

FUTURE PROSPECTS FOR EXPLORATION GEOPHYSICISTS

By

J. HODGKINSON *

In this period of intense seismic activity, rapid technological change and rising operational costs, it seems appropriate to take stock of the current situation and to compare it with the recent history of geophysical exploration. By so doing we can perhaps avoid repeating some of the mistakes of the past, and making new ones in the future.

From management's viewpoint, the key to successful exploration is the exercise and coordination of the skills developed by such specialists as geologists, geophysicists and economic analysts. Within this context, the primary function of an exploration geophysicist is to translate into meaningful terms the results of geophysical surveys. With this in mind, we note with some misgiving the tendency in our profession to subdivide into even narrower fields and to develop specialists in the various phases of geophysical exploration such as field techniques, digital processing or electronics.

This is undeniably the day of the specialist. Because technology is advancing so rapidly, the limitations upon the time of any one individual make it inevitable that specialists will emerge in specific technical fields. The nature of our profession makes it imperative, however, that the various facets of our work be interwoven and coordinated into a meaningful whole. This can be done effectively only by those who are familiar with all branches of exploration technology, which would seem to invite a tendency to learn less and less about more and more. There is no obvious solution to this problem, but it is evident that the effective application of the various techniques at our disposal can be achieved only through a thorough understanding of all the processes involved. There is an inherent danger in believing that, because we have accumulated considerable experience over the years, we can sit back secure in the belief that we are indispensable and that no one can interpret our data as well as we can. There can be no doubt that unless we change with the times we will find ourselves being replaced by those who are willing to learn the correct application of new techniques, and to relate the results intelligently to practical exploration.

It has been said of the present generation of young people starting a career that, on an average, each will have to requalify three times during his working life. For us, the alternative to requalifying in other specialized fields is continuous development in our own field. While so developing, there are two conflicting factors with which we will have to contend. On the one hand, the current trend towards more complex field and processing techniques may cause costs to become prohibitive,

*Atlantic Richfield Company. President of the Canadian Society of Exploration Geophysicists.

with the result that management may in future elect to drill rather than to shoot. On the other hand, advancing technology may close the gap between the field seismogram and the sonic log to such an extent that the seismologist, as we now know him, will no longer be needed to interpret field results in geological terms. A consideration of these two conflicting trends may provide the key to our survival as geophysicists. We must find a compromise between the higher costs of some of the new techniques and the benefits to be derived therefrom. Above all, we must be equipped to use the new techniques intelligently, and to the best economic advantage.

Powerful tools such as C.D.P. techniques in the field and digital processing thereafter are extremely expensive, and their use is only justified when the problems involved demand such sophisticated treatment. If costly procedures, used as a crutch, replace an intelligent evaluation of difficult problems on their own merits, the procedures, as well as the geophysicists, are likely to fall into disrepute. It is essential, therefore, that we gain a thorough understanding of the processes involved before we embark on expensive, and possibly needless, field and processing techniques.

Indiscriminate use of C.D.P. without prior evaluation of the parameters involved, or routine digital processing of data without periodic analysis of the validity of the results achieved, can result in the needless expenditure of money which could more profitably be used elsewhere. There are doubtless many prospects which will yield meaningful results only with the help of the most advanced technology, but the decision to use such techniques cannot be made intelligently without a full understanding of all the parameters. This is where the competent geophysicist can make his maximum contribution, but to do so effectively he must be familiar with the basic principles of all the specialties involved. Such familiarity can only be achieved by study. For many of us, depending upon the particular phase of the operation with which we are least familiar, this demands refresher courses in mathematics, geology or electronics. By continuing education we can contribute significantly to our own future security and to the well-being of geophysical exploration as a whole. Such education should not necessarily be confined to geophysics in the narrower sense. An appreciation of the economics of exploration and a general broadening of our horizons is bound to result in better coordination of our efforts with those of our counterparts in other phases of industry.

Geophysical exploration in Canada is currently suffering from a severe shortage of qualified field and interpretive personnel, which may in part be directly attributed to geophysical staff reductions in previous years. Whatever the reason for these cut-backs, the result has been a serious decline in the number of young people who are attracted to a career in exploration geophysics. This affects all of us, since without new blood we cannot survive. A repetition of the staff reductions of 1957-61 can only result in future shortages of personnel and further tarnishing of

our image in the eyes of young people looking to geophysical exploration as a career.

The means of preventing such a recurrence are doubtless beyond our immediate control. However, if management is assured that geophysicists can and do make consistent contributions to economic exploration, in periods of recession as well as in periods of expansion, perhaps we may hope that the next down-swing of the exploration activity curve will not result in wholesale reductions in geophysical staff. The time to demonstrate our economic effectiveness is now, while industry is in a position to provide the funds and opportunities for us to do so. When exploration budgets tighten and the curve starts to fall, it will be too late.