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47. You are in a forest in which every inhabitant is either a prince or a pawn. Princes always tell the truth, and pawns always lie. In addition, some of the inhabitants, both princes and pawns, can be werewolves. You meet three inhabitants, A, B, and C, and you know that at least one of them is a werewolf, but none of them is both a prince and a werewolf. They make the following statements:

A: At least one of the three of us is a prince.

B: At least one of the three of us is a pawn.

Which ones are werewolves?

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48. You are in a forest in which every inhabitant is either a prince or a pawn. Princes always tell the truth, and pawns always lie. You meet three inhabitants, A, B, and C, and you know that exactly one of them is a werewolf, and that he is a prince. They make the following statements:

A: At least one of the three of us is a pawn.

B: C is a prince.

Who is the werewolf?

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## Research Personnel

**Jon F. Claerbout** received his education at M.I.T. (B.S. physics, 1960, M.S. geophysics, 1963, Ph.D. geophysics, 1967). He worked for United Electrodynamics (now Teledyne, Inc.) in 1963 and studied in Uppsala, Sweden, in 1964. He joined the geophysics faculty at Stanford University in 1967. From 1967 to 1973, he was a consultant to the Chevron Oil Field Research Company. He is an active member of the Society of Exploration Geophysicists, receiving the Best Presentation Award for a paper, "Extrapolation of Wave Fields," presented at the 1972 international SEG meeting, and receiving the Society's Medal Award in 1973 "in recognition of his outstanding and original pioneering work in seismic wave analysis." During the year 1972-73, he was a visiting research geologist at Princeton University and a visiting lecturer at Sydney University. His textbook **Fundamentals of Geophysical Data Processing** was published in 1976 and translated to Chinese (1979) and Russian (1981). In 1977, he was elected a Fellow of the American Geophysical Union. In 1979, he joined the MIT Corporation Advisory Committee to Earth Sciences. He is professor of geophysics at Stanford University and director of the Stanford Exploration Project. During the 1979-80 year he was on sabbatical leave at the Department of Geodesy and Geophysics, Cambridge University.

**Alfonso González-Serrano** received his B.S. (Licenciado) degree in oceanography from Universidad Autónoma de Baja California, México, in 1977, and a M.S. degree in geophysics from Stanford University in 1979. His B.S. thesis was a structural model for Todos los Santos Bay, using gravity and magnetics data. During the summer of 1980 he worked on Minimum Entropy Seismic Detection for Gulf Research and Development Company. He is currently a Ph.D. candidate in geophysics and is recipient of a graduate scholarship from Consejo Nacional de Ciencia y Tecnología. His research interests are in velocity estimation and probabilistic dynamic systems in geophysics. He is a member of SEG and AAPG.

**Dave Hale** received a B.S. in physics from Texas A & M University in 1977. He then worked for Western Geophysical Company as a field seismologist in Venezuela and later as a research geophysicist in Houston. In the latter role, he implemented frequency domain methods of multichannel filtering and migration of seismic data and studied marine seismic sources with respect to wavelet processing techniques. In July of 1979, he joined the SEP. He received a fellowship from the Amoco Foundation in 1981, and is currently a Ph.D. candidate in geophysics. Dave is a member of SEG.

**William Harlan** received a B.S. in geophysics from Texas A & M University in 1981, under a scholarship from the SEG. During the summer of 1980, he worked as a seismic interpreter for Conoco. After graduation he became a researcher for Conoco, during which time he designed and completed an interactive event migration package and a multiple layer map modeling and migration package. He joined the SEP in 1981 as a Ph.D. candidate.

**Allan (Bert) Jacobs** received a B.S. in physics from M.I.T. in 1977. He is now working toward a Ph.D. in geophysics at Stanford. During the summer of 1979 he worked on migration programs for Atlantic Richfield. Bert's research activities center around the problem of extracting physical parameters from seismic records.

**Richard Ottolini** has been with the SEP since October 1977. He received a B.S. degree in earth and planetary sciences from M.I.T. in 1976 and an M.S. in geophysics from Stanford in 1978. He did reflection seismology research for GSI during the summer of 1977. He is interested in migration, the automated interpretation of geophysical data, deep continental seismic reflections and Chinese geophysics. During 1979 Rick spent six months studying at the Peking Language Institute, Peking, China. He is a Ph.D. candidate at Stanford, a member of SEG and AGU.

**Joshua (Shuki) Ronen** received a B.Sc. in physics and in geology from the Hebrew University at Jerusalem in 1981. During his B.Sc. studies he worked as a research assistant in the Physics Department and spent a summer at the Geology Department in the Hebrew University. He is now working toward a Ph.D. in geophysics at Stanford.

**Daniel Rothman** received an A.B. in applied mathematics from Brown University in 1979. He then worked for Western Geophysical Company in their research and development group, first in Houston and later in London, developing and testing a variety of data processing algorithms. In March, 1982 he joined the SEP and is currently working toward his Ph.D. in geophysics. He is a member of SEG.

**Chuck Sword** received a B.S. in physics from Stanford University in 1980. That summer he worked at Marathon Oil Company's Denver Research Center, where he helped process experimental marine data and implement a migration scheme. In September of 1980 he joined the SEP, and is currently working toward his Ph.D. in geophysics.

**Jeff Thorson** received a B.S. degree in geology from the University of Washington in 1973 and an M.S. degree in geophysics from the University of Houston in 1975. He has worked for Getty Oil Company as an interpreter and in the field as a company representative on various seismic surveys. He is a member of SEG and EAEG, and is the recipient of an N.S.F. graduate fellowship.

**John Toldi** received a B.S. in physics and an M.S. in geophysics from Stanford University in 1978. He then worked for Chevron Geosciences, Houston, in seismic data processing and later in a programming and evaluation group. In January 1982 he joined the SEP and is currently working toward a Ph.D. in geophysics.

**Ronald Ullmann** received his B.S. in geophysics from Texas A & M University in 1981. During the summer of 1980, he worked for the Oklahoma Division of Getty Oil Company as an assistant geophysicist. The summer of 1981 he worked at Chevron Oil Field Research Company in La Habra, California, where he wrote computer programs to compute seismic wave velocities in saturated, porous rocks. He joined the SEP in September of 1981 and is working on his Ph.D. in geophysics. He is the recipient of an N.S.F. graduate fellowship.

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