ysis in many fields were presented, and many of the technical problems of this method were also explored. Analyses of trace elements in matrices as varied as industrial metals, reactor materials (including uranium and graphite), ancient Grecian marbles, Flemish paintings, human hair, snake venoms, and meteorites were discussed. Among the major problems brought out were those of sampling in connection with archeological and art samples, preparation of samples (including washing) for meaningful analysis for the forensic samples, matrix effects for trace elements in manganese, the general problems of neutron absorption, inhomogeneity of samples, radiochemical separations required for many trace methods, determination of special tracers such as O^{18}, and nondestructive analysis of precious samples such as meteorites (or, eventually, samples from the moon).

Possibilities of using radioisotope neutron sources for activation analysis were well summarized in several papers. Mention was also made of the use of captured gamma radiation from such sources for analysis. Although such methods will not have the high sensitivity of reactor activation, they are readily adaptable to rapid routine analysis at the 0.1- to 1-percent levels. Of particular interest was a new type of portable neutron source described by S. Amiel (Israel) which utilizes the reaction O^{18} (α,n) Ne^{21}. The source consists of two tubes, one with an interior of Po^{210} plated onto nickel, the other containing CO_2 labeled with O^{18}. In use, these tubes are connected so that the CO_2 can come in contact with the Po^{210} alpha particles. For "shut-off" and storage, the CO_2 is frozen in its own storage tube. Such a source is portable and presents no shielding problem. It should become commercially available next year at a cost of a few hundred dollars.

Recently the use of accelerators in activation analysis has enjoyed a major revival. Albert and Engelmann in France have systematically studied the application of (γ,n) reactions from a linear accelerator, as well as charged particles from cyclotrons, for determinations which are very difficult or impossible by reactor irradiation. Examples are the determination of part-per-million amounts of oxygen, carbon, nitrogen, and silicon in high-purity metals such as beryllium, aluminum, and germanium. Albert presented an interesting summary of (γ,n) activation throughout the periodic table.

The session on experimental techniques of activation analysis was highlighted by a very interesting report on progress toward a versatile automated radiochemical separation system by F. Girardi of the Euratom Center, Ispra, Italy. Girardi's system is based on ion-exchange separations and should be particularly applicable where analysis of a large number of repetitive samples is required. D. Comar of Orsay complemented this work by a description of the system he already has in operation to determine the element iodine in biological fluids, while W. Lyon presented an excellent summary of errors and artifacts which the Oak Ridge group have found after long experience in activation analysis. Several other papers described certain specialized nondestructive techniques for use in activation analysis, while a second group of papers considered the application of computers to activation analysis.

The two sessions on analytical applications of radioactive tracers, though hardly representative of the potential of the subject, did nevertheless show some bright spots. Several papers described radiometric methods which use radioactive reagents in both organic and inorganic systems. Similarly, there was discussion of the present state of radiometric titrations. Excellent examples of the powerful radio-release methods were described by D. Chleck (kryptonates) and W. Lyon (sulfur dioxide in air polution), while various modifications of the isotope dilution principle illustrated the experimental simplicity of these methods.

In particular, the papers by J. Ruzicka of Prague and J. DeVoe of the National Bureau of Standards on substoichiometry in isotopic dilution and radiometric methods evoked very interested comment. This principle shows great potential for submicrogram trace analysis involving minimal expense for facilities and equipment.

W. Blaedel (University of Wisconsin) completed the session with an intriguing discussion of his current progress toward a continuous isotope derivative procedure with direct readout for amino acids. Here again, the automation of laborious chemical procedures is a very important step in overcoming the "potential barriers" many people feel toward the use of radioisotopes in analysis.

The final session of the symposium was on the analytical application of radioactive sources and included application of backscattered radiation as well as secondary emission such as x-ray fluorescence excited by radioisotope sources. An interesting new development mentioned was the analytical program in Mössbauer spectrometry being carried out by DeVoe at the National Bureau of Standards.

The proceedings of this symposium will be available from the IAEA and from its sales agents throughout the world within about 6 months.

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Oceanography of the Western South Atlantic

The Brazilian scientific community has become increasingly concerned by the neglect of oceanography in that country, even as it applies to the immediately adjacent seas. As a start in rectifying this situation, the First International Symposium on the Oceanography of the Western South Atlantic was held 14–18 September 1964 at the Brazilian Academy of Sciences in Rio de Janeiro. The large attendance clearly attested to the widespread interest in this theme. There were 157 participants present: 132 from Brazil, eight from Argentina, three from Uruguay, two from Great Britain, eight from the United States, three representing UNESCO, and one from the FAO. On relatively short notice the sponsors arranged for the presentation of 67 papers, including seven invited lectures, a feat of considerable consequence for a region of the world where the study of oceanography is thought to be still in its infancy.

The composite nature of the topic made it necessary to divide the symposium into four sessions: Water Masses and Oceanic Circulation; Ecology of Marine Animals; Topography, Sediments, and Benthos; and the Estuaries and the Littoral Zone. A variety of subjects were covered, including: the activities of the Instituto Antartico Argentino; special aspects of the problem of determination of characteristics of oceanic waves; results of some littoral drift measurements in a basic coastal model; the distribution and displacement of water masses in the Argentinian Sea; new references, based on the study of planktonic foraminifera, on the location of the convergence of

subtropical and subantarctic waters; geophysical investigations in the western South Atlantic; reef rock on the coastal platform of southern Brazil and Uruguay; the movement of sediments at the port of Mar del Plata in Argentina; algae of the western South Atlantic; patterns of distribution of plankton organisms; pelagic copepods in the western South Atlantic; faunistic provinces of the western South Atlantic littoral region; Brazilian coral reefs, ecology of the genus *Balanoglossus*; relation between the condition factor and sexual development in *Sardinella aurita* (Cuv. & Val. 1847); and a biological investigation of the whaling season (1960–1963) off the northeastern coast of Brazil.

In addition to the presentation of the formal papers and lectures, a major purpose of the symposium was to consider the future role of oceanography in this part of the world. As a means of encouraging the growth and interest in oceanography, the Planning Committee of the symposium recommended that meetings be held every 2 years, with the possibility of the next meeting taking place in Argentina. It was the consensus of the Planning Committee that, rather than establish a regional journal of oceanography, workers should be encouraged to publish in the established international journals.

At the request of the Planning Committee, the Brazilian Academy of Sciences will recommend to the National Research Council of Brazil that a National Committee on Oceanography be formed in Brazil to act in a permanent advisory capacity on oceanographic problems to the council and government. A list of names of working scientists for the proposed committee from different institutions, universities, and government has been submitted. The president of the committee will be a representative of the National Research Council.

It was also proposed that the first meeting of the Committee on Oceanography be held at the end of October or November to assess the present state of oceanography in Brazil. At that time reports will be presented covering the programs actually being carried out at the various research institutions. With this background, a number of research topics will then be suggested and will emphasize those areas that might be both feasibly and profitably studied. Two or three members of the committee will periodically visit research institutions to better acquaint the committee with the progress and personnel at these laboratories.

The need for training at both the research and technical levels was clearly recognized as a necessary prerequisite for a solidly based oceanographic effort. Previously, the Latin American branch of UNESCO recommended that an Oceanographic Institute be established to provide such training. Such a program has been activated at the Instituto Oceanografico of Sao Paulo University. The Planning Committee recommended support for that program.

At Sao Paulo the student is given a general background in the aspects of oceanography, that is, physics, chemistry, biology, and geology, during the first two semesters. For the following two semesters he receives specialization in a selected field. The objectives of the program are to provide an understanding of the problems in the area and to provide the background to integrate the various fields of science needed for the solution of fundamental questions.

It was suggested that, for each research fellowship granted, a certain portion of the funds should be allotted for equipment so that the fellowship holder would be able to continue his work upon his return to his home institution. The best students will be sent abroad to major research laboratories, where they will study with outstanding scientists.

The new and well-equipped naval oceanographic vessel *Almirante Saldanha* should provide an excellent vehicle for the training of students at sea. In addition, by being available to the scientific community, it can serve as a fundamental facility for the advancement of oceanography in Brazil.

This symposium was jointly sponsored by the Brazilian Academy of Sciences, with funds from the Ford Foundation, the National Research Council of Brazil, and CAPES, a Brazilian society dedicated to the promotion of advanced studies.

In brief, this observer was impressed with the dedicated, enthusiastic, yet sensible and realistic, attitude of those present at the symposium. This bodes well for the future of oceanography in Brazil.

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Minimum Ecological Systems for Man

It is not surprising, in view of the present status of research accomplishments and the immediate prospects for further studies, that a discussion of the consequences of the absence of normal gravitational force and the deprivation of physical activity should result in more questions than answers. However, participants at the second Conference on Minimum Ecological Systems for Man sponsored by the Interdisciplinary Communications Program of the New York Academy of Sciences capitalized on available data from superficially unrelated areas in formulating their questions. The presentation of results and speculations by scientists representing a wide variety of disciplines was accompanied by thoughtful discussion of methodological and conceptual bases for future research.

A significant area of consensus, in terms of both evaluation of existing data and strategy for prospective research, concerned the relevance of the effects of environmental limitations in situations making no pretense of simulating space flight to the prediction of effects during such flight. Examples of such limitations range from the rather simple case of prolonged immobility (bed-rest, so-called) up to the complex pattern of stresses imposed during deep-sea dives. At the same time that they agreed on the desirability, not to say necessity, of exploiting most fully our capacity to examine responses to stress under this whole range of more mundane ecological conditions, the discussants exhibited a keen appreciation of the limitations on the applicability of these results to the space environment. Variables that are more or less excluded from the design of experiments at or near sea level range from the nearly impossible-to-arrange state of "zero" gravity to the difficult-to-ensure, at a realistic psychic level, separation from the normal physical and social surroundings to the degree represented by transatmospheric flights.

It was also apparent in the remarks of the speakers and discussants at this conference that our knowledge of the effects of restriction of motion, limitation of food and water, and absence of gravity as an interacting system of stresses (and to this principal system could be added other less well-defined influences) is limited to those which occur over relatively short periods of time. It was noted that, even when