dictate some of the members of committees as well as the number or minimum number of appointees. The Chair of the *Nominating* Committee is normally the Past-President, and the Chair of the *Bylaws, Rules, and Regulations* Committee is normally a Board member. To ensure that future Presidents would become familiar with current issues before taking on the role of President, the President-elect (1st Vice-President) was appointed Chair of the Science Policy Committee after 1982. The 1st Vice-President is

²⁷ Innovation, Science, and Economic Development Canada was known as the Department of Trade and Commerce before 1993, and then Industry Canada until 2015.

now no longer the Chair, but remains a member, and the President and 2nd Vice-President are included too.

One member of the Executive Council is an ex officio member of all committees. Other ex officio members of particular committees are the Treasurer (*Finance, Membership, Physical Assets*), President (*Finance*), co-Secretary (*Bylaws, Rules, and Regulations*), Webmaster (*Communications*), and Chair of the Student Awards Committee (*Student and Early Professional Affairs* [SEPAC]).

Most committees include particular members in addition to those appointed ex officio: *Achievement Awards* (1st Vice-President, who is normally Chair); *Annual Meeting* (general Chairs of the Joint Annual Meetings of the year prior and 2 years prior, SEPAC representative); *Communications* (co-Editor of *The Canadian Entomologist*, and Bulletin Editor (or assistant), SEPAC representative, Equity, Diversity, and Inclusion Committee (EDI) representative); *Equity, Diversity, and Inclusion* (that Director); *Fundraising* (Treasurer, regional representatives from the next 3 joint annual meetings, Executive Director); *Publications* (Editors of *TCE*, the *CJAI*, and the *Bulletin*), *Public Education* (1st and 2nd Vice-Presidents, 7 regional representatives); *Science Policy* (President, 1st and 2nd Vice-Presidents, SEPAC representative); *Student and Early Professional Affairs* (at least 2 students and 2 early professionals); and *Student Awards* (subcommittee of 3 systematists for the Keith Kevan scholarship).

Members of the *Nominating* Committee cannot be appointed 2 years in a row. Finally, ordinary members of a few committees should be from Ottawa: *Finance* (2 of the members), and *Physical Assets* (all 3 members).

These details of governance show that running the Society demands considerable collective and cumulative effort. In light of the relative complexity of ESC operations, a formal orientation for incoming Directors was implemented in 2019.

The scholarship fund

The Scholarship Fund of the Entomological Society of Canada was set up as a separate Trust in 1974. It is a Registered Charitable Organization under the Income Tax Act. Strict rules are enforced concerning administration, donations, annual expenditures, and other matters by the Charities Directorate of the Canada Revenue Agency. (For the scholarships themselves, see *Student scholarships and grants*.)

In keeping with the requirements for a registered charity, the Trustees of the Scholarship Fund have complete and independent responsibility for the finances of the Fund. To emphasize this distinction, references to the Fund and Trustees were recently removed from the ESC Standing Rules. Until 2022, Trustees were appointed by the ESC according to procedures in the Standing Rules, but now replacements are chosen by the existing independent Trustees (cf. ESC 2022d). Likewise, donations to the independent charity cannot be made through the Society, so a separate page was established on the ESC website for online donations to the Fund.

Several of the financial requirements that apply to all registered charities constrain the activities of the fund. The Canada Revenue Agency does not allow certain awards that are restricted, such as grants for members to attend an annual meeting, and so these travel grants are paid by the Society from general revenue or from donations to the Society itself, and not by the separate Scholarship Fund. (Therefore, additional travel grants have sometimes been made

possible by specific donations to the Society.) To accord with the limitations on the way charitable funds can be used, too, student scholarships are open to non-members.

Starting in 2015, the Scholarship Fund was able to accept donations of capital property, such as stocks and mutual fund units. This route can generate additional tax benefits for donors (because no capital gains tax has to be paid on donated assets that have appreciated), prompting some donations that were larger than would otherwise have been the case. Legacy donations (bequests to the Fund or to the Society) were instituted in 2019.

In 2018, the Canada Revenue Agency reminded the ESC that charities like the Scholarship Fund are required to disburse 3.5% of all *capital* assets annually on charitable works, rather than merely making expenditures that reflect ongoing general donations. The annual cost of scholarships awarded had to be increased, even though (in the prevailing investment environment) that requirement made it almost impossible to ensure that the capital accounts and endowments funding the scholarships could be maintained, at least relative to inflation. The problem was accentuated by the fact that the Fund holds a relatively conservative investment portfolio, as appropriate for a charity.

The required level of expenditure increased the burden on the Trustees who manage the Fund. Partly in response, a somewhat more aggressive investment strategy was implemented in recent years, based on professional investment advice.

In 2021, steps were taken towards incorporating the Scholarship Fund, rather than keeping it as a Trust. Several required preparatory changes have been completed, prior to filing a formal application. Charitable trusts have lower annual filing requirements than corporations, but are used less and less because of legal concerns about the liability of trustees.

Adjustments in governance

There have been frequent changes in the structure of ESC governance. The general changes of 2013 imposed by the new Act, and the 2018–2019 simplification of governance documents engendered by the 2017 strategic review, were summarized above.

More specific changes adjusted the make up of the Board, the Officers, the Committees, and the Representatives, or addressed operational costs and administrative requirements. For example, as membership declined into the 1990s, ways were sought to simplify governance structures and reduce the cost and effort of administration.

After 1997, costs were saved by reducing the number of Board members elected at-large (from 6 to 3), although the incumbents finished their terms. Both before and after that change, various ways to restrain costs for annual meetings of the Board were suggested. They included limiting travel expenses to attend Board meetings to an excursion airfare, and paying only for those who had no institutional or other funding to go to the associated scientific meeting. They were implemented by some Board members.

Teleconferencing and videoconferencing now allow Society affairs to be managed with less in-person contact, an option used more and more to limit costs, reduce travel, and cope with difficulties caused by COVID. The mid-term meeting of the Executive Council has been held by conference call since 2011, rather than by in-person assembly in Ottawa.

Now that videoconferences make them feasible too, numerous additional meetings of the Board and the Executive have been held—beyond the Board’s annual meetings and the

Executive's midterm meeting—to ensure more rapid progress with ESC business. Facilitated through the association management company, they have been most frequent since 2016.

Changes in the Board, the Officers, and the Committees over time were made for three main reasons: to reduce the workload of individual volunteers; to try to increase effectiveness; and to take account of evolving priorities and new Society initiatives.

The tenor of this evolution is exemplified below by selected changes—most of which prompted extensive work to prepare new Standing Rules and other documents. As already noted, some recent changes were made to permit certain activities to take place online, and to reduce the need for members to approve minor operational adjustments.

One addition to the Board of Directors was a representative of the Student and Early Professional Affairs (SEPAC) Committee. A Student Affairs representative was first invited to attend Board meetings after the idea was endorsed in 1991. The question of “permanent” (voting) student membership on the Board was soon raised, but there were concerns from students about the additional responsibility and workload, and few students offered comments in any case. However, the student representative became a full member of the Board in December 2002.

The legislative changes of 2013 required Directors to be elected for 3-year terms. This period was deemed too long for a student, and a (non-voting) representative was appointed annually to the Board instead. However, after Early Professional status had been established, the Student Affairs Committee expanded to represent those members too. Serving a 3-year term became feasible for many more people, especially when the eligibility for Early Professional status was lengthened to 5 years in 2020. From that year, a SEPAC Director was elected to the Board and could vote. A Director for Equity, Diversity, and Inclusion was also added in 2020.

The 2018–2019 streamlining and revision of governance documents noted above was accompanied by changes to spread the workload of Executive Council members. In particular, each Executive now has to sit as an ex officio member on fewer committees.

The work of Officers is particularly onerous. An Editor for the *Bulletin* alone was appointed in 1970, separating that role from the job of the Scientific Editor. An Assistant Bulletin Editor became a Trustee (now Officer) in 2002. An Editor for the *Memoirs* was installed in 1990, leaving the incumbent Scientific Editor responsible only for *TCE*.

The role of the Scientific Editor of *TCE* is inordinately time-consuming, and several different attempts to distribute the workload have been made. Over time, these have included Editor-in-Chief, Associate or Assistant Editors, Division Editors, Subject Editors, and Co-Editors. As the Editorial structure changed, members had to approve official Trustee appointments of Editors in the various categories!

A multi-tier structure with Division Editors was found to delay the handing of manuscripts, and a simpler editorial procedure without them was restored in 2011. It was enhanced by the new online ScholarOne submission and reviewing system (see *The Canadian Entomologist*). Even so, the workload remained heavy, and three Co-Editors-in-Chief were appointed in 2020.

The Webmaster was made a Trustee (now Officer) of the Society in 2002. Social Media Administrators were added in 2017, but were discontinued with the formal establishment of the Communications Committee in 2022. The post of Co-Secretary was created in 2022.

In the past, the Society would appoint Representatives to several outside organizations, especially when it was involved in advocacy during the 1970s. In 1974, for example, there were Representatives to SCITEC, the Biological Council of Canada, the Canadian Committee on Water Pollution, the Canadian Council on Animal Care, and the Canadian Standards

Association Committee on Common Names for Pest Control Chemicals. Some of these bodies, and later ones that had ESC representatives, were disbanded. The ESC withdrew from others that were judged to bring it little benefit. Currently, there is only a single Representative (to the Biological Survey of Canada).

Committees have changed repeatedly over time (and some were renamed), with additions more common than subtractions. In 1969 there were only 10 committees (three of them Ad hoc). By 1993 there were 22 ongoing or Ad hoc committees, plus several representatives to other organizations.

The Society worried that the involvement of so many volunteers was not sustainable. The 1997–1998 changes eliminated, combined, or reorganized some committees, redefined their responsibilities, and reduced the size of some of them.

Committees have since been added to launch new initiatives and oversee online content. There are 18 Continuing committees and a few Task forces in 2022–2023.

However, I have tried to avoid head-spinning details about the constant adjustments in committees. Instead, sample changes are illustrated in a few sections, such as those on *Public education*, and *Marketing and fundraising*. Some of them reveal unsettling similarities with administrative changes elsewhere! For example, footnotes 3, 18, 19, 26, and 27 illustrate the repeated reorganization and renaming of some federal government branches that have interacted with the Society!²⁸

Overloading key Officers remains a concern, and attention continues (as by a recent Workload Task Force). However, the ESC came to realize that much of its strength comes from the active participation of so many people in running the Society. Indeed, 91 of the 547 current members (17.5%) are listed officially as volunteers (Directors, Officers, Representatives, and Committee members)²⁹, and others contribute without official appointment. Therefore, about one in five members helps with internal Society affairs, a proportion that attests to the health of the organization. Moreover, most committees include relatively recent additions, mitigating even further the concerns of the 1990s about overloading committee members.

Record-keeping and general administration at first fell to the Secretary and Treasurer. Until 1973, the Canada Department of Agriculture had made office space available in the K.W. Neatby building in Ottawa, and the editor who managed production of the journal worked there. In 1974, the Society approved the idea of purchasing a building that could house its office, but real-estate valuations caused a purchase to be long delayed (see below), and the Society's office moved into rented office space.

The most burdensome tasks of day-to-day ESC administration had intermittent secretarial help, but those duties were transferred in 1978 to an Office Manager (referred to at that time as a Clerk), hired part time, and much later full time, by the Society.

Membership lists and renewals, financial records, and many other responsibilities were attended to by that employee, who worked in the office alongside the Managing Editor. In the early 1980s, following advances in technology, the ESC investigated word processors and computers, and purchased a system for the office. The computer was upgraded in 1988.

²⁸ However, unlike these other jurisdictions, the changes made by the ESC incurred no expense to produce new forms, brochures, signage, letterhead, manuals, business cards, or other materials.

²⁹ A few additional statistics about volunteers are included at the end of the section on *Equity, diversity, and inclusion*.

Eventually the real-estate market eased, and the ESC renewed its intention to purchase a house. A property was bought in 1988, but had to be resold the following year because it could not easily be rezoned for use as an office. Finally, the Society purchased a building in 1990, located on Winston Avenue in Ottawa, that would serve as its headquarters.

This building provided space for the office staff more economically than renting. The computer system was upgraded in 1994, especially for editorial work—although a break-in and computer theft in 1995 revealed the need for an upgraded security system as well.

In 1996, Agriculture and Agri-Food Canada announced that space for back issues of the Society's journals would no longer be available in the K.W. Neatby building, where they had been stored for many years. The publications were then transferred to ESC headquarters.

The reorganization of the Society in 1997 meant that a Managing Editor no longer worked in the building, but the Society did not immediately sell it into an adverse real-estate market. The Office Manager and the back issues remained, and the premises were overseen by a Headquarters Committee. Necessary repairs and maintenance were carried out, and for some time the top floor was rented out. A more capable computer was installed for administrative use in 2000.

In 2014 a detailed financial analysis of Headquarters Operations concluded that the most cost-effective way to deliver the necessary services was to contract them out and sell the headquarters building (Lindgren 2014³⁰). The volume of materials in storage had already been reduced because back issues of the journals were digitized by 2009. Some duplicate paper copies were subsequently disposed of after being offered for sale at a generous discount.

Accordingly, day-to-day organizational tasks were contracted to a professional association management company in November 2014, and soon the Society no longer employed an Office Manager. The building was sold in January 2015.

Strauss event & association management of Winnipeg (see strauss.ca) was selected for the management role, under a 3-year contract. That company would be responsible for financial and accounting operations, membership data, registration and submissions for the annual meeting, teleconferencing, website management, and governance support, including financial management and advice on investment strategy. The Society's investments were transferred from National Bank to TD Waterhouse (a financial services corporation owned by TD Bank), and a new, somewhat more aggressive, investment strategy put into place. However, the Society limits its investments to ESG (Environmental, Social, and Governance) companies, despite somewhat lower returns for this investment category than for the market as a whole (cf. Anonymous 2023).

The transfer of these various tasks to Strauss event & association management allowed a few existing ESC committees to be disbanded. Strauss continues to assist the Society, after contract renewals of 2 and 4 years after the initial 3-year term. (Another renewal until the end of 2026 was recently approved.) The company's representative attends Board meetings of the Society as Executive Director, and is a member of the Fundraising Committee (with responsibility for liaison with long-term sponsors).

The ESC maintains an administrative calendar and a manual of Standard Operating Procedures. These tools are designed to assist Strauss management and members of the Executive to run the Society. They were recently revised by a Task force on Administrative Procedures.

³⁰ No more specific reference can be cited, because the report of the Ad hoc Committee on Headquarters Operations was not published.

When the ESC headquarters building was vacated, possible transfer of further records to Library and Archives Canada was investigated without success. Eventually, available digital records back to 1960 were transferred to Strauss management to be retained on a secure server, and remaining items were placed in a rented storage locker (see *Archives*). The care of these and other assets was assigned to a Physical Assets Committee, which replaced the Headquarters Committee.

Conclusions

This outline of governance, as well as the Board discussions that underpinned the changes, reveal several recurring themes. Chief among them are attempts to support the onerous work of Officers, and constant adjustments in the existence, names, and mandates of committees. An Ad hoc committee might become an ongoing one, a development commonly seen (e.g., for the Bylaws, Rules and Regulations Committee, and more recently for committees associated with the website and social media).

More generally, for all Society activities, a few ideas were raised more than once but treated as new each time; some were deemed unworkable, or were not feasible with existing technology; and others were not followed up or petered out, most often because of changes in committee membership. Further examples of a lack of continuity are noted below under *Other observations on ESC operations*.

Nevertheless, the main conclusion about ESC governance is the same as the one already made for history, advocacy, membership, publications, communications, and joint annual meetings: the Society has found ways to adapt to changing circumstances.

Marketing and fundraising³¹

The ESC made somewhat scattered efforts to raise funds and market the Society, appointing Marketing, Fundraising, or Marketing and Fundraising Committees to do so. The efforts were intermittent, and not unduly successful, as indicated by constant reformulations to explore new avenues.

The Finance Committee cautioned in 1978 that fundraising needs a unified approach. Advertising, sustaining membership, annual meeting financing, and solicitations from different committees can cause confusion, and should be coordinated for effectiveness and donors' goodwill.

One major effort in national fundraising was directed towards the 1988 International Congress of Entomology in Vancouver. Another major effort, from 1990, came as part of an Ad hoc committee with the Canadian Phytopathological Society to plan marketing for the book on *Diseases and pests of vegetable crops in Canada* (DPVCC). A "new" ESC Marketing Committee in 1992 aimed also to promote the Society and raise funds.

That committee arranged for a paid advertisement for *The Canadian Entomologist* in the Cooperative Subscription Catalogue in 1993, but then concentrated almost exclusively on marketing the DPVCC book until after its publication in 1994.

³¹ Fund-raising (with a hyphen) was most often used in the past, but the term is standardized here into the current form, "fundraising".

The committee—still officially termed the Marketing Committee (although sometimes referred to in the *Bulletin* as the Marketing and Fundraising Committee)—defined its duties in 1995 to include promoting Society publications, marketing miscellaneous items, promoting the sale of advertisements in the *Bulletin*, promoting membership, and encouraging corporate sponsorship and private donations (Floate 1995).

In this context, it investigated (partly through a questionnaire to members) the feasibility of selling shirts, mugs, calendars, note cards, and so on, and also the possibility of a 2x2 slide competition. Some of these items were later used by regional societies and students to raise funds at annual meetings.

The Marketing Committee also advertised the *Memoirs* to try to reduce the number of copies that had to be stored. A leaflet highlighting the *Memoir* series was prepared in 1997, and authors were also urged to promote their own memoirs. A broader brochure about ESC publications was distributed (in 1999) through mailing lists exchanged with the Entomological Society of America. Again, in 2009, the committee asked members to urge their libraries to buy back issues of *TCE* and the *Memoirs*.

A major effort in 2000 was a booth at the annual meeting in Montreal, run jointly with the Société d'entomologie du Québec and the Entomological Society of America (Braun et al. 2001). The booth held ESC membership information, items for sale, a leaflet promoting the Society and the benefits of membership, information about the Biological Survey (and about NRC publications including *TCE*), as well as a large poster to promote the ESC and affiliated societies. This effort helped to increase membership and raise funds.

For a few years in the 2000s, microfiches of ESC publications were marketed through a contract with the company ProQuest, but there were very few sales. In 2008, the NRC paid the Society to distribute leaflets about NRC publications in the packages prepared for delegates to the joint meeting.

Additional attempts to explain the advantages of ESC membership were also made. Some of them were targeted toward the many entomologists who belong to regional societies but not to the national society. In 2003, the Marketing Committee produced a Power Point presentation that would highlight the ESC, and made it available to members and regional societies.

A longer Power Point presentation, including an embedded video, was developed by the President in 2017. It could be used to bring greetings from the ESC to a meeting of a regional entomological society and to outline the benefits of ESC membership. An accompanying one-page document summarized those benefits.

Fundraising in the ESC normally sought funds for scholarships or for travel to the annual meetings, rather than for ESC operations. Letters of solicitation to corporations were sent without success by a Scholarships Fundraising subcommittee in 1977 and by the Marketing Committee in 1999. Attempts to secure additional “Sustaining members” were likewise unsuccessful (see *Membership*).

A more aggressive ESC Ad hoc Fundraising Committee was set up in 2003, and secured corporate donations for travel awards to attend the 2004 annual meeting (Bostanian 2004). Unfortunately, the main lesson of this exercise was that the ESC Fundraising Committee should avoid conflicts with the joint meeting organizers. When the local committee approached some of the companies normally expected to sponsor the meeting, they were horrified to learn that those companies had already donated—for the ESC awards! The ESC's Annual Meeting Committee called for better liaison between committees (Shore 2004).

The Annual Meeting Committee itself considered mainly ESC roles and financial arrangements with regional societies (see *Joint annual meetings*), rather than sponsorships, but in 2004 it secured a 5-year agreement with the company Syncroscopy for annual donations of \$2 000 per year, allowing the company to introduce displays or publicity materials at a succession of joint meetings (Shore 2004).

In 2011, following a recommendation from the Annual Meeting Committee, the ESC set up a Fundraising Committee charged specifically with raising support for joint annual meetings, and invited regional representatives to join. The following year, it was merged with the Marketing Committee.

That Marketing and Fundraising Committee developed a plan for a series of workshops at the 2013 JAM that might attract support from sponsors, but it bore little fruit. Newly reconstituted in 2014, the committee sought opportunities to increase membership as well as to acquire sponsorships.

However, in 2017, renamed (again!) as the Fundraising Committee, its duties were restricted to acquiring national and international sponsorships. Unlike the wider responsibilities of earlier ESC Fundraising Committees, the committee would focus on obtaining recurring annual sponsorships to make relationships between the Society and potential sponsors more meaningful and longer-lasting. This focus, and the inclusion of future local meeting chairs (see *Governance*), would help to avoid duplication of the initiatives of regional organizers.

The aim has a precedent in the 2004 agreement with Syncroscopy, although it too was linked with the annual meetings. It is worth noting that the agreement was secured by providing a marketing opportunity for the company, not simply by offering a modest benefit like a positive acknowledgement in the meeting program.

Recent fundraising by that committee has been successful, notwithstanding the fact that COVID tends to limit face-to-face contact with company representatives, which is the most fruitful way to secure sponsorships of this sort.

Awards

Several Society awards and honours serve to recognize the achievements of members. (For student awards, see *Student scholarships and grants*; and for presentation prizes, see *Student participation at annual meetings*.)

The first such honour was the *Gold Medal* of the Society (originally called simply the achievement award or the Entomological Society of Canada Medal), inaugurated in 1962. The recipient makes a formal presentation at the annual meeting. From 2006, items required from nominators were specified in detail to try to ensure that submissions for the award would be comparable.

In 1975, the *C. Gordon Hewitt Award* was established to recognize similar achievements by an entomologist less than 40 years old. The award was proposed in 1973 as the silver medal, but the name was rejected because it might imply second-class status, and implementation was deferred to allow the choice of an entomologist who could be honoured through the name of the award. The choice made was particularly apt: the first Dominion entomologist, C. Gordon Hewitt (1885–1920; appointed in 1909), who achieved a great deal before his death at the age

of only 35 years (e.g., Gibson and Swain 1920; Riegert and James-Abra 2008; Gillott 2013). In 2013 the age limit for the Hewitt Award was changed from less than 40 years old to within 12 years after completing a doctoral thesis.

An ESC award for active involvement in and promotion of amateur entomology came in 1977. Originally called the Junior Development Award (Conroy 1977), it was subsequently renamed the *Norman Criddle Award*. The award has been given in many but not all years. The name honours Norman Criddle (1875–1933), a gifted naturalist, artist, and economic entomologist who collected extensively at Aweme, Manitoba (Holliday 2005). The award has generally gone to someone studying Canada's insect fauna, but efforts in teaching, community projects, publicity, popular writing, and preparation of educational materials can all be recognized. The recipient is proposed each year by the regional society hosting the joint annual meeting.

The *Bert and John Carr Award* was first presented in 2011, to encourage the next generation of entomologists by supporting individuals, preferably amateurs or students, who study the natural history, taxonomy, and distribution of Canada's insect fauna. The name honours Bert and John Carr (Anonymous 2010; see Entomological Society of Alberta 2006, Anonymous 2008a), who contributed greatly to entomological knowledge through the collection and taxonomic study of several hundred thousand North American beetle specimens. The Carr's collection has been donated to the Canadian National Collection.

Individual recognition is also provided by two categories of membership. *Honorary* membership was instituted in 1969. Recipients are elected by members to acknowledge outstanding contributions to advance entomology, and are not to make up more than 10 members or one percent of the active membership. The benefits accorded to Honorary members have changed several times since the category was established, but since 2005 Honorary members receive full member benefits without fees.

Beginning in 1975, *Fellows* of the ESC were selected to recognize major contributions in any aspect of entomology. The category is limited to ten percent of current members. The idea of Fellowships was endorsed by the Board in 1972, but did not begin immediately because a few members had strong objections to distinguishing "preferred" from "ordinary" members! A membership ballot approved the category, and nominations were then sought from members (Holland 1974). A Fellowship scroll was designed in 1976 (Holland et al. 1976), and distributed to existing Fellows.

Candidates for awards can be proposed by any member, and recommendations are invited from regional societies, in addition to selection of a candidate for the Criddle Award by the society hosting the joint annual meeting. All other selections are made by the Achievement Awards Committee for ratification by the Board (members must then elect proposed Honorary members). Until 1996 there was a separate Fellowships Committee.

In addition, *ESC Service Awards*, in the form of shields, are presented to Presidents and Officers when they retire from duty. Although service awards were not instituted until 1972, identical shields were subsequently forwarded to all those who had served the ESC since its re-establishment in 1950 (Corbet 1972b, p. 79). Other specific service awards have sometimes been given. For example, outstanding efforts in revising Bylaws to conform with the 2013 legislative changes, and in providing French translations for many years, have been acknowledged in this way.

ESC awards therefore recognize a range of services to entomological science and to the Society. Moreover, the proposal and selection of entomologists for the awards, the facts about recipients disseminated to members, and in-person award presentations at meetings, have helped to strengthen links across the entomological community in Canada.

Student members

Student encouragement, integration, and employment

Membership in the ESC by university students has long been explicitly encouraged, with lower fees, typically (and currently) half the regular cost. The fee is further discounted—to about a quarter of the regular cost—for the many students who opt not to receive the journal. As might have been expected, student membership fell when fees were increased but rose again when they decreased (Danks 1994). Student membership also tends to increase temporarily when the annual meeting is held in conjunction with the Entomological Society of America, because members can register at these content-rich but relatively expensive meetings for a lower fee, and because ESC student membership is cheaper than student membership in the American society.

For many years (commencing in 1971), an Employment Committee worked diligently to assemble information about entomologists seeking employment, and about job opportunities. Their findings were provided to students and employers, particularly through the *Bulletin*.

Scholarships and grants for students were later introduced by the Society, and have increased substantially from the first scholarship (1977). In 2022, 11 scholarships and 15 conference travel grants were awarded (see *Student scholarships and grants*). The Society also considered educational opportunities for entomology, and an analysis of the entomological education available in Canadian universities was published in 1983 (Holliday et al. 1983).

In 1987, the Employment Committee was renamed the Student Affairs Committee, and came to be staffed entirely by students. This change provided a setting for ever-increasing student involvement in the ESC.

The importance of students and their activities was recognized in 1991 by inviting a student representative to attend meetings of the Board. The student representative, often the Chair of the Student Affairs Committee, became a full member of the Board at the end of 2002. A change in legislative requirements meant that the representative, although still attending Board meetings, was not a Board member from 2013 until 2020. At that time, a Director for Student and Early Professional Affairs was elected and once again became a voting member of the Board. The changes from 1991 to present are explained under *Adjustments in governance*.

Although the name of the Employment Committee had been superseded, the Student Affairs Committee continued to develop ideas related to employment. Events were organized at joint annual meetings: an employment booth in 1989, a workshop on writing grants and research proposals in 1993 (the subject chosen according to questionnaire responses from students), and a workshop on employment opportunities in entomology in 1994.

Lists of employment opportunities were still prepared too, even as the number of jobs offered to entomologists, and employer interest in the information, declined. By 1997, however, the availability of job banks on the Internet, and the delay between assembling the information and its publication in the *Bulletin*, made the effort no longer worthwhile. Employment and research postings now appear in the *Opportunities* section of the website.

The Student Affairs Committee became very active in other areas (cf. Danyk 1996). For example, it compiled an electronic directory of entomological education in Canada, which was posted on the website in 1997. The directory was updated many times, at first frequently (e.g., 4th edition in 2002), and then—with some changes in form—every 4 or 5 years. It is now updated regularly, a valuable resource that is searchable, helping students to find potential supervisors, thesis committee members, and collaborators. Links to laboratory web pages are included. The directory currently contains 278 entries.

An alphabetical list of student members, with contact information, research interests, and other details was posted on the website in 2002. However, it was later discontinued, chiefly because of privacy and allied concerns.

Increasing communication among students, and benefits engendered by their activities, were reinforced in 2003 by *The student wing*, the *Bulletin* column devoted to students. This regular column presented information such as recent theses, graduate student positions available, student events at annual meetings, available ESC scholarships and awards, and useful publications. The column appeared in every *Bulletin*, and some of its components later moved to the website.

A list of recent theses, entitled Thesis Roundup, was at first compiled for the column by members of the Student Affairs Committee by contacting relevant university departments. However, some students were omitted, and privacy concerns arose too, so after 2009 only theses reported by the students themselves were included.

In addition to the Thesis Roundup, occasional articles appeared in the student column about current research. Individual web pages were invited for the student section of the website in 2003, but relatively few students provided them. Nevertheless, Facebook and Twitter feeds were established for students, and were actively used (see *Social media*).

The option of co-Chairs for the Student Affairs Committee was added in 2012, to spread the workload. When the category of Early Professional member was introduced in 2015 (see *Membership*) and the Student Affairs Committee expanded, the name changed to the Student and Early Professional Affairs Committee (SEPAC). The name of the representative to the Board changed accordingly, and the quarterly *Bulletin* column, *The student wing*, was renamed *STEP corner*.

In 2015–2016, several Research Roundups were posted on the ESC blog (as well as on student Facebook and Twitter). They transmitted results from papers recently published by students, exposing their work in a less formal setting than standard publications. The invitation to contribute to Research Roundups was included in every *STEP corner* section of the *Bulletin* for several years. The text somewhat expanded in 2022. However, there were no blog entries after 2016, and currently (2023) the idea is being reconsidered by the SEPAC and other ESC committees.

The committee developed further initiatives from time to time. For example, a STEP photo contest was organized in 2016, allowing students and early professionals to submit photographs of their research and field work.

Student participation at annual meetings

The roles of students in the ESC are particularly visible at annual meetings, through their contributions to the scientific program and other components.

Student presentations were encouraged by instituting an ESC “President’s Prize” for the best student paper, first tested at the joint meeting of the Entomological Societies of Canada, Ontario, and America in 1982. The concept had been introduced earlier by the Ontario society, as well as some branches of the American society.

The competition soon became a feature of every ESC meeting, and care was taken to avoid bias during judging (e.g., Eidt 1984). Detailed procedures for the competition, and the sheets used for judging, are now posted on the website.

The success of the student paper competition led to its expansion. There were several subject sections (which differed depending on the particular meeting), with a prize for each section, and a best poster competition was added too. Moreover, so many excellent presentations were made that honorable mentions, runners-up, or second-place achievements would often be selected in addition to the winners. The rules were amended for 2011 and subsequent meetings to admit undergraduate students. Occasionally, one of the prizes was for the best paper by a member of the regional society.

Winners receive recognition for excellence as well as a modest cash prize. At the 2022 Joint Annual Meeting, 1st and 2nd place winners also received 2023 subscriptions to *The Canadian Entomologist* that had been donated for that purpose by Cambridge University Press.

All presenters gain valuable experience ... and helpful practice as they prepare for the competition. Many of them profit from coaching by local faculty, who realize the value of student participation and the educational opportunity it provides!

Many students now compete every year for these prizes. Up to 15 prizes at a single meeting have been awarded in recent years. Funds for student travel to the annual meeting have also been granted since 2004 (see *Student scholarships and grants*).

A Graduate Student Symposium began at the annual meeting in 2002, containing student presentations beyond those entered in the President’s Prize competitions. The symposium continued every year until 2013, when it was replaced with a plenary “Graduate Student Showcase”. That format allowed the student presentations (which were relatively long papers by selected individuals) to take place without competition for attention from simultaneous events.

Several other activities at the JAM focus on students. A student mixer was organized by students at the large 1982 joint meeting that included the Entomological Society of America. The ESC provided some funds to support it. For many years from the late 1980s, the ESC sponsored a reception entitled Students meet the Board. However, after 2006 it was replaced by a reception for students only, a format that students preferred. A less formal mixer for students is now integrated into the program of every annual meeting.

Entomological knowledge contests among institutional teams were arranged by students from time to time, but recently less formal insect trivia quizzes have been held at the mixer.

Students also developed a highly successful series of Silent Auctions, of donated books, which began at the annual meeting in 2004. Donated or created items with an insect motif were added from time to time, such as t-shirts, a quilt, artwork, and bandanas. The silent auctions have already contributed many thousands of dollars to the Scholarship Fund.

Conclusions

Support and recognition of students by the ESC has steadily increased—and has been paralleled by increasing student involvement in the Society. The roles of students in assembling information about thesis research, disseminating knowledge about opportunities for entomological education and employment, participating at annual meetings, and promoting entomological interests on social media, confirm that student and early professional members are highly active. Indeed, their energy and commitment have been responsible for several initiatives in addition to those already mentioned, such as issues of equity (see *Equity, diversity, and inclusion*).

The strong influence of students within the ESC is encouraging, because their voices are not always listened to (Bankston et al. 2020). The Society's interest continues, most recently as it investigates the possibility of sponsorships to cover membership fees for students.

The involvement of students and their backing within the ESC have been reflected by excellent enrollment. The percentage of student members in the Society varies from year to year, but 5-year means centred on sample years confirm that student representation has increased. Only 12% of members were students around 1970 and 15% around 1995, but no less than 26% of members were students around 2020 (plus about 6% early professionals).

Student scholarships and grants

The ESC Scholarship Fund was set up in 1974 to award scholarships as part of the effort to encourage students. (For President's Prizes, awarded for student presentations, see *Student participation at annual meetings* just above; for administration of the fund, see under *Governance*.)

After sufficient capital had accumulated from member donations, a single *ESC Postgraduate Scholarship* of \$500 was awarded in 1977. Since then, many different scholarships have been added (Holliday 2018).

There was some hope that that the ESC scholarship might grow sufficiently to be a significant means of support for a student. However, the non-monetary value of winning a competitive award of any amount was also recognized. Moreover, additional awards with specific sponsors can be easier to fund than those supported by general donations. These factors led to the establishment of multiple awards rather than a single large scholarship.

A second ESC scholarship (\$500) was made available starting in 1979. The amount of these postgraduate scholarships increased to \$1 000 in 1981, and to \$2 000 in 1985. The increases followed not only additional member donations, but also unusually high investment returns—and inflation—in the early 1980s, but interest rates have since fallen much lower. The scholarships were recently increased to \$2 500 each.

From 2004, one of the scholarships was normally awarded at the MSc level and one at the PhD level, given the difficulties of assessing the academic standings of the two groups together. (This format was actually first suggested in 1991 so as not to disadvantage MSc candidates.)

Beginning in 1989, two *ESC Research Travel Scholarships* were also awarded, allowing students to visit outside institutions to carry out additional key components of their studies.

Other student scholarships come from endowments contributed by relatives to honour deceased individuals. The *Keith Kevan Scholarship*, in memory of D. Keith McE. Kevan (1920–1991; see Vickery and Stewart 1991) was formalized by the Kevan family in 1991 and first awarded in 1993. It is given every second year to support studies in insect systematics, and so honour Keith Kevan’s diverse and productive contributions to systematics and other fields of entomology.

The *Lloyd M. Dosdall Memorial Scholarship*, from 2015, was established by Teresa Height-Dosdall in memory of Lloyd Dosdall (1952–2014; see Danks and McClay 2014). The scholarship commemorates Lloyd Dosdall’s many contributions to crop protection, insect ecology, and aquatic entomology, and assists students conducting research in the area of arthropod community ecology, including biodiversity and interactions among plants, herbivores, and their natural enemies. A second annual award has often been made.

The two annual *Danks Scholarships*, first awarded in 2016, were endowed by Hugh Danks and his wife Thelma in memory of David Danks (1974–2008; see Anonymous 2008b). They support studies on the taxonomy, life history, or environmental relationships of the native Canadian arthropod fauna (but without any focus or bias towards species of direct economic importance), reflecting the interests of David and his father Hugh in environmental science and entomology.

Another student award, the *Biological Survey of Canada Scholarship*, was instituted by the Survey to support studies of the Canadian fauna (Mousseau 2004). It began in 2004, and is awarded every other year, alternating with the Keith Kevan Scholarship.

Donations to recognize a colleague support a further scholarship. The *John H. Borden Award*, established in 2000 and first presented in 2005, is given to a student conducting research on integrated insect pest management, in recognition of John Borden’s prestigious contributions in the field of forest pest ecology (Anonymous 2001). Two Borden awards were presented in 2022.

Travel funds were approved for students to go to the 1969 joint annual meeting, but there were no applicants, and the first more formal and better-promoted *Conference travel grant* from the ESC was awarded in 2004. In 2009 this category was named the *Edward C. Becker conference travel grant*, and in 2022 renamed the *Ed Becker JAM Participation Award*. The name recognizes the uninterrupted 49-year attendance at joint annual meetings of Ed Becker (1923–2008; see Bennett and Hume 2008). His participation in the ESC also included many years as Treasurer. Multiple grants each year now allow students to attend annual meetings.

Changes in the administration of the scholarships and grants were made mainly to facilitate applications and evaluations as the number of scholarships grew. For instance, some annual deadlines were changed in 2005 and 2006 to avoid the need for multiple evaluation sessions each year, and to coincide applications with a time of year when students are less busy. Electronic submissions were required from 2009.

In recent years, ESC scholarships and grants have totalled about \$16 000 per year. The amount was recently increased to \$18 000 because of the disbursement requirements (noted under *Governance–The scholarship fund*). The annual total may also vary depending on the number and particular needs of applicants for research travel funds.

Additional JAM Participation Awards to attend the 2022 JAM with the Entomological Society of America greatly increased the amount that year, providing 15 grants supported by a specific donation for the purpose (Wist 2022). The increase has been maintained, because 16

such awards are available in 2023, half funded by the Society and half by a similar donation (Anonymous 2023).

Many individual members continue to provide donations to the Scholarship Fund. Fundraising by students has contributed significant amounts (see *Student participation at annual meetings*). The ESC also sought wider donations from time to time (see *Marketing and fundraising*).

The various scholarships and grants help students to undertake off-site research or training, attend annual meetings, and in other ways, but they also bring recognition to the recipients, and serve to confirm acceptance into the Society. Such merit-based awards prove useful for future job applications! Many candidates now seek the prestige, encouragement, and funding offered through the ESC Scholarships and annual-meeting travel grants.

Biological Survey of Canada

One of the most successful initiatives of the ESC is the Biological Survey of Canada (BSC), which promotes knowledge of faunal diversity. A brief proposing the Survey was prepared by the Society in 1974, and followed up by diligent attempts to fund a pilot study.

These efforts led to an “unsolicited-proposal” contract with the federal government in 1977. The Survey then developed strongly for 30 years, guided by a Scientific Committee appointed by the ESC. During most of this period, the Survey was supported by the National Museum of Natural Sciences (renamed the Canadian Museum of Nature in 1990). There it was known as the Biological Survey of Canada (Terrestrial Arthropods). Resources were not available to add Survey elements for other groups of organisms, and nor was there real interest from other societies.

The Museum greatly reduced its support for the BSC in 2009, and withdrew it completely in 2010. However, the Survey remains strongly linked to the ESC and continues to be highly active as a volunteer-driven Not-for-profit Corporation in a somewhat broader form. Since 2009 an ESC Representative approved by the Board holds membership in the Survey.

In 2011, the ESC adopted the BSC’s *Canadian Journal of Arthropod Identification* (see *Publications*) and appoints its scientific editor as an Officer. The Society also provides space for an annual BSC membership meeting in conjunction with the joint annual meeting.

The Biological Survey of Canada continues to foster exploration and analysis of the fauna through the wide involvement of the scientific community and the leadership of the group. It is best known for major cooperative projects that produce valuable publications of scientific synthesis. The latest extensive treatment updates information about the diversity and relationships of the Canadian arthropod fauna (Langor and Sheffield 2019).

Some of the Survey’s earlier books, symposium proceedings, and briefs were mentioned in sections above. However, no further details are given here because the history and benefits of the BSC are treated at length elsewhere (Danks 2016, 2017). Current information, and a twice-yearly newsletter, are available on the Survey’s website (BSC 2023).

Bilingualism

Some progress was made in the 1970s towards providing *Bulletin* content in both official languages, including the annual report of the President. Informally, too, a French name was used in the Society, as in the title of the *Bulletin* from 1977.

Papers for *TCE* were accepted in both languages. There were very few submissions in French, but the Scientific Editor stated: “I can assure authors that language is not a barrier to publishing in *The Canadian Entomologist*.” (Eidt 1982).

Nevertheless, the ESC had not fully taken into account the fact that French was the first language of many members, and conversations in 1986 at the joint annual meeting in Winnipeg made me aware that francophone members felt under-served in the general operation of the Society. I therefore spoke at the Board meeting (although not as a member of the Board) to suggest the matter be considered.

Some members of the Board were sensitive to the term “Bilingualism”, because they were unhappy with procedures implemented by the government of the day that seemed to weigh language proficiency more heavily than scientific competence. Indeed, letters of concern were sent to politicians some years earlier by the ESC and other societies, although most replies merely repeated general policy without reference to scientific concerns. Furthermore, some Board members were not conversant with the issues.

These undercurrents caused the name of the Ad hoc committee that was proposed (and agreed to) to be the “Language Advisory” rather than “Bilingualism” Committee. When the recommendations of that committee’s report (Danks 1987a) were adopted as ESC policy, the committee established to implement them was indeed called “Bilingualism”! Its work included translation of remaining official Society documents, as well as bilingual information on awards, ballots, and other materials. The Bilingualism Committee continues to ensure necessary translations of items in the *Bulletin* and elsewhere. The website was converted to a bilingual format in 1997, soon after its inception.

Changes to applicable laws forced the Society to continue in a somewhat different form after 2013 (see *Governance*), giving the opportunity for a change of legal name from Entomological Society of Canada (as incorporated in 1956) to the bilingual form Entomological Society of Canada/Société d’entomologie du Canada³².

The Canadian Entomologist kept its long-established English name, although manuscripts in both English and French were accepted. Abstracts in both languages were also encouraged explicitly. Beginning during 1980, an ESC volunteer prepared a French résumé if the abstract had been submitted only in English (Turnock 1980a). In 1982, a statement was added to the author instructions that a résumé was desirable and would expedite publication. In the 1990s, papers with résumés added by the journal bore the label “traduit par la rédaction”.

Abstracts of all papers continued to be published in both languages, although from 1997 a \$50 charge was made to authors if an adequate résumé had not been supplied and one had to be prepared by the journal. However, the universal inclusion of abstracts in both official languages ended in 2014, because it was causing publication delays.

³² The Quebec Society became incorporated in 1983, and changed its name at that time from la Société entomologique du Québec to la Société d’entomologie du Québec. The French name customarily used within the ESC gradually changed accordingly.

In 2019, the Bilingualism Committee recommended that papers in French should no longer be accepted, because very few were being received, virtually none of them had a Canadian author, and the standard of submissions was very poor. Although a French-language paper was almost never published in *TCE*, submissions in French imposed an undue burden on the few subject editors capable of handling them.

After review and endorsement by the Publications Committee, the change was approved by the Board (Anonymous 2019b, c), and the Standing Rules were modified accordingly (Anonymous 2022a). Although only papers in English are now published, résumés are included if authors provide them.

In the Society as a whole, of course, all formal documents, official statements, and other appropriate materials are still provided or maintained in French as well as English.

Equity, diversity, and inclusion

A recent concern is to what extent participation or experience in the Society may be compromised by potential discrimination, based on gender, ethnicity, minority, ability, religion, or other factors, and how such possible biases and adverse effects can be offset (Jimenez 2021). Moreover, such effects would not apply equally, because students and early professionals tend to be more diverse—in terms of gender and ethnicity, for example—than senior researchers (e.g., Nikaj et al. 2018).

Apart from the importance of these issues in society at large with respect to schooling, the job market, and other areas, they imply the existence of constraints on careers in entomology. Moreover, if certain groups feel less welcome in the ESC, they may be less likely to join or to develop a bond with the Society.

Trying to offset any such possibilities is consistent with the intention of policies like the general Code of Conduct (ESC 2022a, 2023a) and the Meeting Code of Conduct (ESC 2020c, 2022c). Although those policies encapsulate common-sense behaviours that respect other people, too many individuals still need to be reminded or educated about them.

ESC attention to equity issues came in 1990 when affirmative hiring actions (which actually had been implemented at some Canadian universities much earlier) prompted commentaries in the *Bulletin*. Partly in response, the low representation of women in entomological societies was pointed out (Myers 1990).

Another recognition of such issues in the ESC was the relabelling of the so-called “Ladies Program” associated with annual meetings, a term deemed appropriate at a time when nearly all entomologists were men. However, successive meeting organizers grappled with the problem of finding the best replacement title, choosing labels like “Spousal” (1992), “Alternative” (1993), “Participants and their Spouses/Partners/Friends” (1994), “Associates” (1997), and “Participants and their guests” (1998). Gender-neutral language in the Bylaws, Standing Rules, and Committee Guidelines was endorsed in 1993. In 2023, substantial work was done to make the French version of the Standing Rules as gender neutral as the language allows.

In several countries, including the United States, recent attempts to highlight the existence of discrimination—together with conspicuous evidence—were widely publicized. These events

reinforced concerns within the Society about the potential impact on entomologists of discrimination. Interactions among members, the Executive, and the Board led to an ESC Statement of Diversity, and Inclusion, now posted on the website (ESC 2023b). In 2020, an Equity, Diversity, and Inclusion (EDI) Committee was established, and an EDI Director elected.

An occasional EDI column appeared in the *Bulletin* from December 2021. Responses to questionnaires sent to members were summarized there (Mori et al. 2022).

Actions in this context sought to increase awareness, and included presentations at joint annual meetings, as well as webinars. Another initiative of the EDI Committee is a micro-grants program, “Open Spaces”, aiming to support those who identify as underrepresented members. The ESC now accepts donations towards EDI initiatives, as marked specifically on the website.

The Society has also made donations to agencies supporting minority groups. The charitable organization EntoPOC funds selected students [Black, Indigenous, and People of Colour] to become members of entomological societies. The Canadian Black Scientists Network supports black Canadians in science and related fields.

In this arena, it is often difficult to collect unbiased data, to take account of the many cultural factors that shape every individual, and to identify concrete actions other than offering education about the issues. Moreover, some influences are much less obvious than simple ignorance or overt prejudice. For example, most people everywhere who have had limited exposure to diverse individuals and diverse cultures tend to feel more comfortable with people who resemble them. Even without conscious discrimination, this tendency limits the diversity of the workforce by ensuring that current majorities remain over-represented, because it can give them a hiring advantage over equally qualified minorities.

Notwithstanding the difficulties, the common interests of entomologists, their relatively small numbers, and the frequent communication among them (through interactions at annual meetings and online), provide a positive setting. Moreover, the Society has become more diverse, especially over the last decade or two, and a larger proportion of members participate in running it. Most prominent has been a marked change in gender distribution.

Fifty years ago, less than 3.5% of members were women (as shown, for example, by the membership list for 1971 that was published as a supplement to the March 1972 *Bulletin*). Ten years later (1981–1982), when there were 971 total members, the pattern was similar. Only two of the 79 different volunteers then serving as Board or Committee members, Trustees, or Representatives (and filling a total of 109 positions) were women (2.5%), although the first woman elected as ESC President served in 1976–1977.

Currently (2022–2023), with 547 members but many more women, 91 volunteers occupy 147 positions³³, but 43 of them are women (47%), including 14 of the 27 Directors, Officers, and Representatives (52%).

Even so, it appears that historical effects will echo for a long time. Honorary membership is granted predominantly to senior members of the Society, who are mostly men: 8 of the 9 current Honorary members (and 16 of 18 all-time) are men (89%). All have the same ethnicity.

³³ Some people serve on more than one committee, including ex officio roles. Recent committees deal with a wide range of issues, some are very large, and there are many ex officio members.

Men also dominate in ESC Award categories where the average age of the recipients is lower. Only 4 of 61 Gold Medallists (6.5%), 7 of 117 Fellows all-time (6%), 4 of 39 current Fellows (10%), and 6 of 48 Hewitt Award winners (12.5%) are women.

However, the patterns have begun to change. For the last 20 and the last 10 years respectively, the corresponding numbers are 15% and 20% of Gold Medallists, and 26% and 33% of Hewitt Award winners³⁴. The numbers for Fellows (18.5% of those added since 2000) are potentially distorted by uneven intakes, because further appointments are not allowed when the fellowship limit has been reached.

Other observations on ESC operations

The ESC depends on the energy of members. Therefore, people are its most important asset. Many attend annual meetings, present papers or posters there, help to organize the meetings, judge student papers, or attend the business meeting. Some contribute to the journals and act as reviewers. They write for the *Bulletin*, provide book reviews, or submit images to the annual photo contest. A number are active on ESC social media or participate in other ways.

In addition, the Society operates because of the efforts of the volunteers who act as Directors, Trustees, Officers, Representatives, and Committee members. Every President who has worked with them realizes their goodwill, effort, and involvement, a fact commonly emphasized by Presidents in end-of-term remarks.

The Officers have been—and continue to be—extremely important. Secretaries and Treasurers (identified in the *Bulletin*, and also by Timms et al. 2017) have kept the Society running, in partnership with the Executive Council. Communication among members has been assured by Bulletin Editors, and more recently by social media coordinators too. A succession of Scientific Editors (whose names appear on journal mastheads and in the *Bulletin*, and are listed for *TCE* by Floate and Huber 2018) have maintained the quality of ESC journals.

Nevertheless, relatively few members volunteer on their own. Most of them are recruited by someone who recognizes their potential abilities. In the same way, most contributions to the *Bulletin* and the blog (other than official announcements and records prepared by Officers) are encouraged by specific invitations—the main avenue by which *Bulletin* content was diversified after 2002, for example.

The enlistment of volunteers therefore depends not only on the suggestions of Directors and Officers, the initiatives of Presidents in staffing committees, and editorial ideas for contributions, but particularly on the fact that current volunteers are familiar with other members. Such connections develop not just in the workplace, but significantly too at annual meetings and through social media. In other words, the quality and variety of ESC activities and the vigour of Society affairs are sustained by the existence of an active community of entomologists from which volunteers can be recruited and retained.

Despite their willingness, ESC volunteers are not necessarily versed in legal matters. Therefore, the Society is best served by enlisting professional advice for important tasks. They include major operations such as the journal, contract arrangements with employees and service providers, and other areas with legal implications such as issues of copyright. Otherwise, difficulties may be (and have been) encountered with agreements that were too loosely written, or with actions that might expose the Society to liability.

³⁴ There was no Hewitt Award in 2020.

Potentially useful or important actions may simply have been overlooked. After a professional association management company was hired, issues of meeting insurance, sales taxes on meeting fees, and other matters came to light. Governance was streamlined only recently by reducing the need for cumbersome votes to change the Standing Rules, and by transferring domestic details of committee arrangements from the Standing Rules to the Committee Guidelines.

Useful precedents or ideas for entomological activities can sometimes be discovered by reviewing the activities of other entomological societies, a route not always considered. The various societies outside Canada have diverse publications and different administrative elements, and sponsor a range of events (e.g., the Royal Entomological Society organizes an insect week). Societies in the United States, United Kingdom, Australia, New Zealand, Southern Africa, France, Belgium, Switzerland, and elsewhere have websites in English or French that describe their operations. Automatic translations provided by Internet search engines allow information about societies in other countries to be accessed without undue difficulty. Regional society websites may not have been checked for salient information either.

Careful analysis is required before making any major changes to the ESC, especially ones with financial implications. An abrupt increase in membership fees in 1989 (even though page charges were reduced at the same time) resulted in an abrupt decline in membership. Purchasing a house in 1988 before zoning issues had been resolved forced the Society to resell the property, although thankfully the loss was relatively small.

Some administrative challenges stem from the fact that the ESC depends on willing participation, and not on paramilitary lines of command! The majority of committee members pursue committee mandates, provide feedback on issues that arise, and submit timely reports. However, some are less efficient in carrying out tasks or solving problems. Indeed, some of the information in this article shows how the performance of committees may wax and wane, distinguishing groups working actively from those less engaged.

By the same token, most Committee Chairs are effective, but I encountered some who did not help with continuity at the end of their terms. Taking over as Chair of the Publications Committee, I asked the previous Chair to pass on helpful documents and recent correspondence. After some delay, he said that most of the material would be irrelevant anyway, and delivered nothing at all.

In their absence, I compiled a binder containing not only a copy of the Standing Rules and other formal documents about the committee (which were not readily available elsewhere because the website did not yet exist), but also reference documents for tasks then within the committee's purview, such as guidelines for book reviews. In addition, the binder contained correspondence and memoranda about issues of various kinds that were still active.

Likewise, a binder prepared for my use as Chair of the Finance Committee brought together items helpful for understanding the role of the committee—formal documents, recent committee minutes and reports, ESC budgets, and items concerning active issues. A few years later, I agreed to take on that role again. To my chagrin, the binder had disappeared!

These and other problems of continuity arise because most volunteers serve in a given capacity for only a few years. Executives are in place for 4 years. Routinely appointing Executives to the Science Policy Committee provides them with experience before they advocate for policies on behalf of the ESC. However, for a long period when that committee was chaired by the 1st Vice-President, the annual change in the Chair sometimes led to neglect of earlier interests, or to a capricious change in priorities. One Treasurer pointed out that it is

not easy for constantly changing Scholarship Trustees and Treasurers to ensure that the Scholarship Fund is following all of the constraints imposed by the Canada Revenue Agency.

Lack of committee continuity or lack of attention might also mean that a useful initiative is not acted upon. This happened several times—although the idea might be implemented later, sometimes as if it was completely new, by the same committee with different members.

Some suggestions were ahead of their time. Routine electronic submission of manuscripts became fully feasible only after most organizations used the same popular software for word processing (notably Corel WordPerfect and Microsoft Word, the latter becoming increasingly dominant).

The dynamic nature of the website is an advantage because it stays current, but at the same time it limits historical analyses. Financial records are no longer published in full in the *Bulletin*, and only recent versions appear in the members area of the website. Detailed results of the 2017 strategic review were posted in 2020, but are no longer there. However, older records can still be seen by members outside the Board, albeit with more potential difficulty, by seeking specific assistance through the Heritage Committee (see *Archives*).

In fact, my attempt to outline the development of the ESC demonstrates the extraordinary historical value of the *Bulletin*, which contains full versions of many older documents (until 2002). Therefore, it is especially important that the short summaries of ESC business now published there report fully and accurately on the information provided by committees, the decisions taken by the Board and Executive, and the resulting actions of the Society.

Given the key roles of volunteers in Society affairs, each President's task in suggesting the Chairs and members of committees for appointment during their term has to be done carefully. Although Presidents have the discretion to suggest changes, thoughtful initial selection of committee members is preferable to actions—such as replacement—requiring undue diplomacy! Board appointments of Officers (Secretary, Treasurer, Editors, and more recently others) are especially critical.

Naturally, Presidents too differ in personality and execution, but their performance is sometimes unexpected. Years ago, a President generally thought to have a remarkably plodding personality proved highly effective. He simply kept his desk clear with great diligence, and no critical issues arose during his term. On the other hand, the performance of someone who seemed capable of considerable insight, although adequate, was disappointing. Frozen into inaction by perceived limitations, and by excessive parsing of the Standing Rules, he achieved far less than anticipated!

A President might also have to avoid, monitor, or referee potential conflicts of interest. Not uncommonly, someone judging honours or awards has links with a particular candidate, or might even have input into judging their own candidacy. Not everyone recuses themselves without diplomatic persuasion!

A final illustration of Presidential responsibility comes from a Board meeting. The Board had been informed about a sensitive matter currently in progress, but without details because of the sensitivity of the subject. A member of the Board proposed a motion to force full details to be provided. The President knew that it was essential for the motion to be withdrawn, because even a defeated motion would go on record, stimulating curiosity and making wider disclosure more likely. Fortunately, the proposer acquiesced, thereby reducing the chance of litigation or other threats. The following year, the Board could be told that the matter was resolved (as endorsed by the ESC's lawyer) without further difficulties.

The values of membership

Those who founded the ESC, and those who belonged to it during the expansion of entomology in Canada that took place from the late 1940s until the late 1960s, viewed interactions with the community of entomologists as the major benefit of membership. To them, the value of the Society was self-evident. Moreover, the audience most interested in their work could be reached by publishing in the Society's high-quality journal.

Nowadays, however, many potential members seem to be deterred by the cost of membership (see *Influence of cost on membership*), although that cost is lower than for many national groups, and is insignificant compared with ordinary day-to-day expenses. This section, most of it based on my own experiences, summarizes the values of an investment in ESC membership.

Membership can be considered worthwhile for one or more of three reasons. A first reason to join the Society is the belief, or assumed obligation, that entomology in Canada should be supported in principle for the general good. (This belief includes support for students, the next generation of entomologists.) Most people appear to make a less idealistic choice!

A second reason stems from the financial and practical benefits provided by the Society. These benefits have commonly been touted as the major justification for the cost of membership. They include free electronic access not only to current issues of *The Canadian Entomologist*, but also to past issues of that journal as well as to the *Memoirs*³⁵. The *Bulletin* publishes updates about ESC activities, as well as a wide range of information of entomological interest, and members are notified as each issue appears. The *Bulletin* may also accept member submissions.

Other benefits include reduced annual meeting fees for members, potential Society awards that bring recognition, and discounts on certain publications³⁶. There is also ready access to website resources, some of which are available only to members. Members can participate in ESC social media platforms, which reach an audience that extends well beyond members of the Society.

Student members receive substantial support, including low fees for membership and meeting registration. They are eligible for various scholarships and grants, and multiple prizes are awarded for student presentations at annual meetings.

Nevertheless, I believe that a third set of advantages is at least as important as these direct member benefits. They were recognized by the founders of the Society, who sought inclusion in a community of people with related interests. Belonging to that community brings much wider, and more valuable, long-term member benefits than are calculated by a simple cost-benefit analysis.

For example, the annual meetings of the ESC reward participants in many ways, not just through presentations about their particular scientific fields. Broad exposure to diverse entomological subjects is easy there, which brings wider knowledge and may stimulate new ideas. Interactions with students and professionals of all ages (and recently a larger number of amateurs), who have different backgrounds and who study different disciplines, broaden

³⁵ However, some members do not regard access to ESC publications as valuable, because they have free access through their institutions, or chiefly publish in and read more specialized journals. Moreover, digital journals with open access are now common, giving entry to other outlets.

³⁶ Recent discounts on additional publications were negotiated by an Ad hoc committee that was established for the purpose in 2017.

scientific perspectives and reveal overlapping themes. Associated workshops address a range of topics. Liaison with members of regional societies brings added insights. The shared enthusiasm of fellow entomologists is infectious, so that the meetings help to reinforce the fascination with insects that brought many members into entomology.

There are wider benefits too. Spontaneous scientific and social discussions generate contacts that often lead to collective efforts and cooperative projects, reveal instructive links with seemingly unrelated work, or hint at potential employment opportunities. Some of these advantages of in-person meetings were summarized by Fields (2009), who asked, among other questions: “How many new ideas have you had during a phone conversation? ... How many collaborations have been born over a video conference?”

Moreover, the full benefit of this wide range of meeting components, including the cumulative development of personal interactions, is reaped by entomologists who attend successive meetings. They are less profitable for temporary members who attend a single meeting for its perceived thematic, geographical, or tourist relevance.

Outside the meetings, the ESC’s embrace of social media (Facebook, Twitter, blog) has allowed rapid and more or less informal interchanges within the ESC community too. All of these personal contacts, at meetings and online, help and encourage members and give a sense of belonging. The wider benefits of the ESCs network of connection and communication are exemplified by the speed and illuminating detail with which it proved possible to answer an enquiry about an insect collection (Lindgren 2022).

The value of personal interactions is common knowledge outside entomology, of course. Employees of all kinds who work in similar fields in the same building profit by interacting with their colleagues. These contacts—formal and informal—bring new ideas and opinions, feedback, and a sense of community. Anyone who stays at their desk ignoring the others is at a personal and professional disadvantage.

Another aspect of ESC membership, and one that is often underappreciated, is the opportunity to work as a volunteer in the affairs of the Society. Such participation attains entomological objectives, but also gives essential professional experience, especially by working with people who have different viewpoints and talents.

Experience within the Society may also demonstrate how meetings of committees and other groups can be made successful. Learning how to do this is seldom disagreeable, because ESC members (with very rare exceptions) seek the same goal of enhancing the Society’s aims, rather than pursuing specific agendas or hoping for personal gain. Effective meetings require thorough preparation, realistic agendas, a positive mindset, and leadership that encourages or gently constrains participants whilst generating specific actions. Outside the Society, these conditions may have to be learned from unpleasant exposure to opposite examples!

In addition, volunteer involvement in any capacity provides education about finances, publishing, corporate regulations, or other subjects that may be unfamiliar. At the same time, it brings further enjoyment of social interactions and shared accomplishments.

In other words, the member benefits that come from community participation—the third set of advantages just recognized—have major value. They help people to feel good about themselves and their work, and catalyze advances in research and other elements of the profession. Coupled with support for entomology in general, and cost-effective practical benefits, these advantages of membership suggest that all Canadian entomologists should belong to the Society.

Concluding remarks: The evolution and achievements of the ESC

The ESC has evolved over its 160-year history from a small regional group of naturalists to a leading national professional society. The initial intention was to provide a simple means for people to share their interest in Canadian insects, but the ESC now encompasses a wide range of activities:

- Scientific journals and other publications of high quality are produced to disseminate entomological knowledge nationally and internationally.
- A generous website provides access to these publications, to numerous sources of information, and to other entomological resources.
- Scientific meetings co-organized and co-funded by the Society help entomologists to present their work and ideas, and to interact and cooperate.
- Social media and other avenues are enlisted to bring similar advantages.
- The importance and benefits of entomological studies are explained locally and nationally.
- University students of entomology are supported and encouraged by research and travel scholarships, grants to attend annual meetings, awards for presentations at those meetings, reduced fees, and direct participation in the operation of the Society.
- Interest in insects is promoted amongst young people and members of the public, especially through liaison with regional societies.
- Individuals are recognized for their roles in advancing the science of entomology, and the Society.
- Members are encouraged to participate in Society affairs, favouring connections within the community of entomologists, the development of new skills, exposure to new ideas, and the process of informed decision-making.

The preceding account details the development of these many roles. It provides a basis for several general conclusions.

First, the Society's efforts have greatly advanced entomological knowledge. Initially (after it was set up separately from the Entomological Society of Ontario, and as its roles broadened after the 1960s), the ESC made many attempts to influence science policies at the national level. Its political impact was hindered by funding barriers, and by the restricted vision and scientific understanding of those in charge (see *Supporting entomology*). However, these disappointments were mitigated by the entomological results of the Society's efforts.

The forums it provided for ideas to advance entomology, its support for entomologists and their profession, its insistence on maintaining the quality of its journals, and its production of scientific briefs and reports on issues of concern helped to push forward important scientific studies. One conspicuous result was the establishment of the Biological Survey of Canada, bringing increased knowledge about the Canadian insect fauna.

The range of resources available to members (as well as non-members), in the form of both direct benefits and data, steadily increased. For example, more than 119 000 pages of back issues of the Society's publications were digitized and made available online, assisting research and communication. Other measures organized common names and other knowledge, and favoured information exchange and cooperation among members.

A second main theme has been constant change in the ESC. It was partly triggered by adversity. For example, beginning in the late 1960s and continuing for many years,

government programs had been curtailed, management and administration to assign the remaining funds had grown, and the numbers of research entomologists employed in Canada had diminished. Economic pressures intensified as ESC enrollment fell and publication costs rose.

In response, the Society initiated the first of its strategic reviews, enlisting a considerable number of members to identify the best ways to reorganize itself. Recognizing that simply continuing to increase fees for subscriptions and memberships was untenable, the ESC streamlined its operations, subcontracted production of *The Canadian Entomologist*, discontinued the *Memoirs*, and decreased the size of the Board.

Another major set of changes stemmed from advances in technology. Individual entomologists had to adapt to these advances too. One of the first new roles scientists were expected to play was typing, as computers were provided in lieu of typists. Subsequently, photography, statistical analysis, library services, graphing, and other specialties that used to be provided by ancillary staff were left increasingly to researchers as digital technology made them feasible for non-specialists.

The Society adopted the new technologies both in order to survive and to assist its members. It modernized its activities and made them more cost-effective, incorporating computers, email, Internet resources, imaging, and other tools. Scientific results and other materials were published more efficiently through digital production and electronic editorial processes. Information and publications were made more accessible through online platforms. Communication was assisted by making additional use of the web.

There were ceaseless challenges (not all of them mentioned above), requiring constant vigilance to maintain the Society's roles. The publishing environment, corporate legislation, audit requirements, real-estate tax, federal pay equity issues, and many other factors all forced a response.

The Society's actions reveal a further theme: the acuity of members. New possibilities were accepted, but not without critical examination—even if some of the resulting discussions much prolonged the deliberations of the Board!

The Society came to realize, for example, that legal advice is essential before it enters key contracts. Copyright questions have to be considered carefully, especially for digital publications and to make back issues available. Privacy issues are important, and online platforms need particular care to police them. Web-based content requires careful management, to avoid disseminating inappropriate or misleading information, and to avoid difficulties of access. Timely updating of technology avoids obsolescence. Adequate security and control of modes of communication limit the possibility that systems could be compromised, or used to generate spam, bots, and other adverse elements.

These assessments highlight a related theme: impressive participation by members in the evolution of the ESC. Most striking to me was that volunteers sought the best way to benefit science and entomology in general, and the ESC and its members in particular, rather than considering personal advantage. Apart from the time-consuming roles of editing and administration, for example, members have undertaken labour-intensive tasks such as scanning of back issues.

In fact, most Society initiatives stemmed from the zeal of one or a few key individuals, whose ideas were then affirmed by others. Especially during the 1970s, leading entomologists felt that the Society should play a wider role in promoting entomology and its national

relevance than had been considered up to that point. This belief led to a variety of letters, proposals, and briefs.

Progress in internal matters, such as bilingualism as well as equity and diversity, were likewise promoted by individuals who recognized the importance of addressing potential limitations within the ESC. Equally importantly, they were quickly joined by others and by the Board, who saw the merits of each initiative.

Another index of the constant interest of volunteers is how, in addition to major steps, ESC activities have constantly been fine-tuned. Adjustments were made over time in almost every aspect of Society operations: governance arrangements; committee structure and responsibilities; procedures for scholarship application and appraisal; fees and benefits for member categories; qualifications for the Hewitt Award and Early Professional status; website adjustments; minor but useful cost savings; and a host of others.

Yet another theme has been particular attention on how to encourage students of entomology, and help them to pursue their studies and find employment. Scholarships, prizes, and other means of recognition and support were established. Information and other resources were made available. The input of students was harnessed by integrating them more closely in the Society. Indeed, student representatives have commented on the amount of time often spent during Board meetings to discuss further possible means of support for students.

A final and wider theme in the evolution of the ESC has been the role of general changes in society as a whole. Most visibly, perhaps (though not most importantly), the level of formality has decreased in the ESC, just as elsewhere. Years ago, nearly all men at annual meetings and at Board meetings wore a jacket and tie, and had relatively short hairstyles. Now, most people there are casually dressed.

Likewise, less formal styles of address were introduced, in person as well as in documents. At one time, Board members were referred to by title (e.g., Dr, Mr) and surname, and were listed with full initials. From the mid 1990s, the format (as used in the *Bulletin*, for example) began to change to given names or single initials. Now given names are normally used for authors³⁷, Directors, and Officers (although some longer lists, such as committee members, use initials).

More significantly, liberal ideas in the sense of liberty and equality have become widely accepted. Acceptance of differences—in attire, as just noted, but also in many other features—brought not just the participation, but also the welcoming, of a wider range of contributors. Those developments highlighted the contributions of junior scientists as well as senior ones, and the worth (and productive energy and perspective) of students and amateurs as well as seasoned professionals. They reflect growing knowledge of how people of all kinds make positive contributions to the community.

The proportion of women in science, especially in biology, has increased, for a variety of reasons. This trend has given the Society a less limited representation of women, including nearly half of ESC volunteers (see *Equity, diversity, and inclusion*).

Receptivity to fresh ideas and different contributors is the sign of a mature and inclusive organization, and has allowed the Society to achieve far more than might be expected of a small specialist society. The pattern of increasing reach, inclusion, and accomplishment has

³⁷ One result is that citations, both within the *Bulletin* and in other publications, may show different initials even for the same author.

generated a comprehensive range of outputs, as indicated by the roles listed at the beginning of this section.

The information in this article shows that the evolution of the ESC was driven chiefly by pressures from government policies, cost increases, technological advances, and changes in society, rather than generated internally by striking new insights.

Nevertheless, suitable adjustments were possible only through the interest and energy of many members. They recognized the value of insect studies; the responsibility to promote and build on them for the benefit of science, the entomological community, and society; the advantages of collective effort and communication; the importance of new perspectives; and the need to accept ongoing changes within the organization.

Those strengths are exemplified in this history. They can be expected to drive the future evolution of the Entomological Society of Canada³⁸.

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³⁸ It seems fitting that this final sentence looks forward to the future, because it also ends my series of 26 articles that have looked back at the past.

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