

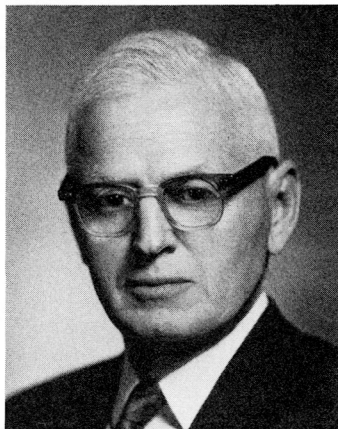
Memorial to Hollis Dow Hedberg

1903–1988

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Hollis Hedberg's life included the equivalent of several professional careers. A single memorial to him cannot cover fully his contributions in paleontology, stratigraphy, sedimentology, compaction, hydrocarbon exploration, source rocks, history of geology, the Law of the Sea, and teaching. I will concentrate here on his dedication, throughout his broad geological career, to the development of an international language of stratigraphy in order to further communication among geologists worldwide. His quiet but powerful influence in stratigraphy extends to virtually all geoscientists of today. Some of us he also managed to infect for a lifetime with a most active stratigraphic virus.



Others will write in detail about Hollis Hedberg, the petroleum geologist and successful explorer for hydrocarbons. His views on stratigraphy were strongly influenced by his early experiences exploring for oil in Venezuela, where he encountered thick sedimentary sections filled with stratigraphic problems. Effective exploration meant surmounting these problems and understanding all of the stratigraphic relations in the enormous volumes of rock. For many areas, diagnostic fossils were lacking, while other areas had fossils of unknown stratigraphic significance. Northern South America was geologically little known in outcrop. Hollis and his co-workers worked tirelessly in the field while the increasing number of wells being drilled provided a third dimension of stratigraphic information.

I believe that the rapidly expanding knowledge about the Venezuelan sedimentary section, the concurrent increase in stratigraphic problems, and the stimulus of major economic rewards for geologic understanding provided the ideal environment for Hollis Hedberg, the stratigrapher. To solve Venezuela's stratigraphic problems, it was necessary to return to basic methods originally used by the pioneers of stratigraphy. No single method based only on fossils or lithology or an established geologic time scale would suffice.

Hedberg brought to this situation a valuable, rare talent—the ability to extract from a complex situation a simple truth or series of truths. This would characterize all of his work in stratigraphy. He realized that stratigraphic units could be based on, for example, either characteristic rock types or fossil content, and that such units need not and commonly do not coincide. Nevertheless, either or both could be useful for understanding the geology of an area. There was no natural hierarchy of importance to the characteristics used to recognize stratigraphic units. Gross lithology was critical for some rocks, heavy minerals for others. Macrofossils were essential for some parts of the section, microfossils for others.

Most of Hollis's ideas about stratigraphy and stratigraphic practice appear to have developed very early. Through his published works, there is, of course, some variation in the words he used to describe the ideas. Many of the ideas were shared by other stratigraphers, but the totality was unique. After this initial synthesis, Hollis embarked on a lifelong effort to convince others of the

validity of his thinking. He was, finally, enormously successful; it is sometimes forgotten that much of what we accept today as normal, logical stratigraphic practice is a result of that success.

The purpose of Hollis Hedberg's stratigraphic crusade was not to enhance his reputation and professional standing. He recognized that many problems in stratigraphic practice resulted from poor communication between geologists. Even today, we all know that paleontologists, well-log specialists, field geologists, geophysicists, seismic interpreters, metamorphic petrologists, geochemists, and all other types of geoscientists do not commonly get together to discuss their personal philosophies of stratigraphy. The ability of two rational, logical geologists to arrive at entirely different conclusions when looking at the same suite of rocks is legendary. Hollis believed that they needed to use stratigraphic terms in the same, understandable way; they needed a common, well-understood stratigraphic language. Because our profession is, fortunately, not restricted to a single nation, the language of stratigraphy must also be international.

Hollis provided us with much of the common international stratigraphic language we use today. He was able to explain his simple, elegant concepts so effectively that their adoption has been overwhelmingly widespread, both internationally and across the range of geological professions. The process of communicating these concepts might have failed had it not been for the tenacity of the man pushing them. In the 1930s, one of Hollis's first papers on stratigraphic terminology was rejected for publication. Perhaps his concepts appeared simplistic rather than elegantly simple. But the setback was temporary. In the 1930s and 1940s, he was actively publishing on many aspects of stratigraphy. In May 1948, the Geological Society of America *Bulletin* published Hollis's first article purely on stratigraphic classification, "Time-Stratigraphic Classification of Sedimentary Rocks."

Hollis continued publishing in journals, but he also expanded what for him proved to be an even more effective method: participation in organizations dedicated to stratigraphic terminology and practice. He was one of the founders of the American Commission on Stratigraphic Nomenclature (today the North American Commission on Stratigraphic Nomenclature) and he strongly influenced much of the early work that led to the publication of the first *American Code of Stratigraphic Nomenclature*. Although Hollis remained a participant in the American Commission, his attention shifted to the International Subcommittee on Stratigraphic Terminology, which was founded in 1952 under the auspices of the Commission on Stratigraphy of the International Geological Congress. In 1966, this became the International Subcommittee on Stratigraphic Classification (ISSC) as part of the Commission on Stratigraphy of the International Union of Geologic Sciences. The Subcommittee was Hollis's most successful means of communicating his ideas on stratigraphy to a large group of internationally prominent stratigraphers and of convincing them of the validity of those ideas. The Subcommittee led to the eventual dissemination of these ideas to the entire geological community.

Hollis suggested the aim of the Subcommittee very early in its history. Using a method that was to characterize much of his Subcommittee work, he put it in the form of a question: "Do you agree that for the sake of clarity in geological literature and clarity in communication between geologists it is desirable to try to reach international agreement on principles of stratigraphic classification, on the significance of the principal kinds of stratigraphic units, and on the terminology to be used for each kind of stratigraphic unit?" what geologist could answer no?

The Subcommittee began as, and remained, an international group of stratigraphers with widely varying backgrounds, differing national views, and very strong wills. Hedberg's ideas were commonly considered "American," which was true insofar as they represented the thinking of many, but not all, American geologists. Several other "national" schools of thought within the Subcommittee were often in opposition. Hollis favored establishing lithostratigraphic, biostratigraphic, and chronostratigraphic units without considering one intrinsically superior to the others. Some English stratigraphers felt lithostratigraphic units, such as had been used for the Cambrian,

should be the most fundamental stratigraphic units. Some German and French stratigraphers championed biostratigraphic units, and Russian stratigraphers considered chronostratigraphic units to be stratigraphy's primary units.

Between International Geological Congresses, the major means of communication was (and remains for today's Subcommittee) in the form of Subcommittee circulars that were sent by mail to all members. These circulars were the forum for the ideas of all Subcommittee members, but also were the means of persuasion for Hollis. One of the early circulars (Circular No. 3, 1956) was particularly effective. In it, Hollis used a series of questions about stratigraphy to lead Subcommittee members to many of the conclusions that he had reached so many years before. There were no "trick" questions involved. They were simply phrased so as to establish for each respondent the logic supporting the stratigraphic ideas.

During the sometimes acrimonious debate in the circulars, the Subcommittee began work on a written stratigraphic guide. That this was a major goal of the Subcommittee was clearly established in Circular No. 7 (1955): "It is highly desirable to work toward international uniformity in stratigraphic classification and terminology. The establishment of a new International Stratigraphic Code under the auspices of the International Geological Congress should be a definite objective." The first part of the guide to be drafted was the chapter on lithostratigraphy that appeared in ISSC Circular No. 18 in 1970. This was followed by chapters on stratotypes (Circular No. 20, 1968), biostratigraphy (Circular No. 29, 1970), and chronostratigraphy (Circular No. 30, 1970), and the Introduction (Circular No. 31, 1970). These chapters, most originally drafted by Hollis, went through several revisions (almost exclusively by means of the circulars) before being published in draft form.

The drafting procedure did not vary and is an illustration of one of the few effective methods of having a large, highly varied committee arrive at a consensus on a complex subject. The key, of course, was a single individual who did nearly all the work, with others concurring, modifying, or criticizing. Hollis compiled all of the suggested changes to the drafts and redrafted the chapters. The new drafts were again discussed in the circulars and again redrafted. Cooling-off time was available to answer strong comments thoughtfully and rationally. All Subcommittee members could answer or add any comment. Everyone had the opportunity to contribute, and Hollis included all the contributions in the next circular.

The 21st International Geological Congress, Norden, published the *Statement of Principles of Stratigraphic Terminology* in 1960. The 24th International Geological Congress, Montreal, published the chapters on lithostratigraphy, biostratigraphy, stratotypes, and chronostratigraphy as individual "red" booklets in 1970 and 1971. Lethaia and Boreas published the Introduction in 1972. These initial publications were still considered drafts, and the general geological public was asked for comment and suggestions.

An editorial committee was formed, and the task of compiling the individual chapters into a single volume began. Hollis received the most help from Amos Salvador (who was to succeed him as chairman of the ISSC in 1976). In 1976, John Wiley & Sons published, for the ISSC, the *International Stratigraphic Guide*. The *Guide* is the culmination of the many years of effort on the part of Hollis Hedberg to promote logic, communication, and international agreement in stratigraphic practice. His ideas, profound despite their simplicity, have found worldwide familiarity and, usually, acceptance. Symbolic of the international impact of the *Guide* is the publication of Chinese, Russian, Spanish, and Turkish translations. Members of the International Subcommittee are now working on a revision of the *Guide*. Most of the changes are supplements, many of which came from Hollis himself, for he remained characteristically active (with the title of past chairman) in the work of the Subcommittee. Changes to the existing chapters are primarily to further improve clarity.

Hollis was a friend to many and a professional companion of all geoscientists. He had a strong

personal influence on several generations of geologists. I was about 40 years his junior, but still feel I saw some of the most important parts of his career as a stratigrapher. His career as a petroleum geologist greatly influenced, and continues to influence, the lives of many. His warmth, generosity, and unselfishness remain a fond memory for the many people who knew him. Hollis will not be writing any more about stratigraphy, sedimentology, compaction, hydrocarbon exploration, source rocks, or the Law of the Sea, but he remains with us, and we are thankful for that companionship.

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