The Journal of the Canadian Society of Exploration Geophysics (J CSEG), now named the Canadian Journal of Exploration Geophysics (CJEG), has been published from 1965 to 2016 (with a dormancy period from 2000-2010). The journal has typically had 5-10 refereed papers in 1-2 issues per year. It is impressive to see that many CSEG Journal authors have been recipients of the Maurice Ewing Medal; the SEG’s highest honor, and this list of Ewing medalists includes geophysical pioneers such as Nigel Anstey, Roy Lindseth, Enders Robinson, and Sven Treitel. In the coming months, the CSEG RECORDER will publish a series of articles entitled From the Archives which summarizes highlights of past CSEG publications. This first article summarizes the early journal publications from the 1960s.

Prior to the first CSEG journal publication in 1965, it should be noted that the mid-1950s was truly a golden age for modern geophysical exploration techniques. Many of the modern seismic exploration methods got their start during this time.

In 1954, Enders Robinson published his famous Ph.D. thesis entitled “Predictive decomposition of time series with application to seismic exploration” which demonstrated the viability of seismic digital filtering and seismic deconvolution. This was one of the major highlights of work by the Geophysical Analysis Group (GAG) at the Massachusetts Institute of Technology (MIT) during the 1950s.

Enders Robinson, SEG Ewing Medal winner in 2001, laid the foundation for seismic deconvolution and digital processing with his pioneering Ph.D. thesis “Predictive decomposition of time series with application to seismic exploration” with subsequent publication in Geophysics. Photo courtesy of Shirley Lines in the June 2006 CSEG RECORDER.

While Robinson’s seminal thesis was published in a 1967 Geophysics paper, Enders has made contributions to both the CSEG RECORDER and the CJEG. In 2005, Enders was the CSEG Doodletrain Inaugural Speaker. Robinson’s ground-breaking research which established him as the “Father of Deconvolution” attracted another famous geophysicist, Sven Treitel, who was also a Ph.D. student at MIT at that time. Together, Robinson and Treitel published an unprecedented number of seismic digital processing papers. While most of the papers by Robinson and Treitel were published in Geophysics, both authors have papers in CJEG. Their most recent paper in the June 2012 CJEG issue is entitled “Amplitudes Upon Reflection in Acoustical Experiments”. In addition to contributing papers, Sven Treitel is an Associate Editor of the CJEG. (I will describe Sven’s contributions in future RECORDER issues.)

The year 1954 was a great one for exploration geophysics. During that year, J.G. Hagedoorn published a paper in Geophysical Prospecting entitled “A process of seismic reflection interpretation”. This important paper laid the foundation for seismic migration methods by describing migration in the geometrical terms of wavefront mapping and maximum convexity migration (diffraction stacking). Another of Hagedoorn’s seminal papers described the Plus-Minus method of seismic refraction analysis. This impactful paper was published in Geophysical Prospecting in 1959 and was later reprinted in the J CSEG in 1965. This paper was widely used in Canadian exploration for refraction statics corrections.

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Many other important developments in exploration seismology occurred in the 1950s. In 1956, Harry Mayne proposed the idea of common depth point (CDP) stacking and published this important idea in Geophysics in 1962. The concept of vibroseis was developed at Conoco in the 1950s by Crawford, Doty, Lee and others at the Conoco research lab at Ponca City, Oklahoma. The vibroseis idea was based on concepts from chirp radar, and this revolutionary seismic acquisition method was publicly disclosed in 1958 and published in a Geophysics paper in 1960. Today, vibroseis surveys represent an alternative to dynamite seismic surveys and account for about half of the land seismic surveys in the world.

A very comprehensive paper by Roy Lindseth in the 1967 J CSEG on “The nature of digital seismic processing” explained digital sampling, aliasing, Fourier transforms, amplitude and phase spectra. Lindseth’s early papers in the J CSEG on digital seismic processing provided widespread education for Canadian exploration geophysicists. Lindseth would later initiate seismic inversion technology that is widely used throughout the petroleum industry today.

From the early days of seismic digital processing methods, it was clear that the CSEG Journal was clearly describing the technical advances of the industry by the publication of numerous important papers. Our next installment of From the Archives will examine the industry advances during the 1970’s.


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